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**«ACADEMIC AND SCIENTIFIC CHALLENGES OF DIVERSE
FIELDS OF KNOWLEDGE IN THE 21ST CENTURY»
«АКАДЕМІЧНІ ТА НАУКОВІ ВИКЛИКИ РІЗНОМАНІТНИХ
ГАЛУЗЕЙ ЗНАНЬ У 21-МУ СТОЛІТТІ»**

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CONTENTS

PART I. HUMANITIES

THE IMPACT OF THE ADVERTISING CAMPAIGN AND STRATEGY ON THE POLITICAL SITUATION (ON THE EXAMPLE OF DONALD TRUMP AND HILLARY CLINTON) Almakaieva E. Language supervisor: Naidina Y. S.....	9
LEXICAL COHESIVE MARKERS OF THE GERMANIC BELLES-LETTRES STYLE TEXT STRUCTURES FORMATION Andrushchenko V. O., Dushenko A. V. Language supervisor: Andrushchenko V. O.....	11
SURZHUK – A SERIOUS DISEASE OF THE UKRAINIAN LANGUAGE Bondarenko V.A. Language supervisor: Savchenko N.M.....	13
MODERN CHALLENGES OF INTERNATIONAL LAW EDUCATION Bykanova D.A. Language supervisor: Avdieienko I.M.....	15
GLOBAL AND NATIONAL INFORMATION SECURITY: AN EMERGENCY CASE Chornovol-Tkachenko K. Language supervisor: Peshkova O.G.....	18
THE INFLUENCE OF MODERN YOUTH’S VALUE SYSTEM ON DEMOGRAPHIC STRUCTURE IN UKRAINE Filatova E.V. Language supervisor: Kovinko K.V.....	20
TOPICAL ISSUES OF THE INFORMAL DISPUTE RESOLUTION WITHIN THE UNITED NATIONS INTERNAL JUSTICE SYSTEM Fomin P. V. Language supervisor: Polotska O.O.....	23
REGULATION OF PROHIBITED METHODS AND MEANS OF WARFARE IN THE CONTEXT OF INTERNATIONAL HUMANITARIAN LAW Golubchenko A. Language supervisor: Kurnitska N. M.....	26
EVALUATION OF ENVIRONMENTAL LITERACY, ETHICS AND ATTITUDES OF HIGER EDUCATION STUDENTS, IRANIAN PERSPECTIVES Hamidian Ali, PhD Student, University of Tehran (Iran).....	27
DIE BESONDERHEITEN DER ERKENNUNG UND HEILUNG VON HAUTKREBS Ibrahimova S.B. (Nationale Medizinische Universität Charkiw) Betreuerin: O.G. Gusak, Kandidatin der pädagogischen Wissenschaften, Dozentin.....	31
KYRYLO ROZUMOVSKY – THE LAST HETMAN OF COSSACK UKRAINE Khalep N.O. Language supervisor: Stupnytska N.M.....	33
ACTUAL PROBLEMS AND POSSIBLE WAYS OF THEIR SOLUTION IN THE SPHERE OF POPULARIZATION OF MODERN SCIENCE Kolomoicev O.O., Trunova D.S. Language supervisor: Savchenko N.M. Scientific supervisor: Kotlyar V.M.....	35
WAR AS A DIRECT CONSEQUENCE OF ETHNIC CONFLICTS ON THE EXAMPLE OF THE BOSNIA CRISIS	

Kolyada Y. N. Language Supervisor: Kucherova O.V.....	37
SPIN-DOCTORING AS AN ELEMENT OF MASS COMMUNICATION	
Kononova V.V. Language supervisor: Stupnytska N.M.....	39
DIALOGUE IN THE LANGUAGE OF CULTURE: GEORGIA'S CULTURAL POLICIES TOWARDS ABKHAZIA	
Kvaratskhelia M., Ivane Javakhishvili Tbilisi State University.....	41
VALUES IN THE PROCESS OF POLITICAL MODERNIZATION OF UKRAINE	
Kyselova V. A. Language supervisor Tkalia I. A.....	47
THE TENDENCY OF SELF-MARKETING IN MODERN EMPLOYMENT PROCESS	
Kysil S.R. Language supervisor : Plotnikova O.V.....	51
SOCIO-PSYCHOLOGICAL ELEMENTS OF AN EFFECTIVE PUBLIC SPEECH	
Lianna Y. I. Language supervisor: Chernysh T.V. Scientific advisor: Lutsenko E.L.....	53
THE INFLUENCE OF JOURNALISM ON PUBLIC OPINION	
Lozoviagina E. A. Language supervisor: Rapava R. B.....	56
LACUNARITY AT WORK: LINGUISTIC PHENOMENON	
Naumenko I., Derevianchenko M. Language supervisor: Anokhina Tetiana.....	59
THE SCOPE OF ARBITRABILITY THROUGH THE RULES OF UKRAINE'S NATIONAL LEGISLATION	
Navrotska J.O. Language supervisor: Avdieienko I.M.....	61
AESTHETIC EDUCATION. DEVELOPMENT OF ARTISTIC SKILLS	
Pasko M.O. Language supervisor: Tkachenko S.V.....	63
GENRE PECULIARITIES OF THE FILM REVIEW TEXTS IN THE HISTORICAL PERSPECTIVE	
Pirog A.V. Language supervisor: Kryvenko V.P.....	65
INDIVIDUAL DIFFERENCES OF MEMORY	
Plisko A.G. Language supervisor: Chernysh T.V.....	67
THE PROBLEM OF TERRORISM IN MODERN SOCIETY	
Popova O. Language supervisor: Naidina Y. S.....	69
TOPICAL PROBLEMS OF FORMATION OF CONSTITUTIONAL BASES FOR INTERACTION BETWEEN A HUMAN AND THE STATE IN THE CONDITIONS OF INFORMATION SOCIETY IN UKRAINE	
Roskoshnyi I.V. Language supervisor: Polotska O.O.....	72
TRUST IN PRINTED ADVERTISING IN MODERN UKRAINIAN SOCIETY	
Savchenko A.O. Language supervisor: Kovinko K.V.....	75
VIRTUAL REALITY: HISTORY AND INFLUENCE ON MODERN SOCIETY	
Shapoval O.V. Popova M. V. Language supervisor: Sharun Yu. F.....	77
THE CONCEPT OF "CONTAMINATION"	
Starchenko N.	

Language supervisor: Skryl O. I	80
.....	
INNOVATIVE POLICY OF THE STATE AS A MEANS OF REDUCING INNOVATIVE RISKS	
Sviezhentsev O.O.	
Language supervisor: Kotova A. V.....	82
TYPES OF PRESS IN GREAT BRITAIN	
Tetirko I.V.	
Language supervisor: Strelchenko D. V.....	86
GAPS IN LAW	
Turchenko M.	
Language supervisor: Kotova A. V.....	87
MEDIATION AS AN INTERDISCIPLINARY SCIENCE AND SOCIALLY IMPORTANT INSTITUTION	
Varnavskaya K. A.	
Language supervisor: Kotova A. V.....	89
THE IMAG OF DIONYSUS IN ANCIENT GREEK RELIGION	
Varshanidze N. V.	
Language supervisor: Serdiuk V.	91
HIGHER EDUCATION IN UKRAINE: PROBLEMS AND SOLUTIONS	
Vynychenko K.D.,	
Language supervisor: Tkachenko S.V.....	93
CONTEXTUAL PARADIGM IN TEXTS OF SONGS OF UKRAINIAN PERFORMERS	
Yerokhova K.	
Language supervisors: Serdiuk V.M., Bieliayeva O.Yu.....	95
ANALYSIS OF THE SEMANTICS AND TRANSLATION MEANS OF ENGLISH FOR-TO-INFINITIVE CONSTRUCTION	
Yevtukhova S.M.	
Language supervisor: Aniutina H.A.....	97
SPECIFICITIES OF DEFINING THE STATE IN THE FRAMEWORK OF MODERN REALITIES	
Zaporozhchenko R.O. (Kharkiv)	
Language Supervisor: Peshkova O.G.....	100
LEXICAL INFLUENCE OF AMERICAN ENGLISH ON BRITISH ENGLISH	
Zemlyanov D.A.	
Language supervisor: R. B. Rapava.....	102
HUMAN RIGHTS MECHANISMS	
Zhyrnykh V. P.	
Language supervisor: Sergeyeva O. A.....	105
<u>PART II. NATURAL SCIENCES</u>	
URSACHEN DER ARSACHEN DER ALZHEIMER-KRANKHEIT	
Andrieieva V. S.	
Betreuerin: Gusak O.G.....	108
ANTARCTIC LIMPET NACELLA CONCINNA IN THE COASTAL WATERS OF THE ARGENTINE ISLANDS ARCHIPELAGO	
Berezkina A.E., Moiseyenko E.V, Voronina K.V., Utevsky A.Yu., National Antarctic Scientific Center of Ukraine (Ministry of Education and Science of Ukraine) (Kiev), V.N. Karazin Kharkiv National University (Kharkiv).....	111
MODERN METHODS OF MALIGNANT BRAIN TUMOR THREATMENT	
Bezdolnaya O.A.	
Language supervisor: Kovalyova A.V.....	113
ARTIFICIAL HYDROGEOLOGICAL WINDOWS IN EASTERN UKRAINE	
Dmytrenko K.O	
Scientific supervisor F. V. Chomko	
English language supervisor Cherkashyna N.I.	115

THE ECOSYSTEM OF THE GREAT BARRIER REEF	
Doroshenko A.M.	
Language supervisor: Bondar S.N.....	117
PROSPECTS FOR GOLD MINING IN UKRAINE	
Dzhagupov P.G.	
Language supervisor: Bondar S.N.....	118
THE IMPACT OF MINING ON THE ENVIRONMENT	
Kalashnyk I.V.	
Language supervisor: Bondar S.N.....	120
DEVELOPMENT OF NON-CONVENTIONAL RENEWABLE ENERGY IN CHILE	
Koniaieva Y. G.	
Language supervisor: Polotska O. O.....	121
COMPARISON OF REPRODUCTIVE CHARACTERISTICS OF WOMEN FROM CHERNIVTSI AND SIMFEROPOL	
Kozak N.A., Antsupova V. V., Mustafaeva L.A.	
Language supervisor: Savchenko N.M.....	124
THE ANTIBIOTICS CRISIS	
Krishtalevich A. A.	
Language supervisor: Belyayeva E. F.....	129
ENVIRONMENTAL ASSESSMENT OF WATER QUALITY IN POND №1 IN LYUBOTYN, KHARKIV REGION	
Kuz`minova A. Y.	
Language supervisor: Cherkashyna N. I.,	132
.....	
THE DETERMINATION PROBLEM OF EXECHESOPS FOLIATUS FRIESER, 1995 (COLEOPTERA, ANTHRIDAE) IN THE FOREST-STEPPE ZONE OF THE LEFT-BANK UKRAINE	
Makarova M.O.	
Language supervisor: Pavlova L.V.	
Scientific supervisor: Terekhova V.V.....	134
PARKINSON'S DISEASE TREATMENT METHODS	
Mykyshenko D.O.	
Language supervisor: Kovalyova A.V.....	136
DIFFERENTIATED APPROACH TO THE TREATMENT OF ANDROGENETIC ALOPECIA TAKING INTO ACCOUNT INFLUENCE OF AN INFLAMMATORY COMPONENT AND IMMUNE DISORDERS	
Salyenkova O.A.	
Language supervisor: Polotska O.O.....	139
BIOLOGICAL AND CLINICAL ASPECTS OF TYPE 2 DIABETES MELLITUS TREATMENT	
Shepel V.V	
Language supervisor: Kovalyova A.V.....	144
INTAKE OF INDIVIDUAL SATURATED FATTY ACIDS AND RISK OF CORONARY HEART DISEASE	
Shikhaleyev S. Yu.	
Language supervisor: Belyayeva E. F.....	146
MITOCHONDRIAL DYSFUNCTION ASSOCIATED WITH CHRONIC FATIGUE SYNDROME	
Shneiderman S. I.	
Language supervisor: Kovalyova A. V.....	148
MODELING RESEARCH OF FEMUR BONE RECONSTRUCTION WITH BONE GRAFT SUBSTITUTES AT DIFFERENT LOADS	
Skliar I. K.	
Scientific director: Lysytsya V.T.	
Language supervisor: Chernyshova N.V.....	151
INFLUENCE OF HEMICLONAL POPULATION SYSTEM'S TYPE ON SPERMATOZOIDS' SIZE IN PELOPHYLAX ESCULENTUS COMPLEX	

Stepanenko K. R. Science supervisor: Shabanov D. A. Language supervisor: Lenskaya O. O.....	153
ESTIMATION OF RISK OF DEVELOPMENT OF TYPE 2 DIABETES MELLITUS IN STUDENTS	
Teslenko A.O. Language supervisor: Kurnitska N. M.....	156
ANALYSIS OF THE INCIDENCE OF EPSTEIN-BARR VIRUS (EBV) AND HUMAN HERPES VIRUS TYPE 6 (HHV-6) IN DISTRICTS OF KHARKIV IN 2012-2016	
Veklych K. A. Language supervisor: Polotska O. O.....	159
VASCULAR COGNITIVE IMPAIRMENT AND VASCULAR DEMENTIA. SYSTEMATICS, PATHOGENESIS, CLINICAL FEATURES.	
Zlobin O.O. Language supervisor: Polotska O.O.....	163

PART III. TECHNICAL SCIENCES

SATELLITE COMMUNICATION

Balakhnina I.O. Language supervisor: Lieshniova N.O.	167
NEUTRON STARS. WHAT ARE THEY?	
Bilokon E. O. Language supervisor: Zubkova L.M.....	171
THE MYSTERY OF THE MISSING NEUTRINOS	
Bilokon V. O. Language supervisor: Zubkova L.M.....	172
COMPUTATIONAL MODELLING OF SILVER NANOMATERIALS	
Blazhynska M.M. Science supervisor: Dr. Sci. Kyrychenko A.V. Language supervisor: Matviichuk O.M.....	174
ARTIFICIAL NEURAL NETWORKS IN THE MODERN WORLD	
Gavrilyk E. A. Language supervisor: Chervinko Ye. O.....	178
THE IMPOSSIBILITY OF DETECTING THE DIVERGENCE OF THE HARMONIC SERIES IN A COMPUTER EXPERIMENT	
Herasymov V.A. Language supervisor: Chernyshova N.V.....	181
ENCODING CLASSIFICATION MODEL TO IDENTIFICATION OF EXTRAGALACTIC SOURCES IN THE ALL-SKY CATALOGUES: FEATURE ENGINEERING STAGE	
Khramtsov V. Scientific supervisor: V. Akhmetov Language supervisor: Lenskaya O. O.....	183
PERSONAL DATA PROTECTION	
Kondria Y.O. Language supervisor: Chervinko Ye.O.....	187
INFLUENCE OF MECHANICAL STRESS ON THE STRUCTURAL PARAMETERS OF EXTRACELLULAR MATRIX BIOPOLYMERS	
Kostina T. V., Ponomarenko A. N. Language supervisor: Belyayeva E. F.....	191
HELA CELLS	
Kurmaz P.V. Language supervisor: Lieshnova N.O.....	194
ARTIFICIAL INTELLIGENCE IN MODERN TECHNOLOGY	
Kvitka O.M.	

Language supervisor: Chernyshova N.V.....	197
CLASSIFICATION OF EPOXY RESINS AND THEIR PRACTICAL USE FOR RESTORATION	
Kyrychenko Yulia A.	
Language supervisor: Galchenko V. N.	
Science supervisor: Danchenko Yu.....	199
METHODS OF COMMUNICATION AND THEIR IDENTIFICATION IN ARCHITECTURE PRACTICE	
Molotkova V.G.	
Scientific supervisor: Leonidova O.M.	
Language supervisor: Lysenkova T.M.	202
OBSERVATION OF WARM/HOT GAS FILAMENTS BETWEEN PAIRS OF LUMINOUS RED GALAXIES	
Moskalenko O.O.	
Language supervisor: Zubkova L.M.....	204
VARIOUS TYPES OF MAGNETIC LEVITATION AND THEIR RECHNOLOGICAL APPLICATIONS	
Myerna A. D.	
Language supervisor: Zubkova L.M.....	207
SUPERFLUIDITY AND ITS PROPERTIES	
Nikolaenko A. A.	
Language supervisor: Orach Yu. V.....	210
MATHEMATICS AND MUSIC (CONTINUED FRACTIONS IN IN THEORY OF MUSIC)	
Prodashchuk N. V.	
Language supervisor: Chernyshova N.V.....	212
HOLOGRAMS	
Rozhyna A.A	
Language supervisor: Lieshnova N.A.	216
ARTIFICIAL INTELLIGENCE EMPLOYING QUANTUM COMPUTERS	
Ryabykina A. S.	
Language supervisor: Lenskaya O. O.....	217
REPLACING CONCRETE JUNGLE	
Shmatova A. Y.	
Scientific supervisor: Leonidova O.M.	
Language supervisor: Lysenkova T.M.	220
FROM SKYSCRAPERS TO VERTICAL CITIES	
Strumskas O.V.	
Scientific supervisor: Leonidova O.M.	
Language supervisor: Lysenkova T.M.	222
THE MOST EFFECTIVE INTERNET SERVICES FOR WEBSITE CREATION	
Tolstiak A.K.	
Language supervisor: Chernyshova N.V.....	224
DISGUIISING METHODS OF COMPUTER VIRUSES	
Tsarova A.A., Levina M.K.	
Language supervisor: Sharun Yu.F.....	228
SOLAR BATTERIES	
Vereshchaka Y.A.	
Language supervisor: Zubkova L.M.....	230
INSTABILITY OF THE FERROFLUID DROPLET IN THE PRESENCE OF INHOMOGENEUS STRONG MAGNETIC FIELD	
Zaitseva O.	
Language supervisor: Orach Yu. V.....	235

PART I. HUMANITIES

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THE IMPACT OF THE ADVERTISING CAMPAIGN AND STRATEGY ON THE POLITICAL SITUATION (ON THE EXAMPLE OF DONALD TRUMP AND HILLARY CLINTON)

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Abstract: Social consciousness is an important part of any culture and this article investigates the extent of manipulating public opinion by mass media. In order to understand the mechanism of media's manipulation, we consider its methods and functions. The arguments revealed in the course of our research allow us to conclude that media is an essential tool for the formation of public opinion in the modern world.

Keywords: influence, manipulation, media, public consciousness.

Introduction: Today the media plays a big role in a person's life and has a sufficient share of influence on the formation of a personal opinion. Daily millions of newspapers, magazines and TV programs give the world information not in its pure form, but in the light of somebody's profit and the recipient does not have the opportunity to give his/her own assessment of the information. Society has to some extent become dependent on the media, despite the fact that it is not as vital as primary needs. The reason for this is that the present requires a person to be always in the center of events.

At this stage of human development we are hardly ever able to make independent movements and decisions. All of us in one way or another are influenced by the press, radio, television, or Internet. This dependence explains the topicality of the research topic. The main theoretical challenge is the understanding of the relationship between the media and the public through the study of mass communication with its power and influence, professional culture of media professionals, audience of mass communication, the role of the media in political and economic life of society, shaping public opinion and universal reproduction of culture. We have to admit that the media has become one of the powerful structures in modern society, and it is now hardly debatable. In order to be safe from such direct or indirect affection people have to realize the power of the media and understand the processes through which they become puppets.

The **object-matter** of the study is the influence of the media on public opinion in day-to-day life, and **the subject-matter** is methods of the media's influence on the person and his/her priorities.

The **objective** of this article is to examine the place and role of the media in society and its influence on public opinion. The article suggests the following **tasks**:

- 1) to assess the extent of the media influence;
- 2) to investigate the functions of the media;
- 3) to examine the methods of the media influence on public consciousness.

We applied two **methods of research** in the course of this article: description and observation.

Discussion and results: The influence of the media on mass audience has been a widely-discussed problem in different countries for about a century. At the beginning of XX century, when mass communication was finally formed, manipulation of society became possible. With the advent of television and radio our world has become more informative. However, the Internet made our society highly dependent on being daily or even hourly informed about all news and events. Nowadays information is not a privilege of minorities, but an essential necessity for a wide audience. Communication has changed and nowadays it has new means, and the target respectively. Mass communication, or in other words, the media became a translator of the entire information environment for the society [1].

The mass media is one of the means which allows to maintain the functioning of the society as a whole. Among many classifications of the functional characteristics of mass communication, two basic levels are distinguished: the level of society and the level of an individual. The functions of the mass media in society are classified in the following way:

1. information,
2. education,
3. advocacy,
4. socialization,
5. criticism and control,
6. mobilization,
7. innovation,

8. operation,
9. formation of public opinion [2].

The media has developed the most effective training techniques and programs of influence on individuals and groups. It takes into account the specifics of the tasks, goals, and audience which are the target [3]. Such methods and programs include:

- information technique. It is actively used in advertising campaigns and informational announcements. It is aimed at informing the audience about a particular event, person, or phenomenon;
- emotional technique. It brings the emotional component to the forefront when it forms the person's attitudes to a certain phenomenon. It is usually used together with other methods thus enhancing their influence on the audience;
- patriotic technique. Most people are not indifferent to their land, home, and homeland. Using this fact, the media stimulates people's attention and encourages certain actions. This method is actively used for promotional purposes, during political campaigns etc.;
- “awakening the fear” technique. It is based on people's concern for their health, well-being, and welfare and its aim is human emotions. The method is widely used for promotional purposes, during various political actions and campaigns;
- humorous technique. Simple and comprehensible humor captures the audience easily and quickly. Information presented with humor is remembered more easily. The method is actively used during entertainment, political, advertising campaigns. One of the important requirements when using this technique is to ensure that the humor suits culture, age and mentality of the target audience [4].

The abovementioned techniques are in most cases used with positive and friendly purpose. However, we would like to show some examples of the media's negative influence. In this respect it is appropriate to say about subconscious pressure on those people who are easily subjected to such influence because of their complexes, health problems or psychological disorders. Nowadays it is not a secret that the media widely advertises unhealthy food, at the same time urging people to lose weight and maintain a slim figure. Furthermore, a big quantity of entertainment TV programs, series or soaps absorbs a person's leisure and thus leaves no time for physical exercises. As we know, girls of all ages are concerned with their own weight. Many of them keep diets being quite young. One of the reasons for it is that the media often promotes unrealistic appearance of a perfect person. Often a well-built man, whose image is shown on screen or in print, is just a picture composed of different people's parts. This installation is created using computer graphics.

One problem associated with human's health is the promotion of thinness on TV and in the Internet. We can thereupon mention the Russian series “Kuhnya” (eng. Kitchen) (2012). One of the main characters, Dmitriy Nagiiev, the owner of the restaurant, is always eating, but nevertheless stays well built. A lot of people may follow his manner of eating and not doing any workout. As a result, they will gain weight and their health will be undermined. American series “Scream Queens” (2015) can also illustrate this tendency. Its main heroine Chanel Oberlin is worried about her weight too much and she is crazy about diets. Moreover, she constantly pesters other girls who are not so slim. Young and naive viewers believe that if they become the same with this character, their life will be as great as Chanel's. However, being so skinny and healthy at the same time is impossible but many young ladies still harm themselves and follow this role-model. This phenomenon is very common not only with films for adults or teenagers, but with cartoons as well. Nowadays one of the most popular cartoons among children is “Monster High”. Its main characters are very skinny with unreal long legs and thin waists. Their influence is very powerful because little girls are very sensitive at this age as this is the time when they first think about their appearance.

Another example of the media's influence on people is medicine advertising. Nowadays such advertisements are so common that people are mindlessly buying what they see or hear about on TV or in the Internet. Such an irresponsible behavior of people leads to tragic consequences because the right drug for safe treatment may be only prescribed by a doctor. Usually advertised medicine has quite a high price and thus most consumers have no idea about a cheaper analogue.

Conclusions: This article considers the basic concepts and types of the media, their role and place in today's society. The media is the main channel of formation and expression of public opinion in the modern world. Print media, radio, TV and the Internet are powerful tools of socialization. Thus, they may implement both the creative and destructive tasks. As the media can influence different target audiences using a great variety of methods and programs, its effect has no limits. It should be noted that through manipulation of values and beliefs, the media can change public attitudes and opinions. We have mentioned that the mass media's influence can be both positive and negative but the latter is coming to the foreground. The best way to be protected from the media's harmful influence is to be aware of its methods of manipulation. Sometimes

people allow themselves to be manipulated by dropping responsibility for their actions on the so-called manipulators. However, we have to admit that no one is responsible for our opinions and attitude but we ourselves. We have to read, learn and self-educate as much as possible.

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LEXICAL COHESIVE MARKERS OF THE GERMANIC BELLES-LETTRES STYLE TEXT STRUCTURES FORMATION

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Abstract: The study focuses on the peculiarities of the coherence category linear realization as a prominent textual feature of the Germanic belles-lettres style thematic-synchronic text structures formal-semantic and functional-informative spaces organization within the supra-phrasal unity (SPU) by means of linear intra-textual interlinear syntactic link (LITISL) cohesive devices (CDs) manifestation.

Key words: coherence category, belles-lettres style text unity, SPU, LITISL, CDs.

Introduction. The specificity of the internal belles-letters style text system research, its formal materialization and contentive completion (V. Dressler, M. Halliday, I. Halperin, R. Hasan, O. Moskalskaya, E. Selivanova, H. Solhanyk, A. Zahnitko etc.) determined by the list of the coherence category realization linguistic means (cohesion / coherence) allow to trace both structural and semantic peculiarities of the cohesive belles-letters style text whole organization within the supra-phrasal unity. The made attempts of text structure analysis concerning its grammatical devices representation on the lexical level are lack of their interpretation as strong formal cohesive markers of the Germanic text unity, English, in particular. Thus, the linguists R. Hasan and M. Halliday point out that cohesion is expressed partially by grammatical means (ellipsis, conjunction), partially by lexical means (reference, substitution, lexical cohesion) [Halliday 1976: 14] which range provides a certain text sense background.

To O. Moskalskaya's mind, the most widespread formal-contentive devices of belles-lettres style text whole cohesive organization are regarded to be a regular repetition of homogeneous thematic key words; synonymic and lexical repetitions as theme bearers; pronominalization phenomenon; definite words reference within a SPU [Moskalskaya 2006: 17–20].

Being focused on I. Halperin's formulation of the notion "cohesion" as peculiar types of relations [Halperin 2004: 74–79], we, in our turn, suppose that text formation is determined by some intra-textual interlinear syntactic links which manifestation may be traced on all text levels owing to the coherence category linguistic-semantic realization.

At that, H. Solhanyk among texts in regard with syntactic interlinear ties peculiarities distinguishes three types: 1) texts with a linear tie; 2) texts with a parallel tie; 3) texts with a conjoint tie [Solhanyk 1997: 85]. A. Zahnitko differentiates a left-handed (a linear link – anaphora), right-handed link (a parallel link – cataphora), integrative-cumulative and coalition-implicit intra-textual interlinear links [Zahnitko 2006: 133].

In our research we have taken these scholars' views (H. Solhanyk, A. Zahnitko) into consideration concerning intra-textual interlinear syntactic links classification into linear, parallel and integrative with an appropriate spectrum of their means representation as prominent factors of belles-lettres style SPUs cohesive structuring. Though, current study is mostly concentrated on lexical-linear coherence formalization represented by LITISL CDs realization within the Germanic thematic-synchronic belles-lettres style text wholes.

Consequently, **the subject-matter** of the study appear to be lexical CDs of the coherence category realization by means of LITISL manifestation within the Germanic thematic-synchronic belles-lettres style text wholes, since the object-matter – these Germanic thematic-synchronic belles-lettres style text wholes proper structured due to SPUs combination within their boundaries. **The objective of the research** is determined by its tasks: to qualify the linguistic devices manifested on the lexical level due to LITISL means realization as significant cohesive formal-semantic markers within the English language thematic-synchronic belles-lettres style texts structural and sense organization.

Materials and methods. By means of structural-functional analysis as well as continuous sampling and descriptive methods such CDs of LITISL as a linear succession and sense-semantic unity of combined components within SPUs were traced in the Germanic thematic-synchronic belles-lettres text structures by J. London “Martin Eden” and W. Maugham “The Painted Veil”:

1) demonstrative-substitutive words (in a postpositive sentence within a SPU to denote the latter antecedent of a prepositive sentence) such as he (she, it), this (that) etc.: He glanced around the table. Opposite him was Arthur, and Arthur’s brother, Norman. They were her brothers, he reminded himself, and his heart warmed toward them [London 2004: 20] (the antecedents represented by proper nouns are correspondingly expressed by the pronoun they).

The last antecedents of prepositive sentences may be expressed by common nouns as well.

2) Lexical repetition (derivational repetition): They sat in silence for an hour. He sat quite still, in that same easy attitude, and stared with those wide, immobile eyes of his at the picture. His stillness was strangely menacing. It gave Kitty the feeling of a wild beast prepared to spring [Maugham 2006: 56] (still – stillness).

3) Lexical repetition: Martin had faith in himself, but he was alone in this faith. Not even Ruth had faith. She had wanted him to devote himself to study, and, though she had not openly disapproved of his writing, she had never approved [London 2004: 113] (the lexeme faith repetition).

4) Synonymic (antonymic) repetition: Was it possible that he really designed her death? That would be the act of a madman. It was odd, the little shiver that ran through her as the thought occurred to her that perhaps Walter was not quite sane [Maugham 2006: 101] (madman – sane).

5) Periphrastic (hyponymic) repetition: Tuesday was a day of similar unremitting toil. The speed with which Joe worked won Martin’s admiration. Joe was a dozen of demons for work [Maugham 2006: 137] (the direct nomination the speed with which Joe worked rephrasing by a phraseological one: a dozen of demons for work).

6) Linear thematic (topical) repetition: One day, because the days were so short, he decided to give up algebra and geometry. Trigonometry he had not even attempted. Then he cut chemistry from his study-list, retaining only physics [Maugham 2006: 107] (the thematic field of the analyzed SPU is formed around the concept study-list that is characterized by the key components to denote school subjects: algebra, geometry, chemistry etc.).

Discussion and Results. So, we intended to study the cohesion category grammatical manifestation by LITISL representation within the English language belles-lettres style supra-phrasal fragments. As a result, it was traced that the analyzed CDs of LITISL expression turn out to be typical for both belles-lettres style text structures formal-semantic organization. All this witnesses LITISL as a prominent and essential for both belles-lettres style texts structural-contensive organization.

Conclusions. All this enables to qualify the category of coherence as a certain universal linguistic regularity of the general English language belles-lettres style continuum supra-phrasal fragmentary model horizontal-formal structuring. Hence, the obtained procedure of the Germanic internal belles-lettres style texts formal-sense organization analysis determined by the coherence category linguistic markers realization together with typical peculiarities trace of their grammatical-semantic manifestation in English is reasonable to be implied to belles-lettres style texts research in other languages, literature trends, synchronic dimensions. Such horizontal-vertical analysis of belles-lettres style text unities is aimed at a general idea comprehension of the latter by a reader due to their prominent deep subtextual conceptual-thematic and implicit-paradigmatic relations stratification by an addressee.

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SURZHUK AS A SERIOUS DISEASE OF THE UKRAINIAN LANGUAGE

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Summary: Scientific work is an actual problem for the entire population. The problem concerns the catastrophic violations of the language norms of the Ukrainian language. Mass infection of the Ukrainian language is unacceptable for a modern nation. The paper considers analyzes the most relevant causes of this situation that can result in triggering the decline of the Ukrainian language.

Key words: native language, contamination of vocabulary, language learning, mixing languages, spread of dirty and misleading language.

Introduction. The native language of millions Ukrainians is the language that ranked first in the world ranking for its fine-heartedness. It is a great honor for our state. There were a lot of competitors. Even the French and Italian languages that were striking with their softness and tenderness could not resist the beauty of the Ukrainian language. Many writers compare Ukrainian language with a beautiful girl and this is not just that. Ukrainian language can be called feminine by many factors. Of course, this name can be interpreted only at the metaphorical level. Grammar and vocabulary of our language tend to over-simplify. This can be proved by comparing certain Ukrainian words with Russian. For the Russian language it is normal, when the word stands next to 3 or 4 consonant sounds. Ukrainians do not like this. Our people are all simplified, easy. Therefore, at most two consonant sounds are encountered in Ukrainian words. Linguists and all nations have created a refined, simple and melodious language for their state. Ukraine can be proud of even the fact that our language is being studied in many other countries due to its uniqueness. It is thanks to the Ukrainian language that many famous writers and poets have found their vocation, which brings refined lines to the world. Taras Shevchenko, Lesya Ukrainka, Ivan Franko, Lina Kostenko, Vasyl Stus, Pavlo Tychyna and some hundreds of well-known celebrities all over the world who succeeded precisely thanks to the love of language. They created lines that impressed with their warmth and tenderness, even from people from other continents. Then there is a very painful question why citizens of other countries are fond of our literature, folk singers and the language as a whole, and Ukrainians themselves do not appreciate what they have? The meaningless shredding of Ukrainian words, the excessive use of strangers, a mixture of Russian and Polish ... Why all this? Why not just be proud of the treasure that we got. Modern Ukrainian language has never experienced such a decline as in the last two decades. In the minds of modern youth, the stereotype that talks in Ukrainian is wandering around is not fashionable. That is why it is necessary to accumulate a speech with a bunch of stranger words and also to add some slang ... Is it really cool? But it is not too much regret not only that youth is destroying state pride, but also people of mature age. This is due to a wide variety of changes, ranging from low development to major historical changes.

Discussion. Consequently, given the causes of the clogging of the Ukrainian language by Russian words, it is possible to distinguish three groups of the population that communicates with a surzhuk. The first reason, in my opinion, is the most significant – this is a historical cause. This group of non-literate language speakers is the largest. Basically, it is a mature population. People who have spent most of their age in the Soviet Union. This is due to the fact that the Ukrainian language in those times was not a priority in contrast to Russian. As a result, the Ukrainian-speaking population began to speak Russian somewhat. It turned out that a person did not speak a single language perfectly, therefore, he partially used two languages. In general, it is not surprising that people could not improve the Ukrainian language in schools or universities in the Soviet Union. After all, for almost four centuries Polish, Russian and Ukrainian languages competed with each other. Almost always the Ukrainian language took its positions. Beginning from the sixteenth century, when the first order was passed on the extermination of all copies of the "Teacher Gospel" by Cyril Stavrovetsky, the Ukrainian language significantly took the position of Polish. Then every ten or fifteen years later, new decrees were issued that banned the use of the Ukrainian language in church books. And later, the Valuev circular in general banned the printing of anything "Little Russian". Despite all the prohibitions, our language seemed to be an unbridled soldier who got up from his knees and revived through such people as Ivan Kotlyarevsky. So, the language of the initiator of the Ukrainian language is closer to the

mixed with Russian, but he wrote folk, not literary language. "Aeneid" was written mainly for the Ukrainian people. Subsequently, many writers continued to spell against the risk of reviving the language, despite the mistreatment of her. And the bullying was serious. Our language was called "Little Russian", considered a Russian dialect or a mixture of Polish and Russian. Accordingly, the patriots of the Ukrainian state were called Little Russians. But despite this dismissive attitude there were such people as VolodymyrSosyura, who called:

Love Ukraine in your dreams and in fact,
Your Ukraine - cherry red,
her eternal, and new living beauty
her nightingale like language.

It was thanks to such calls that people did not forget their native language. Yet the lack of proper knowledge of the Ukrainian language is evident. People replace the Ukrainian words in Russian. This is not due to the desperate patriotism of the Russian state, but only because of the lack of knowledge and excessive imposition of the Russian language.

Consequently, if the first reason for the spread of dirty and misleading language was mainly mature and elderly people, then the following reason applies exclusively to young people. The younger generation is always striving for something better, new and unique. It is believed, imposing a stereotype about the priority of the Russian language over Ukrainian comes from television or the Internet. For example, until November 8, 2016, when a law was adopted that introduced radio quota for songs in Ukrainian and programs in Ukrainian, 95% of the broadcast of any TV channel was exclusively in Russian. Of course, this greatly influenced the consciousness of the growing generations. Now it's very difficult to eradicate the stereotype of the supremacy of the Russian language over Ukrainian. This does not mean that the Russian language is something worse. Each language is unique, but if it is good to own it and not cluttered with revised words, which no dictionary has seen. It much more enjoyable to communicate with a person whose language you can admire and listen to for hours. Communication with a Russian-Ukrainian speaker does not cause such feelings. Particularly unpleasant is the moment when the child grew up in the Ukrainian-speaking family and parents learned the correct language and under the influence of television and social networks in conversations Russian words begin to appear. The child may know the Ukrainian equivalent, but does not already use it, thus she enjoys his "deep" knowledge of the Ukrainian language. If people like the Russian sound of words, the melody of language, then why not study it perfectly and freely to use? Why spoil both languages in one fell swoop? It is believed that about 40% of the population were infected with syrzhik precisely under the influence of the media. After all, for people, this flow of information seems to be the most truthful, therefore, subconsciously, all the shoddy words that sound on TVs are fixed in the head as correct and reliable. For example, if you listen to the most important people in our state.

The third group of dirtinesses was formed due to one of the most well-known reasons, due to which a lot of misfortunes occur. Of course it's laziness. In general, 90% of our troubles arise precisely because we lazy to do something to prevent this. This is the most elemental example among the pile of troubles that may occur due to the inability to speak correctly. For example, pure language is an element that can provide you with respect in any team. Lynn in the language learning plan appears due to the lack of respect for her. Everyone thinks linguistics is not serious science. But no talented programmer will be hired if he interviews shocked everyone with his "literary" language. Recently, the government has begun much more reform of the elimination of the Russian language and the respect of the native Ukrainian language. For example, when applying for a job in the civil service, you should take examinations in the Ukrainian language. The result should be much higher than the average. This can not be please, because public service is a set of basic services that people use every day.

Many children in the school are superficially related to Ukrainian language lessons. Examples of mathematics can be done at home, and exercises from language - in the class write off. Of course, the mathematician is the queen of sciences. Integrals, square equations, and different graphics sound much more seriously than the rules in the Ukrainian language .. With such a schedule, nothing will be good. Such an attitude may arise because of the inability of teachers to interest the language. It is necessary to gradually show the interesting foundations of linguistics, and not to hammer the head with abstracts and obscure rules. If you go deep into the dictionaries you can find a bunch of amazing things. Take for an example at least an etymological dictionary. What are the interesting cases of the origin of the words occur? It seemed that we use this word every day and do not think that this is not a kind of word at all, but a kind of Turkicism. Or, for example, not everyone knows that in the Ukrainian language there are only two words beginning with the letter "F". This is the name of the city of Fastov and the popular exclamation "Fe!". And only through

laziness, millions of people do not know such interesting facts about our state language, which we must respect.

Conclusions. So, having studied the issue of mixing and contamination of the Ukrainian language, one can understand that this problem is really more serious than it seemed. No country can complain about such disparaging attitude to the national language, except our state. This problem can be solved only by large-scale measures. Example:

- reforming the teaching of the Ukrainian language at school and higher educational institutions;
- Serious treatment of texts in newspapers and advertisements;
- make compulsory examination of the Ukrainian language before the parliamentary elections, since a large number of state leaders do not have basic knowledge of language;
- communicate more in Ukrainian.

Thus, a mixture of two languages – Ukrainian and Russian – is spoken by a part of the people of Ukraine. A crippled speech drowns a person, reduces her thinking to primitivism. After all, the language expresses not only the opinion. The word stimulates consciousness, submits it to itself, forms. Surzhik in Ukraine is dangerous and harmful because it parasites in the language that has been formed for centuries. It threatens to change the language that Taras Shevchenko accepted and polished, showing the world its beauty and strength. Maxim Rylsky called for "vigilantly and timelessly" to weed weed. But in our time, that "weed" so much washed out that the canvas will take a long time. We spoiled the language with hundreds of useless words. Why? After all, a unique Ukrainian language has several matches for each word of the Russian language.

We must improve the knowledge of our language, because speech is the business card of every person. As the folk proverb says, not judging by clothes, the judgments are by reason.

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MODERN CHALLENGES OF INTERNATIONAL LAW EDUCATION

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Abstract: This article deals with the analysis of modern international law as an academic discipline. The study of the relevant international legal acts and scientific works has resulted in discovering certain difficulties and providing ways to resolve them. The emphasis is placed on the role of diplomatic training of future international lawyers as well as the importance of developing a specific professional mindset during their term of apprenticeship.

Key words: international law, UN, dual nature, legal consciousness

Introduction: In this article we consider the most important problems of teaching international law nowadays, such as the dual nature of this speciality and a formation of professional international legal consciousness.

International law as a phenomenon has its roots in ancient history of humankind. However, it has recently emerged as an academic discipline. In Europe a higher education programme first included this course at the end of 17th century with the famous Cambridge University of England as a pioneer. [1] In the realm of history, the discipline of international law appeared, figuratively speaking, yesterday. It is also important to consider that today international law itself is experiencing significant reforms and progress by stepping away from the classic version in favor of contemporary needs. Based on that and the novelty of the course we can conclude that the question remains open whether international law has completely taken shape as an academic discipline. This is what makes the raised issues relevant as at the stage of transforming into a subject any science needs versatile specialists, who not only are experts in their area but who also think appropriately.

The relevance of this topic is further confirmed by such a universal organization as the UN paying a lot of attention to the matter of teaching international law, which reflects in its numerous resolutions. It is worth mentioning that the first resolution 94 (I) adopted by the General Assembly in 1946 laid the

foundation for further discussion of this question, which is confirmed by the Organization adopting similar acts at regular sessions. "... it is necessary to further the aims of the General Assembly's resolution 94 (I)... one of the most effective means of furthering the development of international law consists in promoting public interest in this subject using the media of education and publicity..." [2]

The object matter of the study is legal relations in the area of education and the subject matter is the problems of teaching international lawyers. The objective of the study is to define the correspondence between traditional educational programmes and the professional environment which international lawyers face in practice as well as the ability of the programmes to satisfy the requirements of such environment. In order to accomplish the set objective, we suggest completing the following tasks:

1. To analyze relevant acts on this issue adopted by the UN as the most influential international organization;
2. To determine an optimal ratio between the two main elements of international law as a speciality by interpreting its dual state;
3. To examine the nature of international legal consciousness, its place in the system of international law and offer ways to increase its level.

Materials: Over the last few years this topic has been popular with legal scholars, both foreign and Ukrainian. Internationally, the problem has been actively discussed by German researchers, for example Mirka Möldner from Max Planck Institute for Comparative Public Law and International Law in Heidelberg in her article "The Future of Teaching International Law". The issue of teaching international law is also relevant in the USA: Howard S. Schiffman, a professor from the New York University School of Continuing and Professional Studies has discussed it thoroughly in his "Teaching International Law to Undergraduates and Other Non-Legal Audiences: Practical Suggestions for Pedagogical Approaches". Although, when it comes to international law the most authoritative researches would most likely belong to British scientists, for instance, Georg Schwarzenberger from Cambridge University and his work "On Teaching International Law". As to Ukrainian studies, the ones that stood out the most were the ones published in the Ukrainian Journal of International Law run by the Institute of International Relations of the Taras Shevchenko National University of Kyiv. The projects we found the most significant to our topic were A. Zadorozhnyj "The Problems of Teaching International Law", T. Korotkij "The Problems of Forming International Sense of Justice...", L. Volova "On Contemporary Methods of Teaching International Law and V. Kononenko "High-quality Teaching of International Law as Key to The Protection of Human Rights and Public Interests".

We applied the methods of research in the course of this article: description, comparison and analysis.

Discussion and Results: Proceeding to the main material, it must be noted that in the above-mentioned UN resolution "Teaching of international law" the General Assembly "requests the Governments of Member States to take appropriate measures to extend the teaching of international law... in the universities and higher educational institutions... or to initiate such teaching where it is not yet provided". The Organization has continuously worked on this issue ever since. As a result, a special programme of international coordination has been established. In the resolution 20/99 titled "United Nations Programme of Assistance in the Teaching, Study, Dissemination and Wider Appreciation of International Law" the General Assembly "...recognizes the need for the strengthening of the role of international law in international relations, notes that a large number of Member States have expressed the view that a programme of assistance and exchange should be established and administered by the United Nations... for the purpose of furthering the objectives of... assisting Member States, in particular developing countries, in the training of specialists in the field of international law and in the promotion of the teaching, study, dissemination and wider appreciation of international law, considers a better knowledge of international law a means of strengthening international peace and security and of promoting friendly relations and cooperation among States, decides to establish a programme of assistance and exchange in the field of international law...". It is clear from the content of this document that the matter of teaching international law is universally important and requires effort from all the participants of international relations. The UN suggests such forms of cooperation as "seminars, training and refresher courses, fellowships, advisory services of experts, the provision of legal publications and libraries, and translations of major legal works". [3]

Moving on to the problem of the dual nature of international law, it is worth noting that it crucially influences the content of teaching. It is shown evidently in a question of the ratio between, roughly speaking, a lawyer and a diplomat in an international law specialist as well as the ratio between the role of traditions and contemporary reality in his activities. [4]

The profession of an international lawyer is often recognized as one of the most prestigious in the list of legal professions. It is only logical to assume that the requirements for such specialists are directly

proportional to his high status, so there is no denying the necessity for his versatile training. Though while searching for the answer to simple question “What should an international lawyer be like?” we faced the tendency to throw everything “international” aside and focus on everything “lawyer” and mentioning that such person needs to be fluent in several foreign languages. Guided by this description we would rather think of a lawyer-interpreter while the lawyers working in the international arena are bound to deal with various types of diplomatic activity, such as official international negotiation, conferences, etc., where they would require the knowledge of “operational diplomacy”, that is, not only the languages, but also the rules of protocol and etiquette, historical and political subtext etc. Thus, today we can see serious discrediting of the role of diplomatic knowledge and skills in the profession of an international lawyer, not only in the inaccurate definitions, but which is more important, in incomplete educational programmes.

Speaking of the ratio between traditions and modernity, on the one hand, we should be considering the question if the international law training programme needs to include the so-called old-school disciplines like Latin and their optimal part in it. On the other hand, it is also about familiarizing students with the current international situation and problems. In the first case, it is true that international law today is vastly different from international law in Roman times, even in some fundamental theoretic points, although it would be wrong and extremely impractical to throw away all the centuries-old experience. In the second case, today’s demand for specialists with the ability to analyse critically “on the spot” and the highly competitive market dictate the need to “fill students in” while they are still students. This could be done in many ways, from simply having relevant discussions with students and among students during seminars, and different game-like forms of work to organizing special extra-curricular events dedicated to action and practice instead of words and theory, be it petitions or internships, etc. So, it is best to learn the lessons of the past and add to them as the world progresses.

With regard to the problem of developing professional international legal consciousness while studying, we must understand that improving the level of international legal consciousness can dramatically improve international rule of law. This is about using this educational approach that aim at shaping certain emotional comprehension of international law reality besides forming the necessary knowledge and skills. The reason for that is that without faith in its effectiveness and high social value, international law becomes meaningless, and this perception leads to actions that contradict the very core of international law and its highest principle – justice. The claim of the seriousness of this question is based on the idea that legal consciousness is as inherent of a part of any legal system as legal norms, legal relations, etc. [5]

To achieve the desirable result of improving the level international legal consciousness among students, it is first necessary to develop criteria and methods for its objective assessment. Nonetheless crucial would be the actual forming of the thinking described above in the process of studying the related disciplines, and so it is essential to pay special attention to the issues like social value of international law, its role in functioning of the international community, its humanization and democratization. This aspect is particularly important in studying international human rights law, international humanitarian law and international criminal law. A more creative form of work that could help students to form an international sense of justice on their own is writing essays on international legal issues. During lecture and seminar classes, we advise to demonstrate photo and video materials that fill theory with emotional context (for example, consequences of pollution, mass human rights violations, etc.).

Conclusions: Certain contradictions between the practical tasks of professional activity and theoretical content of teaching have been discovered through the research of the contemporary academic challenges of international law. This is explained by insufficient attention to diplomatic and moral sides of the researched profession. The recognition of said problems is an important step on the way to resolving them. The article proves that the situation is not yet critical and there are a lot of solutions for its improvement, which must be based on objective understanding of both the current state of affairs and development prospects.

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GLOBAL AND NATIONAL INFORMATION SECURITY: AN EMERGENCY CASE

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Abstract. The paper contains analysis of principle reasons of massive social change under the influence of rapid technological development. The role of the Internet in the change is emphasized. The research begins with analysis of the political and informational crisis in Ukraine and proceeds with a wider global background for similar problems. The paper finishes with discussion of possible ways of overcoming the crisis and combating the negative impacts of the Internet on society.

Key words: information security, information society, information war; social change, Ukrainian crisis.

Introduction. According to many international analysts, including Z. Brzezinski, at the beginning of the 21st century, the world entered the turbulence zone, when instability and chaos will only increase. The threat of global crisis and chaos is becoming more and more actual, and information technology is playing a bigger and bigger role in it. This raises the need for the ethos of global responsibility, which must be professed by all civilized states, statesmen, media and communication specialists. Today there is already every reason to assert that this is a point of "breaking linearity" of history [1]. It is the point when humanistic understanding of the impact of the Internet and information technologies on society must be reconsidered.

The present paper describes an attempt at analysing social change in the context of information technology development, which is the object-matter of the research. Its subject matter is study of potential threats fast development of Internet communication poses for national and global information security.

The research objective is to analyse reasons of information change in the national and global perspective and to trace the roots of social change connected with them. Pursuing the objective presupposes fulfillment of the following tasks: to study common theoretical concepts of social change in the context of information technology development; to analyse Ukraine as a study case of a country facing information aggression; to specify the role of the Ukrainian crisis in the global perspective; to identify basic threats to information security.

Discussion and results. Scientific thought has elaborated several theoretical concepts for analysis of social change in the context of information technology development. They can be classified in three groups, namely: 1) theory of information society (D. Bell, A. Toffler, Z. Brzezinski); 2) post-classical social theory (G. Debord, H. M. McLuhan); 3) theory of virtual community (A. Buhl, A. Kroker). Only scholars who belong to the first approach mentioned above hold a positive opinion of the undergoing change, while representatives of the other two approaches mainly focus on negative aspects of globalization and informatization of society. This suggests an idea that academic community has not developed universal attitude to the process of information technology development and anticipates problems brought forth by it.

Ukraine: a study case

Since the beginning of the so-called Ukrainian crisis in 2014, the increase in the geopolitical tension in the world has noticeably strengthened. Traditional attempts at solving political contradictions between the main geopolitical players have not succeeded. The situation has grown from its military stage into the plane of hybrid war making every possible use to exert informational influence on Ukrainian society. In other words, the most important lines of the conflict in a global perspective are gradually transferred from the sphere of international relations to the sphere of propaganda and informational struggle within separate states. Ukraine has faced a type of aggression where its military component has been receded into the background. The main shock forces of aggression are humanitarian intervention, the active involvement of the "fifth column", Russia's dominance in the information sphere. As a matter of fact, Ukraine has become a site for testing cyber and information weapons, a hotspot of tension [2].

Ukraine nowadays is experiencing a crisis of statehood and a massive external pressure of informational nature. As a result, there are two polar tendencies in the society. One is connected with utter distrust to any information resources, official or non-official data, skepticism or social escapism. The other one is about unquestionless faith in everything the Internet and other mass media have to offer (irrelevant of which of the opposing camps delivers the information). Both tendencies seem to trace their roots back to the

same societal phenomena: heavy overload with emotionally-charged, judgemental, biased and predominantly untruthful information, as well as the population's poorly developed analytical skills when dealing with the Internet sources. On the other hand, both tendencies seem to have a very similar impact on society: fragmentation and disorientation, poor civic engagement in governance, numerous social contradictions.

Recent events indicate absolute lack of preparedness of local and national state institutions for resisting internal and external challenges. At the same time, effectiveness of methods of ensuring information security proves to be extremely low. Citizens of Ukraine do not feel secure and protected, they are pessimistic about further steps of governing bodies. Even the measures that have been taken (for example, blocking the Russian social network service Vkontakte) are lost upon the menacing threat of possible information and cyber attacks (for example, the notorious virus "Petya" which struck and paralyzed a huge number of governmental and non-governmental organizations, in 2017).

Ukrainian dimension within the global crisis

Today, the information security and defense sector is a mirror of global political and economic problems. I. Vinogradov stated that the world is in constant search for a new order, and regional and world economic, cultural and civilizational associations/communities, which should take part in the formation of a new way of interaction between the participants of the international community, become the subjects of world political relations [3]. In this sense, the "Ukrainian crisis" appeared consistent with the general trends in the transformation of the principal foundations of international order and as an insoluble international phenomenon, and not as an unexpected failure in the logic of building international communication of the 21st century. The "Ukrainian crisis" became a part, a catalyst, and perhaps even a starting point in the final "burial" (dismantling) [ibid] of a number of fundamental parameters of international relations in the areas of international communication and security, as well as fundamental parameters of the international order.

The specificity of the current security crisis is to a large extent the fact that it unfolds in the context of globalization, that is, a radical increase in the degree of mutual dependence of subjects of international politics. This requires raising the level of international responsibility of participants in the system of international communication. Instead, the neglect of international obligations, especially on the side of an influential player, can lead to unpredictable consequences on the regional and global levels, undermining the opportunities for sustainable economic and cultural development in Europe and the world [4, p. 2].

The Internet and information security in the global perspective

Having outlined the principal information threats which Ukraine as a separate state is facing now, let me continue with analysis of global background of the problem. The whole issue is predetermined by a certain epistemological emptiness resulting from social technological development on the one hand and appropriate reflection on the process on the other hand. The global computer network has been developing at a fantastic pace since the end of the 20th – the beginning of the 21st centuries. The Internet can be considered an innovational medium of mass communication bearing attributes of interpersonal, group and mass communication. Unlike traditional mass media, the Internet is a space where not only professional communicators (journalists, reporters, etc.), but also non-specialists can voice their opinion. The latter acquire the power of influencing opinion, evaluation and behavior of great masses of population. Besides, the rapid growth of information propagation speed is closely followed by dramatic decrease of its quality. This mainly happens because Internet communication is mostly depersonalized, anonymized, which breeds temptation to disseminate incorrect, false, immoral or provocative information. This considerable growth of scale of spreading untruthful information in the world computer network has already become a threat to information security. The bulk of the information in the Internet can hardly be controlled.

Thus, we are witnessing an acute social problem involving a contradiction between innovative communication potential of the global net and lack of appropriate control and effective civil management of the Internet [5]. In many cases, this results in information extremism which is a generic term for acts of aggressive communicative influence, mind control, informational terrorism, spreading fake news and rumours, and various cyber-crimes. All information extremism manifestations threaten stable social existence in the system of communication, which can undoubtedly be classified as a threat to state security. Modern society can meet this challenge only if it designs effective tools of control over the Internet sources, coordinated international effort in information security develops systems of automatic monitoring and surveillance.

The Internet in itself is the main driving force of globalization and informatization of modern society. It performs the function of the innovative mass communication medium which erases time, spacial and national boundaries and promotes genesis of a new type of social order. It arranges a specific communication environment characterized by interactivity, impression of being there, almost unlimited access to other communicators and to information. Unfortunately, the immense technical and cultural

potential of the Internet is aimed at achieving not only social, but also anti-social goals. This is where serious concern about information society security arises.

Generally speaking, destructive aspects of the Internet communication can be classified in the following way:

- generation, storage and/or dissemination of untruthful, incorrect or even extremist information;
- using information processed by a computer, computer system or network with the aim of influencing decision-making state bodies and/or international organizations;
- practicing various forms of psychological or indirect physical violence (cyber terrorism);
- dissemination of information which exerts destructive impact on psyche of people who remain unaware of the influence;
- disturbing privacy of individuals;
- information overload;
- mind control;
- hacking and other types of cyber-crimes.

Though the negative effects of Internet communication are quite obvious, neither modern science, nor society has developed a general set of tools necessary to control and manage the World Wide Web. Let me mention some of the aspects which hinder the process: deep contradictions of ideological, cultural and economic nature in international organizations which are supposed to resist negative Internet impact (including the UNO subdivisions); considerable difference in technological development of different countries (developed vs developing).

Conclusions. It is worth emphasizing the importance of the so-called "Ukrainian precedent" in the framework of modern international communication and globalization. The precedent involves a specific type of information warfare. This type is obviously significantly relevant not only to European, but also to global affairs. A new order of international relations is being formed today, and the model of resolving the Ukrainian conflict, as well as its aftermaths, is capable of shaping the global future. In the global perspective, Ukraine is just a country fighting against hybrid aggression of a neighboring state. However, the whole world is going through a period when negative impact of the Internet technology can outweigh its numerous positive aspects. The situation is aggravated by deep contradictions between states and cultures.

There is hardly any doubt that information security has literally become a priority in social relations, state policy and international relations. However, the whole system is hard to control as long as we use traditional preventive and security measures. Methods of social and state control should be reviewed and reframed: leaving censorship, limitations and bans behind, community should focus on optimization of the global computer network mechanisms, preventing mass disinformation, coordination of legal regulatory tools globally, cooperation of international law-enforcement agencies when prosecuting cyber criminals and terrorists.

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THE INFLUENCE OF MODERN YOUTH'S VALUE SYSTEM ON DEMOGRAPHIC STRUCTURE IN UKRAINE

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Abstract: The present article analyzes the influence of value system of modern youth on demographic structure in Ukraine. The conclusions which are represented in this paper are based on empirical investigations and historical researches of phenomenon known as voluntary childlessness. The statistic data indicate that in most cases childlessness is voluntary and connected with value system of

society. Nowadays there is a negative population parameter in Ukraine which may lead to demographic ageing of nation.

Keywords: value system, childfree, voluntary childlessness, demographic structure.

Introduction: Situation when sociologists indicate negative population parameter assumes the name Demographic Crisis. Is there anything dangerous about depopulation? Significant decline in the birth rate comes with phenomenon known as aging of the nation. It means that majority of population are people of retirement age. In such case the nation's potential in production, research, and many other areas are getting decreasing. As a result we can observe increase of pressure on medical and social institutions and a growth of taxes, which are paid by people whose age is appropriate to work.

Moreover, from the sociological point of view, the question that has to be answered is whether families whose members have been made decision to be childless can be considered as full-fledged and is there anything important that may be lost because of orientations to be childfree on scale of society. Nowadays such question is as relevant and important as ever and even more. But we should understand that such social institution as family is able to be changed in accordance with the global situation. So, each of youth should step in front of decision to have children or not. May each choice in this area of life be correct? And is it possible at all to talk about "the right choice" when the topic of discussion is the continuation of the human race?

In recent years, we can observe the following situation: modern young families increasingly have come to the conclusion that they want to have only one descendent or do not want to have children at all [Isupova 2010].

The objective of the present paper is to determine the impact of the value orientations of modern Ukrainian youth on the demographic situation in Ukraine, according to the study of the causes and consequences of voluntary renunciation of parenthood.

The tasks of this paper are:

- to study the historical context of phenomenon of voluntary childlessness;
- to consider the basic categories and the concept of "childfree" as a social phenomenon;
- to determine the factors of occurrence of the phenomenon of voluntary refusal of parenthood;
- to study the issue of voluntary childlessness as a consequence of value system of modern youth.

The object-matter of research is the value orientation of modern youth in terms of attitude towards parenthood.

The subject-matter of the paper is the formation factors of the value priorities of modern Ukrainian youth.

Methods for the study are presented by theoretical and methodological foundations of sociological knowledge in sociology of family and by results of empirical sociological research.

Materials for the present paper are the data of Eurobarometer research in machining of John MacInnes and the results of interviews in focus-groups of voluntary childless young people handle by a team of Russian sociologists.

Discussion and Results. For sociologists and demographers in Ukraine childless families are an actual target for research, because the population of this country has been decreased over the past 20 years. Demographers maintain that every Ukrainian woman should give birth to three children in order to save the nation from extinction. During the last decade, Ukraine has experienced a decline in absolute and relative fertility rates [Osaulenko 2004:23]. According to the researches (Eurobarometer data in machining of John MacInnes) there are 19% of people, who prefer not to have children. It is interesting that only 2-3% of them are incapable to give birth to a descendant because of health issues, the main part of them are willing to be childless [Isupova 2010].

Dose this situation come from nowhere? Or is there some kind of historical context? It definitely is. Not such long time ago the question of depopulation by choice was not as relevant as now. Mainly it was not relevant at all. Of course from some point of view there were always some individuals, who didn't want to have a child, but it was more like exception.

English scientist Thomas Malthus suggested the concept of abandonment of childbirth in the 18th century. He believed that the growth of the population of our planet should be suspended due to lack of food. Malthus also argued that if humans had not reduced the growth rate of the population, mankind would have starved [Malthus T. 1798].

The idea of childfree became its existing otherwise. In Western governments childfree movement has gained popularity since 18th century, when Elen Pek together with Shirly Radle founded the first childfree company - The National Organization of Non-Parents. Now non-parenthood movement is represented by numerous of organizations, such as National Alliance for Optional Parenthood, No Kidding

(USA), Australian Childfree Party (Australia) and Kidding Aside (Great Britain). But for the people of former USSR countries the idea of voluntary childlessness was not popular even 15 years ago, but it is growing in popularity now [Isupova 2010].

So, in order to understand the causes of voluntary childlessness phenomenon we are going to discuss what the youth think about the prospect of parenthood and what the expert opinion about it is.

Renowned academic Pirozov said that family (in classic option of this institution – with children) is a first-order condition of economical, intellectual and political growth of nation. It is interesting that the main part of scientists, who has been doing the research about childfree position, conclude that voluntary childlessness is a form of deviation.

In accordance with classification, proposed by Johan Vivers, there are two types of childfree:

- Rejecters (those, who actually hate children), this group consists of minority;
- Aficionado (those, who refused of having children to the benefit of self-freedom).

Modern researches have led to conclusion that there are two more types of voluntary childless people:

- “Permanent de-layers” (they are the people who actually don’t mind to have a child, but due to different goals delay with this thing. In most cases it ends up with lack of physical possibility to give a birth to a child because of age);
- “Wave-like refusers” (for these people it’s hard to make final decision whether they want to have a child or not, till it’s too late to make a choice) [Vishnevskiy, Volkova 1983].

According to numerous researches all of those positions may be a wish or a purpose to make a career, especially among women. Usually the birth of baby does not make any problems for male’s career, but it almost always makes troubles in this area for female. Nowadays a great amount of modern young women have an orientation to make a career with high salary, which is demanded a lot of their time. So, voluntary childlessness consists of the prospect of self-actualization [Polutova, Janbaz 2015: 92]. According to the statement of academic Bogachiova, self-supportability is the main criteria of modern youth and it is going to destroy the traditional way of the structure of society. This is how parenthood becomes secondary value. The scientific proof of such suggestion is a sociological research made by the team of Russian scientists: A tendency towards child-free lifestyle in Russia and its influence on the crisis of the institution of family [Polutova, Janbaz 2015: 92; Park K. 2005].

Clear-cut example of the foregoing statements is an opinion made by a group of sociologists for the purpose of determine which reasons push young people to refuse of parenthood. They used the method of interviewing. Focus groups contributed to the allocation of the predominant value orientations of young people towards family and marriage. Some of the most indicative answers of youth will be represented further in this paper. One of the first respondents said that children were a waste of time and money: “Oh, you know, I see how much time my friends are killing to the benefit of their children, and I also know how much money they spend on children. So I can say that children are waste of resources. I’d rather spend this money on traveling and self-development.”

Another one of the informants reported: “Surrounding people do not understand me. They ask me questions such as: “when are you going to have children?”, - he also said that it feels like everybody pushes him to become a parent.

Besides, any one of respondents didn’t hate children: “Well, I can’t say that I hate them (children), no. I probably even love children a little bit. But only those kids, who are well-adjusted”. So as we can see the main part of childfree people aren’t childhate, but childfree (according to Vivers) [Vildanova, Granichnaya, Mingalieva, Salyahieva 2017: 193 -198].

Conclusions

The present article represents the results of investigation which took place among the modern youth in relation to the question of childbirth and parenthood. It has also been shown that the socio-cultural, value orientations of youth are predisposed them to become childfree. In order to achieve maximum objectivity we have used the results of interviews.

It was found that the demographic situation related to the values of youth, most of childless people simply decided not to have a children.

So, the conclusions are following: young people aim on career building and self-development and they can’t see such things in combination with parenthood; some youth consider that children are a waste of money and time; there are also some individuals, who acting in opposite of pushing to be a parent.

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TOPICAL ISSUES OF THE INFORMAL DISPUTE RESOLUTION WITHIN THE UNITED NATIONS INTERNAL JUSTICE SYSTEM

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Abstract. The article focuses on the functioning of the UN internal justice system; analyses the settlement of disputes between employees and the UN Administration through informal channels; attention is focused on the topical issues in this sphere.

Keywords: dispute resolution; informal resolution; mediation; Ombudsman; the United Nations; mediation.

Problem statement. The successful functioning of any large organization depends on favorable working environment. This requires some systems, rules and procedures which establish a general standard of the behavior and activities and ensure that the work of each employee provides contributes to the implementation of common goals and objectives. With regard to the United Nations (hereinafter – the UN), such goals are global and favorable: peace and security, development and human rights. Nevertheless, disputes that arise in the process of work are roughly similar to the problems that may appear elsewhere in connection with the issues such as the revival of contracts, fair treatment, advance in office, discrimination, prosecution or taking disciplinary actions. Since the UN enjoys immunity from local jurisdiction and cannot be sued in a national court, an internal justice system has been established to resolve disputes between employees and the administration, including disputes related to disciplinary measures.

Topical subjects. The UN internal justice system is meant to respond to situations where staff believes that their rights have been violated and the rules of the Organization have not been respected. The possibility of using the internal justice system is one of the employee's basic rights at all levels. The internal justice system is also part of a common system aimed at strengthening accountability and ensuring that decisions are taken in a responsible manner.

It should be emphasized that the issues of functioning of the internal justice system organs of international intergovernmental organizations, including the UN, have not been studied enough in the science of international law, which causes the relevance of this research topic.

Separate issues related to the protection of human rights in international organs and institutions were examined in the works of E. Bradley, M. Buromensky, D. Gomien, V. Kartashkin, R. Kay, T. Syroid, L. Entin, and others. However, the issue of dispute resolution between staff and the UN administration within the internal justice system requires further investigation.

Therefore, the purpose of the study is to analyze the protection of employees' rights within the UN internal justice system through informal dispute resolution.

The objectives to achieve the above-mentioned purpose are as follows: to reveal the essence of informal dispute resolution within the framework of the UN internal system; to analyze the principles of informal dispute resolution.

The object of the study is the social relations that arise in the functioning of the UN internal justice system.

The subject of the study is the informal dispute resolution within the framework of the UN internal system.

Research methods. The research employs the dialectical method, the use of which gave possibility to have an objective and thorough analysis of international legal reality, determination of the essence of the legal phenomena studied in their development and the unity of their material content and legal form.

The axiological approach made it possible to comprehend the value orientation of the human right for protection in the organs of the internal justice system of international intergovernmental organizations.

Discussion and Results. The protection of human rights is one of the main activities of the UN. In order to protect the rights of the UN staff, an internal justice system was created to respond to situations where staff believes that their rights have been violated and the UN rules have not been respected. For instance, while establishing the UN internal justice system, the main goal was to create such a system that would be independent, professional, operational, transparent, decentralized and more dispute-oriented, before resorting to formal judicial proceedings, through informal mechanisms.

In this regard, staff is urged to try first to resolve the dispute through informal channels to avoid a lengthy consideration of the dispute.

In addition, informal resolution processes allow the individuals involved to retain a high degree of control, which means that solutions and agreements tend to be durable. When choosing to resolve conflicts early and informally, it is also more likely that the conflict can be contained to the individuals directly involved, rather than setting into motion formal processes that involve other offices and individuals and also often lead to the hardening of adversarial positions.

Informal resolution and early intervention can contribute to preventing issues, such as interpersonal conflicts, from escalating to formal cases. Another benefit is that any workplace concern can be brought to the Office of the UN Ombudsman, whereas the formal system is predicated on the dispute being related to an administrative decision. Informal resolution is flexible and can entail such methods as one-to-one coaching, shuttle diplomacy and mediation. The benefits of mediation are increasingly being recognized. By working to eliminate conflicts of interest, build trust, facilitate open communication, clarify roles and responsibilities and help parties to understand differences and appreciate diversity in a team, mediation can contribute not only to preventing conflict but also to promoting accountability and building a collaborative work environment [Report of the Secretary-General A/70/151: para 43-44].

It should be mentioned that the methods of informal dispute resolution include: negotiations, appeal to the Ombudsman, mediation and other alternative means.

Thus, the Office of the UN Ombudsman and Mediation Services provides an important institutional capacity to prevent or resolve workplace conflict and promote collaboration [Report of the Secretary-General A/71/157: para 1].

The Ombudsman is a specially appointed and independent neutral person who provides confidential and impartial assistance in the informal resolution of problems and conflicts related to work in the UN. The right of appeal to the Ombudsman is given to all UN employees, including former employees and retired employees, regardless of the type of contract and place of work.

The Office of the UN Ombudsman and Mediation Services provides confidential and impartial assistance with the aim of resolving a wide range of workplace issues and disputes. It serves staff globally, including at headquarters duty stations and in field operations. Staff at all levels seek the assistance of the Office on a broad range of issues, including matters relating to contract renewal, equity of treatment, staff selection, discrimination, harassment, interpersonal issues or situations in which there has been a delay or lack of response to an administrative request or entitlement query. The Office assists staff through a variety of dispute resolution approaches, including exploring options, coaching, mediation, facilitation, group processes and team-building [ibid: para 2].

It is important to note that in carrying out its work, the Ombudsman is guided by the core principles based on the Code of Ethics of the International Ombudsman Association. These principles are as follows: independence, neutrality, confidentiality and informality.

Thus, the Office maintains independence from other organizational entities, organs or officials and has direct access to the Secretary-General, the executive heads of the funds and programmes and the Office of the United Nations High Commissioner for Refugees and senior management throughout the Organization, as needed; access to information relevant to cases, except medical records; and access to individuals in the Organization for advice, information or opinion on any particular matter.

In addition, the Office serves as an advocate for justice and fair, equitably administered processes, not on behalf of any individual within the Organization, taking into account the interests, rights and obligations of the Organization and the staff member, and the equity of the situation.

It should be noted that, in the process of carrying out its mandate, the Office maintains strict confidentiality and does not disclose any information about individual cases or visits from staff members; it cannot be compelled by any United Nations organ or official to testify.

In respect to its informality, the Office does not keep records for the UN or any other party; does not conduct formal investigations or accept legal notice on behalf of the United Nations; does not have decision-making powers; and does not make determinative findings or judgements [Report of the Secretary-General A/69/126: para 7-10].

Conclusion. In view of the foregoing, we came to the conclusion that the functioning of the UN internal justice system is an essential guarantee of ensuring and observing of rights of its employees. The possibility of resolving a dispute by referring to informal means, among which are mediation and consultations of the Ombudsman allows resolving the current dispute confidentially and impartially, avoiding the involvement of other offices and individuals.

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REGULATION OF PROHIBITED METHODS AND MEANS OF WARFARE IN THE CONTEXT OF INTERNATIONAL HUMANITARIAN LAW

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Abstract: The article provides the analysis of the main international legal acts, examines the notion of prohibited methods and means of warfare, as well as the types of prohibited methods and means of warfare. Particular attention is paid to regulatory acts, dealing with prohibited methods and means of warfare. The role of international humanitarian law in modern processes of globalization and during armed conflicts in different parts of the world, which needs legal consolidation at this level of society development is considered.

Key words: armed conflict, international humanitarian law, means of warfare, methods of warfare, weapons.

Introduction. Studying the world experience in armed conflicts, one must definitely pay attention to the fact that human rights are violated. Therefore, it should be pointed out that a unique role is assigned to the rules of international humanitarian law intended to regulate armed conflicts and relations between the parties in hostilities. The international community hopes for international humanitarian law, which would contribute to the peaceful resolution of international disputes and to the detriment of humanity. In this regard, there is a need for the process of implementation of the norms of international humanitarian law at the level of each state, which is oriented towards the adoption of universal human values.

According to N. Hendel, the factors determining such an implementation process include: mutual interest of the parties to the conflict in complying with the norms of international humanitarian law, international public opinion and media activities, the creation of bodies of international criminal justice and the development of the institute of war crimes in the international criminal law, material and political responsibility of states for violation of obligations under international humanitarian law, international investigative procedures, the activity of the International Committee the UN Red Cross, regional intergovernmental and various non-governmental organizations, diplomatic efforts of individual states, etc. [Hendel, Hnatovsky, Korotyky 2015: 30].

Object-matter is the social relationships that arise in the field of international humanitarian law.

Subject-matter is an international legal basis for the regulation of prohibited methods and means of warfare.

Objective is to analyze the legal basis for the regulation of prohibited methods and means of warfare, to investigate the provisions of the regulations on the prohibition of the use of prohibited methods

and means of warfare and to characterize the development of new regulations on the prohibition of the use of certain methods and means during the war, which are of particular importance.

Tasks. 1. To define the concept of prohibited methods and means of warfare. 2. To describe the types of prohibited methods and means of warfare. 3. To analyze the regulatory acts dealing with the prohibition of the use of prohibited methods and means of warfare.

Materials. While writing the article, the works of national and foreign scientists were used, in particular: G. Kurdyukov, M. Hnatovsky, N. Hendel, R. Valeev, T. Korotyky, V. Lisik, V. Repetsky.

Methods. General scientific methods of research, such as analytical and empirical methods, the method of system analysis; a logical method, including analysis, synthesis, induction and deduction; a historical method were applied.

Discussion and Results. Considering the work of V. Repetsky, all means and methods of warfare can be divided into the permitted (legal) and unlawful (illegal). Such a division is mostly doctrinal [Repetsky, Lisik 2007: 169].

Having analyzed the Convention on the Laws and Customs of the Land War of 1907, one can state that the means of warfare include weapons, shells and substances used by the armed forces of the belligerents to cause damage and defeat the enemy. The same convention determines the methods of warfare: the order of using the means of warfare. This Convention focuses on the principles of humanism and prohibits the following methods of warfare: to kill or wound treacherously individuals belonging to the hostile nation or army; to kill or wound an enemy who, having laid down his arms, or having no longer means of defence, has surrendered at discretion; to declare that no quarter will be given; to employ arms, projectiles, or material calculated to cause unnecessary suffering; to make improper use of a flag of truce, of the national flag or the military insignia and uniform of the enemy, as well as the distinctive badges of the Geneva Convention; to destroy or seize the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war; to declare abolished, suspended, or inadmissible in a court of law the rights and actions of the nationals of the hostile party. A belligerent is likewise forbidden to compel the nationals of the hostile party to take part in the operations of war directed against their own country, even if they were in the belligerent's service before the commencement of the war (article 23) [2].

According to prof. Valeev, prohibited means of warfare include those that cause excessive suffering due to their properties: balls that are flattened in the human body; shells having the sole purpose to spread asphyxiating or harmful gases; poisons and poisoned weapons, choking, poisonous or other similar gases; bacteriological agents; means affecting the natural environment, which have wide, long-term or serious effects, such as ways of destroying, doing harm or causing harm. Methods of warfare are the ways of using warfare means. The prohibited methods of warfare include: a treacherous murder or wounding people belonging to the enemy's forces; assault on people who gave up weapons; taking hostages; ordering not to leave anyone alive, the threat of this or conducting warfare on this basis; compulsion of persons to serve in the armed forces of a hostile state; bombardment of unprotected cities; the misuse of national and international protective emblems, etc. [Valeev, Kurdyukov 2010: 175 – 176]. International law prohibits the use of certain types of conventional weapons in the war. Non-selective weapons are weapons that cannot be directed to a particular military object, or the consequences of which cannot be limited as required by international humanitarian law. The ban on such weapons is also supported by the general prohibition of non-selective attacks [3].

Also, it should be noted that chemical weapons belong to prohibited means of warfare. «Chemical Weapons» means the following, together or separately: a) toxic chemicals and their precursors; b) munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph a), which would be released as a result of the employment of such munitions and devices; c) any equipment specifically designed for use directly in connection with the employment of munitions and devices specified in subparagraph b) [1].

After analyzing the work of these authors, it is to be noted that much attention was paid to the types of prohibited methods and means of warfare. However, there is a need to investigate the types of prohibited methods and means at the current level of society development and to consider some regulatory acts, including the Cluster Munitions Convention 2008 and the Arms Trade Treaty 2013. Accordingly, the first document states that each State Party never undertakes under any circumstances to: a) use cluster munitions; b) develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, cluster munitions; c) assist, encourage or induce anyone to engage in any activity prohibited to a State Party under this Convention. «Cluster munitions» mean conventional munitions that are designed to disperse or release explosive sub munitions each weighing less than 20 kilograms, and include those explosive sub munitions [7].

The object of the Arms Trade Treaty is to: prevent and eradicate the illicit trade in conventional arms and prevent their diversion; establish the highest possible common international standards for regulating or improving the regulation of the international trade in conventional arms. This is for the purpose of: contributing to international and regional peace, security and stability; reducing human suffering; promoting cooperation, transparency and responsible action by States Parties in the international trade in conventional arms, thereby building confidence among States Parties [6].

Conclusions. To sum up, we can conclude that the state of international relations at the present level, which includes nuclear-weapon States, international wars and conflicts in various parts of the world and accompanied by crimes against humanity and the most terrible mass annihilation of the civilian population - requires decisive actions from the world community as a whole and from each state. This is due to the need to overcome the explosive situations for all humanity by legal methods and to prevent and avoid a large number of civilian casualties, as well as their suffering, which may be caused by military action. Therefore, having considered the international legal acts, we assume that it is the problem of preventing the use of new types of weapons, which by their properties can lead to global problems of mankind and to the destruction of all life on our planet is one of the greatest problems of contemporary world development, which is fixed in many normative acts regulated by international humanitarian law and needs constant improvement.

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EVALUATION OF ENVIRONMENTAL LITERACY, ETHICS AND ATTITUDES OF HIGHER EDUCATION STUDENTS, IRANIAN PERSPECTIVES

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Abstract: Environmental education as a global issue developed around the world. Tbilisi 1978 Decelerating *emphasized on environmental education as* learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. To gain an insight into Iranian students' views on the environment, a survey was carried out on 200 respondents of University of Tehran. The themes identified within the interview data lead us to suggest three important context variables: environmental literacy, environmental ethics and environmental attitude. To assess each category, an applied framework had developed. Four choice questionnaires had been analyzed using MS Excel 2007. The results illustrated that students with a higher degree, have more desirable responses. Male students performed better in only environmental literacy. This is also confirmed by the results that students of agricultural discipline were preponderant in environmental literacy and attitude and Humanities program's students in environmental ethics. The results demonstrated that Iranian higher education students are medium in all categories. But they are not good followers for green programs, because there is no support for these activities. Therefore, this is recommended to revise in higher education curriculum and create opportunities for environmental programs all over the country.

Keywords: Environmental ethics, ecological consciousness, environmental attitude, Iran, student

Introduction: Cultivating knowledge of the scientific and social significance of the environment is the first step in the founding of an environmentally friendly society. It is through knowledge and awareness that positive values and attitudes emerge, values and attitudes that will prompt action to make the adjustment to lifestyles and consumption habits that will reduce the burden we place on the environment (Kwan and Stimpson, 2003). Towards remedying environmental challenges and effecting an improved sharing of

responsibility among all the world's human inhabitants, an urgent need is, clearly, effective global environmental education (Stapp and Polunin, 1991).

Since the 1970s, it has been acknowledged that environmental education has an essential role to play in fostering environmental interrelations to promote sustainable societies, however, the theoretical and practical debates within environmental education are ongoing. Proposals for environmental education developed from growing concerns about the degradation of natural resources and the ever-increasing social inequalities and injustices that arise from unrestrained global economic development (Storey and Oliveira, 2004).

Any effective strategy to achieve sustainable development has to be rooted in environmental education (Bynoe and Hale, 1997). Curriculum objectives, such as, environmental attitude, knowledge, and awareness (AKA), have been investigated in the literature as ways to improve the overall behavior of future citizens toward the environment (Vega, 2004). To develop an environmentally literate society- that is, to build national capacity to develop and deliver high quality environmental education programs and materials- is going to require massive investment every year from now on into the foreseeable future (Potter, 2010). Environmental education is an essential tool for training students and individuals to live in a sustainable society (Tsai, 2012). Environmental education is getting attention from people who are concerned with the problem of a sustainable environment (Rii, 2000). Environmental awareness is a term refers to the growth and development of awareness, understanding and consciousness toward the biophysical environment and its problems, including human interactions and effects. It indicates the meaning of thinking "ecologically", or in terms of ecological consciousness (Ahmed and El-Khatee, 2012). Environmental education should entail widespread education reform is nowadays becoming stronger and more evident (Kwan and Stimpson, 2003). Effective environmental education for sustainability is not just a curriculum issue; it requires the involvement of the whole university (Department of Environment and Heritage of Australia, 2005). *Students need to be experienced in using investigative and critical thinking and have problem-solving skills in solving environmental problems* (Hamidian and Babapour, 2010). Issue-based learning programs are more effective and applied in comparison to knowledge-based studies (Knamiller, 1983). Sauv  recommends using environmental education for the development of responsible societies, instead of environmental education for sustainable development, as this would give environmental education a much richer ultimate goal (Sauv , 1996). Only when the universities change their own culture, will students be able to learn how to integrate new ethics, new worldviews and new ways of collaboration, which belong to the paradigm of sustainability, into their own professional worldviews and practice (Na'jera et al, 2006).

In the United States, since 1992, almost \$ 100 M has been spent to increase the public's awareness of environmental issues. One of the key factors of success in Taiwan's sustainability accomplishments will be attributed to the environmental education in the past decade (Tsai, 2012). Over the last decade, Singapore, has been attempting to develop a cross-curricular environmental education program (Kwan and Stimpson, 2003).

In Turkey and Macedonia, environmental education mostly include knowledge while does not concern about environmentally responsible behavior (ERB) (Srbinovski et al, 2010).

Environmental Education (EE) in Iran. Environmental policies in Iran include "Monitoring and Conservation", "disciplinary and Punishment" and "Development and Education". While governmental regulations are developed toward first two approaches, indeed there is no law concerned to education (Shamekhi, 2011). However; 4th Economical, Social and Cultural National Act emphasizes on environmental education as a crucial key to improve ecological conscious (Management and Planning Organization, 2004). The 4th ESCNA represents EE in formal and non-formal efforts. The first starts on kindergartens and ends in universities. Therefore, the act persists on EE for every citizen in order to sustainable society.

Iranian Higher Education and EE. Approval of 4th ESCNA encouraged higher education institutes to be more environmentally impressive. "Green University Project" done by a number of academies. Some universities offer EE as an elective course in undergraduate degree (Management and Planning Organization, 2004).

University of Tehran, National Paradigm of Science. University of Tehran found at 1934. The university has 33000 students in 2012. UT as oldest university in the region offers a variety of studying programs in 171 department, school and research centers both in bachelor and graduate degrees. UT is known as national paradigm of science and also national leading university.

Research Methods. To evaluate environmental literacy, attitude and ethics, open questionnaires including forty multiple choice questions distributed among UT students. Finally two hundred and one, filled questionnaires received. According to research aims, following items extracted using MS Excel 2007.

Environmental Literacy, or eco-literacy, defined as intending not only “understanding of the language of the environment, but also its grammar, literature and rhetoric” (Environmental Decision Making, Science, and Technology, 2003).

To evaluate environmental literacy, the following framework had been designed;

Environmental Literacy Framework	Performance Ranking		
	Expert	Competent	Limited
Proficiency knowledge of Geography, Environmental Challenges, Air Pollution, Endangered Species and Natural Resources	At least 13 correct answers	Properly answered to 6 to 12 questions	True answers were less than 6

The results illustrated regarding to study degree, field of study and gender.

	Expert	Competent	Limited
Study Degree			
Undergraduate	5	74	11
Master	7	49	4
Doctoral	10	34	6
Field of Study			
Agriculture	13	42	5
Engineering	4	32	4
Medicine	3	17	0
Science	3	31	6
Humanities	2	32	6
Gender			
Male	19	69	12
Female	11	80	9

Environmental Ethics:

To assess environmental ethics, the students answered to this question that, do you attempt to conserve the environment? The findings are represented according to study level, field of study and also gender.

	Yes	No
Study Degree		
Undergraduate	71	19
Master	44	16
Doctoral	45	5
Field of Study		
Agriculture	53	7
Engineering	31	9
Medicine	17	3
Science	30	10
Humanities	36	4
Gender		
Male	83	17
Female	84	16

Environmental Attitude

Environmental attitude analysis implemented using following framework:

Environmental Attitudes Framework	Performance Ranking		
	Conscientious	Mediocrity	Apathetic
Attempting to environmental events such as “Plant for the Planet”, “ CFC free” and /or “ Ozone	Scored greater or	Participating in 2 or 3	Inconsiderable attendance,

friendly”	equal to 4	environmental event yearly	less than 2 attempts per year
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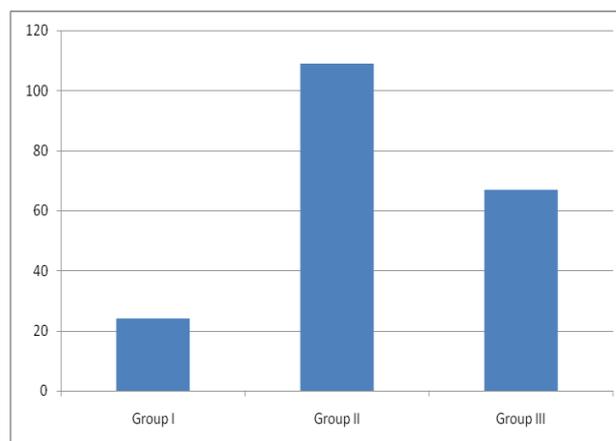
The total number of students in each category displayed in Table X

	Conscientious	Mediocrity	Apathetic
Study Degree			
Undergraduate	4	58	28
Master	4	44	12
Doctoral	8	30	12
Field of Study			
Agriculture	8	39	13
Engineering	4	24	12
Medicine	0	13	7
Science	1	24	15
Humanities	3	23	14
Gender			
Male	7	59	34
Female	9	64	27

Following Environmental Programs, Green Blogs ...

To clarify that how long the students spend their time for the environment, the following structure had been designed.

Permanency	Days per week
Group I	At least 4
Group II	2 to 3
Group III	Less than 2



Discussion. The results revealed that the majority of students have a satisfactory level of environmental literacy. Students of agricultural sciences have a high eco-literacy level. According to our analysis, students with a higher degree, have a greater environmental knowledge. Male students, had better responses to the questions related to environmental literacy, where as girls were better in environmental ethics and attitudes cases. The results demonstrated that Iranian students mostly persuade people to save the planet. Students of Humanities program were better than others in environmental ethics, in a similar way; girls were better and also post graduate students in comparison to bachelor and master students. According to the results, students of agricultural discipline, have a more positive ecological attitude. The results of analysis by gender and study degree are as same as ethics issues. As overall conclusion, Iranian students have a medium level of environmental knowledge, the mainly are good developers of environmental ethics. But on the other hand, they do not follow green programs and activities, continuously. Because there is no dynamic environment for environmental activities. Since green NGOs, blogs and Medias had been ignored

during development projects of the country. There is no environmental approach in university curriculums. Therefore, this is recommended to revise in higher education curriculum and create opportunities for environmental programs all over the country.

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DIE BESONDERHEITEN DER ERKENNUNG UND HEILUNG VON HAUTKREBS

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Abstract: Das Problem des Krebses ist immer noch aktuell. Der Hautkrebs ist einer der häufigsten onkologischen Erkrankungen. In dieser Arbeit betrachte ich die Gründe warum Hautkrebs entsteht, die Symptome dieser Erkrankung und Methoden des Hautkrebscreenings. So lange die Medizin nicht stillsteht, gibt es neue Behandlungstherapien, über die ich am ende meines Vortrags erzählen werde.

Schlagwörter: Krebs, Hautkrebs, Symptome, Hautkrebscreenings, Behandlung

Einleitung: Krebs ist die Geißel der Menschheit. Bei der Sterberate steht Krebs an zweiter Stelle nach Herz-Kreislauf Erkrankungen, die Menschen fürchten jedoch eher den Krebs. Viele tausende von Forschern versuchen, ihre Ursachen zu verstehen, Wege zu finden, den Krebs zu verhindern und zu behandeln. Dutzende von Instituten und Hunderte von Laboratorien auf der ganzen Welt arbeiten an diesem Problem und sorgen für ein erfolgreiches Verständnis und langsame, aber stetige Fortschritte in der Prävention und Behandlung.

Mit dieser Arbeit will ich eine der häufigsten bösartigen Neoplasien betrachten – Hautkrebs. Das Ziel dieses Vortrags ist den Menschen alles über diese Erkrankung zu erläutern. Was ist eigentlich Hautkrebs? Was sind Risikofaktoren für diese Erkrankung? Welche Methoden des Hautkrebscreenings gibt

es? Was sind die ersten Symptome für Hautkrebs? Auf alle oben gestellten Fragen werde ich im Laufe dieser Arbeit antworten.

Diskussion und Ergebnisse. Zuerst will ich euch nähere Informationen über Hautkrebs geben. Hautkrebs ist ein häufiges und lokal destruktives kanzeröses (malignes) Wachstum der Haut. Er stammt von der Zellen, die entlang der Membran angeordnet sind, die die oberflächliche Hautschicht von den tieferen Schichten trennt.

Es gibt drei Haupttypen von Hautkrebs: Bazalzellkarzinom (am häufigsten) und Plattenepithelkarzinom (die zweithäufigste), die von Hautzellen stammen, und Melanom, die aus pigmentproduzierende Hautzellen (Melanozyten) stammt, ist weniger verbreitet aber gefährlicher als die anderen beiden Arten.

Es gibt eine Menge von Risikofaktoren für Hautkrebs:

1. Ultraviolettes Licht, entweder von der Sonne oder von Sonnenbänken. Hellhäutige Personen mit haselnuss- oder blauen Augen und Menschen mit blonden oder roten Haaren sind besonders gefährdet. Das Problem ist in Gebieten mit großer Höhe oder in der Nähe des Äquators, wo die Sonneneinstrahlung intensiver ist, schlimmer.
2. Ein chronisch unterdrücktes Immunsystem von Grunderkrankungen wie HIV/AIDS-Infektion, Krebs oder von manchen Medikamenten.
3. Exposition gegenüber ionisierender Strahlung (Röntgenstrahlen) oder Chemikalien, von denen bekannt ist, dass sie für Krebsarten wie Arsen anfällig sind.
4. Bestimmte Arten von sexuell erworbenen Warzenvirusinfektionen.
5. Menschen mit einer Vorgeschichte von einem Hautkrebs haben eine 20%ige Chance, in den nächsten zwei Jahren einen zweiten Hautkrebs zu entwickeln.

Um Hautkrebs zu erkennen kann man folgende Methoden des Hautkrebsscreenings nutzen. Am wichtigsten ist die visuelle Inspektion der Haut zunächst mit dem „unbewaffneten“ Auge. Viele pigmentierte Hautkrebse weisen das so genannte „Hässliche-Entlein Phänomen“ auf und heben sich deutlich von anderen Hautverfärbungen ab. Eine wichtige Ergänzung ist die Auflichtmikroskopie mit dem Dermatoskop oder computergestützten Systemen, die die diagnostische Genauigkeit erhöht. Verlaufskontrollen durch bildspeichernde Systeme eignen sich, Veränderungen in bestehenden Hautmalen nachzuweisen.

Die Chance auf vollständige Heilung hängt bei Hautkrebsen von der frühzeitigen Diagnose ab. Durch Einsatz der Dermatoskopie werden Veränderungen sehr früh erkannt. Verlaufskontrollen und digitale Hautfotographie zeigen bereits winzige Strukturveränderungen an und erlauben damit schnellere Diagnosen.

Es ist wichtig zu wissen, an welchen Stellen der Haut bildet sich die Frühform des Krebses am häufigsten. Gefährdet sind vor allem die stark beschienenen „Sonnenterrassen des Körpers“ – also Stirn, Ohren, Nase, Dekollete, Hände, Unterarme und bei Männern die haarlosen Stellen am Kopf. Viele interpretieren die rötlichen, schuppigen und rauen Stellen als normale Alterserscheinung, die sie aber nicht sind.[Prof. Dr. Dirschka 2015: 55-58]

Was sind die Warnzeichen für Hautkrebs? Hautkrebs einschließlich Melanom, Basalzellkarzinom und Plattenepithelkarzinom - beginnen oft als Veränderungen der Haut. Sie können neues Wachstum oder präkanzeröse Läsionen sein - Veränderungen, die kein Krebs sind, aber im Laufe der Zeit zu Krebs werden können. Schätzungsweise 40% bis 50% der hellhäutigen Menschen, die 65 Jahre alt werden, entwickeln mindestens einen Hautkrebs.

1. Aktinische Keratose (Sonnenkeratose)

Diese kleinen, schuppigen Flecken werden durch zu viel Sonne verursacht und treten häufig an Kopf, Hals oder Händen auf. Sie können ein frühes Warnzeichen für Krebs sein, aber es ist schwer zu sagen, ob sich ein bestimmter Patch im Laufe der Zeit weiter verändert und kanzerös wird. Die meisten Ärzte empfehlen eine frühzeitige Behandlung, um die Entwicklung von Plattenepithel-Hautkrebs zu verhindern.

2. Aktinische Cheilitis

Im Zusammenhang mit aktinischer Keratose ist aktinische Cheilitis eine präkanzeröse Erkrankung, die normalerweise auf den Unterlippen auftritt. Es können Schuppenflecken oder hartnäckige Rauigkeit der Lippen vorhanden sein. Weniger häufige Symptome sind eine Schwellung der Lippe, Verlust der scharfen Grenze zwischen Lippe und Haut und hervortretende Lippenlinien. Aktinische Cheilitis kann sich zu invasivem Plattenepithelkarzinom entwickeln, wenn sie nicht behandelt wird

3. Dysplastische Nävi (atypische Muttermale) atypische Muttermale sind kein Krebs, aber sie können zu Krebs werden. Sie können in sonnenexponierten oder sonnengeschützten Bereichen des Körpers gefunden werden. Atypische Muttermale können größer und unregelmäßiger in der Form sein, mit eingekerbten oder verblassenden Rändern. Sie können flach oder erhaben sein oder die Oberfläche glatt oder rau sein. Sie sind typischerweise von gemischter Farbe, einschließlich Rosa, Rot und Braun

Um Hautkrebs rechtzeitig zu erkennen soll man sich die ABCDE- Regel merken.

A ist für Asymmetrie. Asymmetrie bedeutet, dass eine Hälfte eines Muttermals nicht mit der anderen Hälfte übereinstimmt. Normale Muttermale sind symmetrisch.

B ist für die Grenze. Wenn der Rand oder die Ränder des Muttermal zerlumpt, verschwommen oder unregelmäßig ist, lassen Sie ihn von einem Dermatologen überprüfen

C ist für die Farbe. Ein Muttermal, das nicht die gleiche Farbe hat oder das braun, schwarz, blau, weiß oder rot ist, ist verdächtig. Normale Male sind normalerweise ein einziger Farbton.

D ist für den Durchmesser. Ein Muttermal ist verdächtig, wenn der Durchmesser größer als der Radiergummi eines Bleistifts ist.

E ist für die Entwicklung. Ein Muttermal, der sich entwickelt - schrumpft, wächst größer, verändert die Farbe, beginnt zu bluten - sollte überprüft werden. [Debra Jaliman (2016)]

Welche neuen Therapien setzen Ärzte beim hellen Hautkrebs ein?

Einzelne Stellen lassen sich operativ entfernen. Wir setzen hier aber nicht nur das Skalpell ein, sondern auch Laser und spezielle Medikamente in Creme- oder Gelform. Wichtige Therapiesäulen sind außerdem die immunmodulierende Therapie und die Photodynamische Therapie. Hier kurieren wir die geschädigte Haut durch UV-Licht. Ein fortgeschrittenes, nicht operables Basalzellkarzinom lässt sich mit einem Medikament behandeln, das einen bestimmten Signalweg in den Tumorzellen blockiert. Die Arznei gibt es in Tablettenform. Gegen dieses maligne Melanom sind eine Reihe neuer Medikamente auf dem Markt. Neue Therapien nutzen Antikörper, um das Krebswachstum bei Patienten mit fortgeschrittenem schwarzen Hautkrebs zu stoppen. Sie regen das Immunsystem dazu an, die Krebszellen effektiver zu bekämpfen. Studien haben eine längere Überlebenszeit durch die Medikamente erwiesen. Zudem setzen wir Kombinationen von Medikamenten ein, um Resistenzen gegenüber den Arzneien zu verhindern und diese effektiver zu machen. Es gab Fortschritte in den letzten Jahren, und weitere stehen bevor. [Prof. Dr. Dirschka 2015: 55-58]

Schlussfolgerungen. In Zusammenfassung will ich sagen, dass Hautkrebs eine gefährliche Krankheit ist, aber es kann früh erkannt und geheilt werden. Dafür muss man Risikofaktoren Aufmerksamkeit schenken und wenn es möglich ist sie vermeiden. Es ist auch wichtig die Symptome zu kennen, deshalb rate ich allen Menschen die ABCDE-Regel auswendig zu lernen.

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УДК 908

KYRYLO ROZUMOVSKY – THE LAST HETMAN OF COSSACK UKRAINE

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Abstract: The article is devoted to life and activity of Kyrylo Rozumovsky. We determine the role of Kyrylo Rozumovsky in the history of our country. He carried out reforms in judicial, military, educational spheres of life of Ukrainian society. All of his reforms were aimed at transforming the paramilitary state into a modernist, and he wanted to establish the power for himself for life, having acquired the right to inherit it and transforming the **Hetmanate** into a nobility-dominated state. Rozumovsky was the last Hetman of Ukraine.

Key words: hetman, history, inherit, reform, transform,

Introduction. While Biron brought Ukrainians little in the way of benefits, the husband of the next empress, Elizabeth, was more helpful. When she came to power in 1741, Elizabeth's consort was Oleksii Rozumovsky, a simple, personable Cossack from the Hetmanate who had caught the fancy of future empress when he had been a singer in the imperial choir. Although Oleksii avoided politics, he did have a great affection for his homeland. Apparently, some of this attitude rubbed off on his wife, especially after she had been received with great enthusiasm on a visit to Kyiv in 1744. On that occasion, the Ukrainian starshyna approached Elizabeth with yet another request for a new hetman. The empress responded positively. She put the matter off because the candidate she had in mind, Kyrylo Rozumovsky was only sixteen and needed experience before he could take the post. Kyrylo was sent off to study to the universities of Western Europe.

The object matter of the article is to study the Cossack epoch of the history of Ukraine.

The subject matter is the history of life of Kyrylo Rozumovsky

The objective of the article is to determine the role of Kyrylo Rozumovsky in the history of our country.

Tasks: Explain the specificity of the Cossack's epoch, determine the role hetman Rozymovsky in the history.

Methods: Descriptive, Retrospective

Materials: facts from the life of Kyrylo Rozumovsky.

Discussion and Results. At the age of eighteen Rozumovsky became president of Russian Academy of Sciences, and four years later he was hetman of Ukraine. Under Rozumovsky, the Hetmanate experienced the golden era of its autonomy. Although he spent a lot of time in St. Petersburg where he was deeply involved in court politics, Rozumovsky maintained close contacts with the Left Bank. Realizing that the society of Hetmanate had become too complex for starshyna to perform judicial as well as administrative and military functions, Rozumovsky started organizing a separate judiciary. In 1763 the Hetmanate was divided into 20 judicial districts, each of which had courts specializing in criminal matters, boundary claims and property conflicts. Judges were elected from among the landowning elite. The starshyna's political rights were expanded, and they assembled to confer more frequently. At their 1763–4 general assembly in Hlukhiv they discussed major issues and projects for state reform and adopted shliakhetstvo (**nobility**) as their official name. Rozumovsky extended the possibility of becoming a starshyna to non-Cossack **estates**, such as the **clergy** and the burgher elite. In 1760 he restricted the mobility of the **peasantry**. During his frequent stays in Saint Petersburg the Hetman state was ruled by the starshyna.

During the 14 years of Hetman Razumovsky conducted a judicial (introduced sub-Comoros, Grodno and Zemsky courts) and military (unified the form of Cossacks) reform, divided the Hetmanate into 20 parts. All of his reforms were aimed at transforming the paramilitary state into a modernist, and he wanted to establish the power for himself for life, having acquired the right to inherit it.

Rozumovsky also succeeded in extending the hetman's authority over Kyiv and the Zaporizhians. He initiated a somewhat superficial attempt at modernizing the Cossack army by systematizing its drills, providing it with uniforms and improving its artillery. Much attention was paid to the retention and equipment of combat Cossacks' horses. Military training was recommended to spend in their spare time. It was extremely important. Particularly highlighted the ability of the Cossacks to quickly charge a shotgun and shoot it in the conditions of a pedestrian battle. The strict requirements relate to the retention of Cossack weapons. In particular, the shotgun was subject to a mandatory daily cleaning.

Plans were drawn up to establish a university in Baturyn and to extend primary education to the sons of all Cossacks. But political developments prevented their implementation. Rozumovsky did succeed in bringing a touch of European gardens and a theatre in which visiting Italian opera companies performed.

Unfortunately, under the influence of Cossack elders who owned peasant serfs, the Hetman considerably limited the rights of peasants. In 1760 he issued a decree that allowed peasants to change their place of residence only with the permission of their previous owner. Even then, all the property of the peasant who wanted to move remained in the possession of the previous owner.

K. Rozumovsky disliked drunkenness, smoking and the excessive spread of wineries in Ukraine. In 1761 he issued a special decree to curtail this activity with licenses to be given only to senior commanders and Cossacks who owned cultivated land and forests. The clergy, Russian landlords and visitors from other regions and countries were also forbidden to own taverns and wineries.

Even the lenient Elizabeth did not respond positively to many of his initiatives. When he asked for permission to establish diplomatic relations with European courts the petition was refused. The answer was also negative when he tried to have Ukrainian troops exempted from wars not directly related to Ukrainian interests. Even during these favorable times for the Hetmanate's autonomy some aspects of imperial centralization were pushed through. In 1754 the budget of the Hetmanate was put under Russian control and the customs boundary between Ukraine and Russia was eliminated. When Rozumovsky sought a free hand in distributing lands on the Left Bank he was informed that only the empress enjoyed this prerogative. It was clear that there were established limits to the extent to which Ukrainians were to be allowed to control their own affairs.

The wide-ranging program for modernizing the Hetmanate, Rozumovsky's participation in it, and the political activation of the Ukrainian **nobility** were completely at odds with the aims of the Russian government, and in the 1750s the government began limiting the Hetmanate's economic and political rights. In 1754 the Hetmanate's finances were brought under imperial control, and import and export **duties** in the **Hetmanate** were abolished. In 1755 the border **tariffs** between Russia and Ukraine were removed. In 1756 the supervision of Little Russian affairs, including control over the **hetman's** appointments

of **colonels** and other officials and his distribution of hereditary estates to his relatives and supporters, was returned to the Russian Senate. In 1761 the Senate took over control of **Kyiv** from Rozumovsky. The government of the new empress, **Catherine II**, intensified Russian centralist policies with respect to Ukraine even further.

In 1763 he submitted to Empress Catherine II a project to establish two universities, several high schools and other educational institutions in Ukraine. The Kiev-Mohyla Academy was to be placed under the hetman's charge, with only the theology department still being under the metropolitan's jurisdiction. This project was not carried out.

Hetman Razumovsky's aspiration for independence greatly irritated the tsarist bureaucrats. They prodded Empress Catherine II into making the final decision to abolish Ukrainian statehood, starting with the hetman's office as its main factor. The formal pretext was a petition to the tsarina, signed by most senior Cossack commanders at the Hlukhiv session in late 1763, with a request to return "the legitimate rights, freedoms, and privileges" to the hetmanate as well as to make the office hereditary in the Razumovsky family. By an ukase of November 10, 1764, K. G. Razumovsky was stripped of hetman's office, which was abolished. To govern Ukraine, the same ukase established the Little Russian Collegium (second) presided over by Count P. A. Rumiantsev. Simultaneously, the empress promoted the former hetman to the office of general field marshal and later member of the State Council (1768-1771).

Conclusions. Rozumovsky's own social policies, aimed at transforming the **Hetmanate** into a nobility-dominated state, created greater social disparities and conflicts, and his dynastic plans met with concerted opposition from many members of the new **nobility**. Those difficulties were compounded by the losses Ukraine suffered as an unwilling participant in the Seven Years' War. **Catherine II** used Rozumovsky's petition to make his descendants hereditary **hetmans** as a pretext for forcing his resignation in November 1764, and placed the Hetmanate under the control of the **Little Russian Collegium**. Rozumovsky was compensated with the rank of field **marshal**, an enormous pension, and many estates in Ukraine, including the towns of **Hadiach** and Baturyn. He subsequently traveled in Germany, France, and Italy (1765-7) and led the life of an aristocrat in Saint Petersburg (1766-76), **Baturyn** (1776-85, 1794-1803), and Moscow (1784-94).

Unfortunately, this time of relative peace, rule of law, economic growth and flourishing cultural life of Ukraine lasted but for a short time. In 1761 the Empress Elizaveta Petrovna died, and Catherine the Second became the Tzarina. In 1764 she ordered Rozumovsky to abnegate his Hetman powers and dissolved the Hetmanate. Thus, Kyrylo Rozumovsky was the last Hetman of Ukraine. He later lived in Petersburg, but before his death he returned to Ukraine, to Baturyn, where he died in 1803, at the age of 75.

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ACTUAL PROBLEMS AND POSSIBLE WAYS OF THEIR SOLUTION IN THE SPHERE OF POPULARIZATION OF MODERN SCIENCE

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Abstract: Science is the most important instrument in the development of any civilization. The article comprises such important issues as the development and promotion of science through mental and material resources. Actual problems and ways to diffuse and popularize science by making it easily accessible to society at large are shown and analyzed in the paper.

Key words: science, popularization, instrument, civilization, development, mental and material resources.

Presently in Ukraine is the question about the state of scientific, research and pedagogical activity. The questions about current state of affairs and searching for relevant and effective methods for solving the problem become relevant nowadays.

Thus, with a report at the meeting of the Bureau of the Department of Physics and Astronomy of the NAS of Ukraine on the popularization of science was made by a young scientist candidate of physical and

mathematical sciences, senior research fellow of the Institute of Physics of the National Academy of Sciences of Ukraine Anton Senenko.

The report stressed that the main problems of the Ukrainian science are: low budget financing, lack of motivation for scholars to self-promotion, lack of media interest and difficulties in introducing innovations [Senenko 2016]. The author proposed several ways to solve the problem, among which the most effective is the popularization of science in the Facebook network.

Thus, a movie "FAQ of science in Ukraine" was spread over the network and collected about 200 thousand views, which is one of the records in the popularization of science in Ukraine. Communication with leading mass media (news agencies, TV channels, radio stations) is also established, cooperation with Internet resources, work is underway to create a School of a scientific journalist.

Interesting results are shown by a study conducted by the Sociological Group "Rating" in autumn of 2017 in which scientists from 35 scientific and pedagogical organizations of the largest cities of the country (Kyiv, Kharkiv, Odesa, Lviv, Dnipro) were interviewed) [Sociological group "Rating" 2017]. Summarizing the authors, 86% of respondents believe that scientists should be engaged in the popularization of science of which 45% are personally engaged in it. Of those who had the experience of popularization, 85% were engaged in it on a public basis, despite the fact that 41% of respondents believe that such events should be paid. 90% of respondents consider it necessary to create in Ukraine a center that specializes in popularizing and supporting national science, 93% said that it is important for them that their studies find practical application and bear significance. However, the results of the study are also negative. Thus, only 2% of respondents said their research was financed sufficiently, 87% of respondents said they wished to quit scientific work due to insufficient research funding (57%), 41% disappointed in Ukrainian science. Selective population – 1000 respondents, personal formalized interview (face-to-face).

For the last two years the science intensity of GDP in Ukraine has decreased fourfold at once and amounted to only 0.6%. However, given the high level of "shadowing" of the Ukrainian economy, in fact, its science intensity does not exceed 0.4% of GDP. At the same time, the tendency to a constant increase in the science intensity of GDP is observed all over the world. Up to the point that this indicator was considered to be the key factor of state competitiveness, and its importance for the world economy as a whole increased from 2.1% in 2000 to 2.4% in 2014 [Serdyukov I. 2017].

Employees of the institutions of the National Academy of Sciences of Ukraine are carrying out activities to popularize science—"Days of Science", "Festival of Science", as well as Scientific picnics. Thus, employees and students of V. N. Karazin Kharkiv National University on a regular basis regularly hosts the "Nights of Science", Open Doors Days, excursions at the faculties, and mobile exhibitions of interesting science for schoolchildren and prospective students, which significantly affects the interest of the younger generation in science.

On improving the state of affairs at V. N. Karazin Kharkiv National University can be judged by the totality of indicators that form the international ranking of universities QS World University Rankings [QS World University Rankings® 2016-2017]. So, 2015-2016 the University was the second in terms of indicators in the country and 480-500 in the world, today the University is the first in terms of indicators in the country and 382 in the world, which shows the positive dynamics of development of the University.

Separately it is worth noting such events as open popular science lectures "15x4", which have become quite popular in Ukraine. They show high attendance and high interest, both among schoolchildren and students, young scientists, and among the population, not related to the scientific or pedagogical environment.

Conclusions. Science is almost the only tool and remedy for the development of modern civilization. Wishing to reach the level of development of the most important states of the world, Ukraine should pay considerable attention to the development of science.

The actual problem is the involvement of scientific and pedagogical staff, their interaction with both academic leadership and potential audience, the lack of financing scientific activities is acute.

In conclusion, it is necessary to say that urgent and effective solutions are strongly recommended. Thus, indifferent citizens are continuously searching for such solutions.

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WAR AS A DIRECT CONSEQUENCE OF ETHNIC CONFLICTS ON THE EXAMPLE OF THE BOSNIA CRISIS

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Abstract: The article examines the ethnic aspect of the Bosnian conflict, the relationship between ethnic groups in Bosnia and Herzegovina during the period of military operations. Attention is focused on the need to extract the maximum experience from the events that occurred and use it in the current political situation in Europe and the world.

Key words: Bosnia and Herzegovina, ethno-cultural conflicts, ethnic cleansing, war crimes.

Introduction. Nationalistic movements, chauvinistic ideas, theories of racial superiority – all this, by no means are new. These concepts, gradually formed during the first half of the twentieth century, have successfully passed the test of time and still exist. Now it is not rare in the news to hear about actions or incidents involving public organizations that openly profess chauvinism. The ideology and worldview of such societies is based on the cultural and ethnic values of the people to which its members belong. A special role in such structures is played by historical memory and culture, as well as by the ethnic factor. However, we should not dismiss the fact that quite often political actions (the seizure of territory, the presentation of a certain kind of claims to another state) are justified by ethnic rights (which could be observed at the actions of Russia regarding Ukraine in the spring of 2014).

The main object-matter is the analysis of the ethnic aspect of the conflict in the territory of Bosnia and Herzegovina 1991-1995.

The subject matter is the ethnic groups in Bosnia and Herzegovina, their mutual relations.

The objective of the article is to present ethnic conflicts in the form of an example, to consider as a lesson from which is possible and necessary to extract experience in order to avoid the repetition of the Bosnia script in the 1990s.

Tasks: to analyze the composition of the population of Bosnia and Herzegovina before the outbreak of hostilities; to consider key points in the course of events; to find out how the experience of the Bosnian conflict can be used in today's political realities, particularly in Ukraine.

Mainly applied the logical and comparative-historical research methods, which based on the analysis of the used sources. It allows to analyze the trends of the development of the Bosnian conflict and come to the following conclusions.

Discussion and Results. The diversity of peoples in Bosnia and Herzegovina (hereinafter – BaH), their cultural differences, the desire to create an independent state, but at the same time, the presence of many disputed territories in the conditions of the break-up of Yugoslavia led to the Bosnian crisis. After all, even Prime Minister of BaH Y. Pelivan in September 1991 said that in the government, the parliament and ministries, a section on the national principle is felt. In addition, he openly admitted the existence of illegal armed formations in the republic, which “provoke armed clashes” [Rat se prenosí na Bosnu, 1991: 6].

An important factor in the escalation of the Bosnian conflict was the fact of the multicultural population. According to the last 1991 peace census in BaH, Muslims made up 1.9 million (43.7%), Serbs – 1.7 million (31.4%), Croats – 0.75 million people (17.3%). The majority of Muslims lived in the central regions of Bosnia, the Serbs in the western and eastern, and the Croats in the south of BaH. But, interestingly, in terms of occupied territory, Serbs were leaders – 53.3% of BaH was dominated by them [Ralich P, 1992: 3].

Much importance in the development of events should be given to the religious and cultural views of each of the three above-mentioned national groups. After all, Muslims (the most numerous ethnic group) professed Islam, the Serbs belonged to the Orthodox Christian church, and the Croats belonged to the Western (Catholic) one. The long contradictions between all these religions, which carried a part of historical

memory, served as an additional catalyst in aggravating relations. With the collapse of Yugoslavia, each of the republics sought to find an independent way to salvation.

The Serbs were followed by protests (right up to boycotting the parliament), based on their reluctance to be in the Catholic-Islamic country, after the adoption on October 15, 1991, of the "Memorandum on the sovereignty of Bosnia and Herzegovina" but later (February 29 – March 1, 1992) a referendum was held on the proclamation of BaH, as an independent state [Nikiforov, 2011: 807]. Despite the fact that the Serbs ignored this action, the decision on independence was accepted with the result "agree" 99.7% of the participants (out of 63.7% of the population who approved the referendum), and on March 5, 1992, BaH officially declared its independence [Trbovich A, 2008: 221].

The Serbian part of the population reacted quickly and arranged a boycott of the referendum, then – declared a disobedience and starting from April it began to form its own state with the center in Banja Luka.

The consequence of this development was the chain of offices and proclamations of independence of individual regions of BaH, among them the Serbian Republic of Bosnia and Herzegovina (arose on January 9, 1992, since August 12, 1992 – the Republic of Serbian Krajina, further – RSK) and the Croatian Republic of Herceg-Bosna (since November 18, 1991). In September 1993, the third participant of the conflict – the Republic of Western Bosnia will join this duo. The first and second republics are sponsored by Serbia and Croatia (that were at war from 1991 to 1995), respectively.

In March 1992, representatives of the RSK with the commanders of the Second Military District of the YPA (the Yugoslav People's Army) decided to take the eastern positions in the country to establish control over the lines of communications. In order to occupy the territory of the Bosnians, where Muslims predominantly reside, between the President of the Croatian Republic of Herceg-Bosna Mate Boban and the President of the Republika Srpska – Radovan Karadzic on May 6, 1992 was signed an agreement.

At the time of the cessation of internecine conflicts, the campaign of ethnic cleansing in Eastern Bosnia begins. Cities and villages turned up under the rule of Serbs, and a lot of men have referred to concentration camps. A vivid example of ethnic antagonism is the case of the burning of 70 Muslims by the Bosnian Serbs on June 27 1992.

The Serbian government began creating concentration camps more effectively. For example, from May 27 to August 16, 1992, there were 3,334 people, of whom 3,197 were Bosnian Muslims and 125 were Croats in the camp in Omarska, which situated in 20 kilometers from the city of Prijedor, according to the Serbian authorities and documents from Prijedor. A similar situation can be traced in the Trnopolje camp, where security was armed even with machine guns [Charges for the International Tribunal for the Former Yugoslavia].

Military operations are intensified in 1993, most of which are accompanied by the Croatian-Bosnian conflict. In January, Croatian troops made another attempt to annex Herzegovina to central Bosnia. This step was actively resisted by Muslims who lived in the area. As a consequence, the previously disjointed actions of individual groups of Bosnian Muslims are now merging into one. In September 1993, they unite under the leadership of Fikret Abdic and create the Republic of Western Bosnia.

In August 1994, Bosnian Islamists (more radical Muslims that were not supporters of F. Abdic) occupy the city of Velika Kladusa, the capital of the Republic of Western Bosnia, from which about 40,000 Muslim autonomists are expelled [Barriot, 2005: 34902-34903]. This fact testifies to the above-mentioned nuance, when ethnic or cultural-religious principles are used to justify political actions. In fact, the territorial motive is traced here clearly.

An intuitive example of national hatred can be the events of July 1995, when in Srebrenica, the UN security zone, the Bosnian Serbs staged mass slaughter of Muslims on the orders of Ratko Mladic. As a result of this action, about 8 thousand people were killed. Finally, international communities (mainly the UN and NATO) interfered in the conflict and armed clashes were stopped by the introduction of peacekeepers, the creation of demilitarized zones, and the signing of the Dayton Agreement in November 1995. As a result, for all these several years of war, about 100 thousand people died, 90% of whom were civilians. Between 2.5 and 3 million people left their homes: 800,000 Serbs from Western Herzegovina, Central and Western Bosnia, 800,000 Muslims from Eastern Herzegovina, Krajina and Eastern Bosnia, about 500,000 Croats from Central Bosnia [Nikiforov, 2011: 839].

Conclusions. Ethno-cultural contradictions of the population of Bosnia and Herzegovina became the starting point of several years of bloody political games. A huge number of people turned into refugees, thousands did not survive this period at all. The desire of each of the nationalities to get their own state, to seize as many territories as possible from the crumbling Yugoslavia and BaH resulted in large number of civilian casualties, repeated ethnic cleansing and killings of civilians, that based on the principle of "not ours", the organization of concentration camps and other war crimes. In my opinion, such events are

unacceptable, in the modern world. However, political instability (for example in Ukraine) makes us turn to the historical past of the whole world. Proceeding from the foregoing, it is possible to realize how dangerous to exist in time unresolved ethnic contradictions within a multicultural and multinational country. Our task is to learn at the lessons of BaH and to prevent scripts like that in the modern world (primarily in our country).

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SPIN-DOCTORING AS AN ELEMENT OF MASS COMMUNICATION

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Abstract: The article is devoted to the concept of “spin-doctoring”. This text deals with social communication and sociology. The concepts "spin-doctoring", “communication”, “media” are mentioned. The text gives a valuable information about the role of spin-doctoring, it is specially noted the influence the audience of spin-doctoring. It is analyzed manipulation technology in modern Ukrainian media with the help of discourse analysis. Conclusions are draw that spin-doctoring in the media is a technology of influencing the human mind by forming a discourse as a functional speech.

Key words: spin-doctoring, communication, media, technology, manipulation, discourse.

Introduction

Public relations (PR) and the creation of a positive image are subsequent and longstanding efforts of many public and nongovernmental institutions. Because of its nature and content, public relations have been identified as bodies in defense of the institution they represent and are often perceived as structures that do not follow the public interest. The conceptual image about the functioning of public relations has been also depicted as the result of perceptions of society and media workers. A wide debate in academic and professional groups about the role and functions of public relations has been dominated in recent years. Various studies have shown that the term “public relations” suggests image building, reputation management and continuous efforts to persuade.

It is important to find an answer not only to the question "what" is said in the text, but also for what this text activity is reproduced [Dridze 1996: 145]. After all, the amount of information and its correctness influence the person's mental development, his awareness, and culturality. Such characteristics allow the formation of consciousness. Under consciousness we mean the ability to understand the surrounding reality.

The formation of consciousness, of course, is influenced by the media that present information in one or another light. And although the term "spin-doctoring" for many sounds unknown, because it is used by a narrow circle of people, but as technology it has existed for more than a hundred years and is an element of mass communication, a technology of manipulating the human consciousness that is being taken by the media.

The **object-matter** is mass communications. The **subject-matter** is spin-doctoring as an element of mass communication.

The **objective** of the work is to describe the role of spin-doctoring in the media, as well as to derive indicators that will help fix the fact of the presence of spin-doctoring in the Ukrainian media.

Tasks of work:

1. Describe the concept of "mass media".
2. Describe the concept of media and technology of media influence.
3. Describe the concept of spin-doctoring.
4. Substantiate the method of discourse analysis in the methodology of studying spin-doctoring.
5. Describe the results of the media discourse analysis.

Method of research: discourse analysis.

Materials:

1. Sources indicated in the list of literature.
2. The results of the author's research on the availability of manipulation technology – spin-doctoring – in modern Ukrainian media.

Discussion and Results. V.V. Rizun defined the concept of "communication" as follows. Communication is a process conditioned by the situation and socio-psychological characteristics of the participants. It includes the formation and support of communication between the participants. Such a connection is formed by means of some unifying factors. The process of unification is based on intellectual-mental or emotional-volitional acts. These acts are mediated by language. V.V. Rizun included in the notion of communication the collection, analysis, interpretation of facts, influence on participants in communication. Different sign systems are influenced by interlocutors. The scientist stressed the presence of influence in communication [Ivanov 2013: 50-51].

All mass communication is most clearly represented in the media. We put forward a hypothesis that the media can attempt to participate in the formation of the consciousness of their audience.

The definition of the media can be extremely short – these are different means of communication. It collects, organizes and disseminates information with a certain periodicity.

Technologies of influence in the media are a combination of successive techniques that are aimed at the formation of certain views among individuals [Vesnin 2016: 71-73].

Spin-doctoring is a political manipulation with the help of mass media. The main lever of pressure is information and the management of its flows [Pogockij: 2]. Based on this information, we formulated the concept of spin-doctoring. Spin-doctoring is the formation or partial modification of information in the media using various manipulation technologies. Such activities as social practice have their consequences.

One of the consequences is the formation of discourse. Recall that a discourse is a set of arguments, reasoning and means of expression that form a functional language created by society, a social group or an organization with a view to spreading a set of ideas, beliefs, norms. [Litovchenko 2004: 46].

Based on this, we put forward the hypothesis that the mass media using spin-doctoring technologies form their own functional «language».

We conducted original research based on specific indicators:

1. Violations of the structure of the edition. The block and hierarchical structures were considered.
2. The duration of the release, the story.
3. Emotional coloring was determined with the help of derived word combinations.
4. Accentuation. The use of word combinations that emphasize attention was considered.
5. Images, symbols.
6. Multiple repeat.

The choice of a news channel for conducting discourse analysis is based on the decentralization of authority in Ukraine. Each district received its representatives of authority. Their activities began to cover the regional news. We chose the Kharkiv news – "Television News Agency" – ATN. ATN news we can find on four TV channels in Kharkiv. Potential audience of ATN is about two million people. According to the latest GfK research, ATN News gathers the largest number of audience in Kharkiv region and is the most rated program on local television which appears on the official website of the channel.

News releases were analyzed for the period from 11.12.2017 to 15.12.2017. At this period ATN released 27 news stories.

Analyzing the news edition for the period from 11.12.17 to 15.12.17 according to the indicators we can confirm the presence of spin-docking as a technology of manipulation in the media.

With the help of this technology the media can attempt to influence the perception of the person and his consciousness. Phrases can form a sense of patriotism, a person's perception of important, relevant at that time events. Moreover, according to Telenkov, the "order of the day", built by the editor, affects the perception of the priority of events by a person [Telenkov].

Discourse media is the embodiment of spin-doctoring technologies. This technology can serve as a tool for manipulation. The degree of its influence on public consciousness will be shown only by further research.

Conclusions are draw that spin-doctoring in the media is a technology of influencing the human mind by forming a discourse as a functional speech and also by constructing an "order of the day" to form a certain hierarchy of events in the mind of a person.

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DIALOGUE IN THE LANGUAGE OF CULTURE: GEORGIA'S CULTURAL POLICIES TOWARDS ABKHAZIA

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Abstract. The conflict between Georgia and Abkhazia¹ is very reviewable topic among not only Georgian experts but many interested individuals from different countries. Despite many attempts of conflict resolution, the situation is still much tensed in the region. Exactly this reality is illustrative that conflict resolution requires different and various approaches that need to be expressed in practice.

Very often society doesn't pay attention and thus, doesn't perceive cultural events and projects as an important tool in conflict resolution; sometimes it leads towards the wrong interpretations and pessimistic attitudes towards the mentioned cultural policies. That is why while talking about the conflict solutions the first thing that appears in people's mind is political or military actions. So, this is the main reason why the cultural policies between Georgia and Abkhazia aren't fully studied.

Since cultural policy plays a crucial role in the rapprochement of people and the conflict resolution, those issues that contain the mechanisms of mentioned policies, their ways of implementation and possible outcomes, must be fully studied. That's why the main research problem of this work is the lack of studies around this topic. This given work studies Georgia's cultural policies towards Abkhazia. In order to get acknowledged to Georgia's cultural strategy, I will make an overview of the conflict and region's history, then I will discuss country's constitutional strategies towards occupied territories and finally, I will conclude my article by examining past, ongoing and future cultural projects and events.

Key Words: culture, policy, cultural policy, Georgia, Abkhazia.

Introduction. Today, when we talk about cross border cultural policies or cross border cooperation, we mostly imagine EU countries or cities that were divided, but they still have something in common. On the other hand, with this essay I want to discuss cultural policy and cooperation in my national distinct: Georgia. Many people believe that politics pay the major role in conflict resolution and that's why the concept of "cultural policies" is very often set aside. So, because of that cultural policies aren't fully and significantly studied and this is the main research problem of my work. While Georgian territories are occupied by Russia and political approaches don't have any notable consequences, thus, it's quite interesting what kind of cultural policies provide Georgian government and sometimes Georgian society as well towards these territories, how strong or weak is the cross-border cooperation between occupied and its border-unoccupied territories and what benefits are being made by the mentioned cultural policies in order to bring back the people together again.

¹ Occupied territory of Georgia by Russia



To analyze and understand “Cross Border Cultural Policies” it’s essential to define given two important terms: “Culture” and “Policy”.

“The word ‘culture’ derives from a French term, which in turn derives from the Latin ‘Colere,’ which means to tend to the earth and grow, or cultivation and nurture. Culture is the characteristics and knowledge of a particular group of people, encompassing language, religion, cuisine, social habits, music and arts.”(Zimmermann, 2017). The [Center for Advance Research on Language Acquisition](#) goes a step further, defining culture as shared patterns of behaviors and interactions, cognitive constructs and understanding that are learned by socialization. Thus, it can be seen as the growth of a group identity fostered by social patterns unique to the group.

In today’s world there are different cultures in different countries or areas. We have a Western or Eastern cultures, High or Low Cultures, African, Latin Cultures. “No matter what culture a people are a part of, one thing is for certain, it will change. Culture appears to have become key in our interconnected world, which is made up of so many ethnically diverse societies, but also riddled by conflicts associated with religion, ethnicity, ethical beliefs, and, essentially, the elements which make up culture; but culture is no longer fixed, if it ever was. It is essentially fluid and constantly in motion.” This makes it so that it is difficult to define any culture in only one way.” (Zimmermann, 2017)

“Policy, as a concept, refers to the “regularizing aspects of politics” that [as an outcome of contingent action; cf. ‘politicizing’ and ‘politicking’] imply the coordination of acts, and measure and regulate the inclusion and exclusion of activities (see Palonen, 2003). When the concrete, regularizing aspect of organizing things and acts is indicated by policy, ‘culture’, as an abstract concept, has to be reified in some sense for analyzing it on that same level. This, in short, seems to be the first theoretical challenge in cultural policy research.” (“Contemporary questions in Cultural Policy Research,” 2009, p. 11)

“A policy is a system of ultimate aims, practical objectives and means, pursued by a group and applied by an authority. Cultural policies can be discerned in a trade union, a party, an educational movement, an institution, an enterprise, a town or a government. But regardless of the agent concerned, a policy implies the existence of ultimate purposes (long-term), objectives (medium-term and measurable) and means (men [sic], money and legislation), combined in an explicitly coherent system.” (Girard, pp. 171-172)

“The rubric cultural policy describes, in the aggregate, the values and principles which guide any social entity in cultural affairs. Cultural policies are most often made by governments, but also by many other institutions in the private sector, from corporations to community organizations. Policies provide guideposts for those making decisions and taking actions which affect cultural life. Cultural policy is sometimes made explicitly, through a process defined by an agency charged with this responsibility. For instance, a ministry of culture or arts agency might draft a policy articulating its goals and operating principles in supporting theater companies in various regions. Very often, cultural policy is not formally defined. Instead, what we have are the cultural effects -- sometimes unforeseen -- of social action.” (Webster's World of Cultural Policy, n.d.)

Literature Review. In order to create the relevant platform of understanding cultural policies in general , my work includes the definition and brief overview of two significant terms: Culture and Policy; how the cultural policies are formed, what their characteristics are and what kind of benefits can they cause in the sense of unification of confronted people- all of these issues and many more regarding to Cultural

Policies are discussed by Miikka Pyykkönen, Niina Simanainen and Sakari Sokka in their book "What about Cultural Policy? Interdisciplinary Perspectives on Culture and Politics."

After analyzing cultural policies and their impact on society the work continues its path to the history of the conflict between Abkhazia and Georgia. For understanding the contemporary problems of the latter ones, it's essential to summarize the past events. With the help of online encyclopedia Britannica and some other Georgian official sources, I am creating the important base for better understanding of the conflict itself.

Then the given work makes an overview of "state strategy on occupied territories" that is retrieved from the Georgian government's official web-page. This strategy emphasizes government's attitudes and approaches, it's methods of rebuilding the relations with people residing in the conflict areas. Shortly after that I am starting the main part of my work that is absolutely about the cultural policies that are implemented either by Georgian government or civil society. This significant part of work is fully based on Salome Kapnadze's work: "Dialogue in the language of culture: non-political aspect of conflict resolution." She examined almost every important cultural events and projects that were conducted either in Abkhazia or Georgia, but the main purposes of those policies were bringing the people together and support the Georgian-Abkhazian friendship. After mentioning all of the notable cultural events, I am concluding my work by giving information about the future events that can be beneficial for both sides. While doing so I am relied on the different Georgian News-Media.

Research method. My research methodology requires gathering important and interesting data from different web-pages, articles, books, and even more, I am using my personal knowledge, as I come from Georgia and I have many people around me who lived in Abkhazia and have gone through this war. After examining all the information and facts, I hope to find answers of my research questions: 1. "What kind of cultural policies does Georgian side use towards Abkhazia?" And "How do these cultural policies affect on Abkhazian and Georgian Society?" In this case Independent variables are cultural policies and dependent variables- Abkhazian and Georgian Societies. My research is qualitative as I am using public documents, internet data and online articles. I will also use my personal data as I come specifically from Georgia. The Aim of my research is subsequent: to examine and get acknowledged to this topic.

Georgia and Abkhazia

As with any other country, Georgian cultural policy towards Abkhazia needs to be viewed in the context of the nation's history, its people and constitution.

"Georgia, Georgian Sakartvelo, country of [Transcaucasia](#) located at the eastern end of the [Black Sea](#) on the southern flanks of the main crest of the [Greater Caucasus](#) Mountains. It is bounded on the north and northeast by [Russia](#), on the east and southeast by [Azerbaijan](#), on the south by [Armenia](#) and [Turkey](#), and on the west by the Black Sea. Georgia includes three ethnic enclaves: Abkhazia, in the northwest (principal city Sokhumi); [Ajaria](#), in the southwest (principal city Bat'umi); and South Ossetia, in the north (principal city Tskhinvali)." (Howe, Lang, Djibladze, & Suny, 2017). Today, Georgia finds itself in two different conflicts: one with Abkhazia and the other with South Ossetia. As these are two very difficult and complicated conflicts, in one small essay it's impossible to analyze both of them. So, in this given essay my main field of studying will be Abkhazian and Georgian cultural relations.

History of the conflict and current status

"Georgians and Abkhazians have very long and strong experience of living together. The Abkhaz were vassals of the [Byzantine Empire](#) when they became Christian under [Justinian I](#) (c. 550). In the 8th century the independent kingdom of Abkhazia was formed. Later a part of Georgia, it secured its independence in 1463 only to come under the rule of the [Ottoman Empire](#) in the 16th century. In 1810 a treaty with Russia was signed acknowledging a protectorate. Russia annexed Abkhazia in 1864, and the Soviet authorities proclaimed its [autonomy](#) as a region in 1919 and raised it to the status of a republic in 1921. It became an autonomous republic within the [Georgian](#) republic in 1930, and it remained part of Georgia when the latter attained independence in 1991.

In 1992, secessionists in Abkhazia staged an armed revolt against the Georgian central government in a bid to obtain Abkhazian independence. The rebels defeated Georgian forces and established control over Abkhazia in 1993, and in May 1994 a cease-fire was arranged. Despite the cease-fire and the subsequent deployment of a largely Russian peacekeeping force in the region, hostilities continued, and in 1999 the region formally declared its independence, a move that was not recognized by the international [community](#). Georgian accusations of Russian support for separatist ambitions in the region, as well as [criticism](#) of the ease with which Abkhazian residents were able to obtain Russian passports (by 2002 more than one-half of the population of Abkhazia had acquired them), served to strain relations between the two countries."(Britannica, n.d.)

In 2008 Russian authorities completed annexation of Abkhazia and formally recognized an independence of Abkhazian State. In reality, it is a seizure of Abkhazian territory, where a number of Russian military units control the political situation.(Government of Georgia, n.d.). The annexation and “ethnic cleaning” [“The Abkhaz had been an ethnic minority of about 100,000 people out of half a million but with the help of Russian and Chechen they ethnically cleansed several hundred thousand Georgians](Association of Diplomatic studies and Training, n.d.) carried out by Russian Federation, absolutely changed demographic image in Abkhazia. Despite the attempts of imperial forces, the autonomous republic of Abkhazia is legally part of the Georgian State.

It is clear that situation is extremely difficult today. Georgian government needs to deal not only with Abkhazians, but with Russia as official language there is Russian (alongside with Abkhazian), currency is Russian Ruble and their political parties are controlled by Russian Federation as well. However, Georgia still has peculiar policies that, in my opinion, are somehow effective strategy to stabilize current situation.

State Strategy on Occupied Territories

Let’s have a look on Georgian government’s State Strategy on Occupied Territories- “Engagement through Cooperation”. The preamble of the document says that the goal of the state is to ensure that all citizens of the country enjoy the privileges of democratic governance, join the world's integrated and developed economies and live in tolerant, multiethnic and culturally diverse societies. This approach is based on common principles and values shared by all European nations reflected in the Helsinki Final Act.

It is promoting cultural relations between communities separated by dividing lines; Facilitate contacts and cooperation around dividing lines, through the support of joint interdependent projects and activities based on common interests and needs, promoting cultural heritage and self-consciousness both on national and international levels. It aims to facilitate the free dissemination of information between the isolated regions with dividing lines for strengthening mutual understanding and cooperation. Georgia will actively cooperate with partner countries and organizations to create the important tools and resources necessary for the implementation of these objectives. (საქართველოს მთავრობა, n.d.)

Dialogue in the language of culture

Cultural activities provide an effective basis for cross-border cooperation projects. Cultural policies promote mutual understanding, recognition of partner and its cultural values, the perception of strengths and weaknesses and helping sides to overcome language barriers. Cultural cooperation is the main exchange of information in the process of cross-border relations that create the basis for further integration. Georgian cultural policies is based on geographical, structural, economic, social, cultural and historical status of the adjacent region that is important to understand the similarity and differences of the both sides. (Kapanadze, n.d.)

Mentioned cultural policies consist of mainly Music, movies, theatre and literature. To illustrate that in the post-conflict period, dialogue in culture language can be far more productive than any other political agreement remaining on paper, I will present several cultural projects and events.

Theatre and Movies

“Sea, which is a far away” is a very interesting play that was performed in 2005 in “Sokhumi K. Gamsakhurdia State Drama Theater”. It should be noted that in this play Georgian and Abkhazian actors participated together, even more, director of it was Georgian and the author of the play was an Abkhazian writer. The play depicts a different picture of the Georgian-Abkhazian war. This performance made a great emotional and intellectual shift in the Georgian audience. According to confirmed information, the video record of the performance was conducted in the conflict zone, namely Sokhumi University. Seeing the performance of the play video in the mind of the Abkhazian youth has woken up the general feeling: that it is impossible to drive people out of their past. This is a big success of the Georgian-Abkhazian relations and prospects of future integration.

In 2009, the play "Sea, which is a far away" was demonstrated in Sochi, during the Assembly of Peoples of Georgia. The performance was attended by representatives of city government circles, Russian, Ossetian and Abkhazian spectators. The feeling of a big regret in Abkhazian and Ossetian people has emerged, and most importantly, the inner demand of expressing it. Abkhazian and Ossetian audience went to the actors, trying not only to establish an emotional contact but also to talk about future relationships. There is no doubt that this great performance has been able to cause the real changes in the minds of the rest of the conflicting parties, which will help them to restore their relationship and maintain peaceful coexistence. (Kapanadze, n.d.)

“Tangerines” is a Georgian-Estonian movie, from „Georgian writer director- Zaza Urushadze that had a nomination at Oscars for the best foreign film, losing out to Paweł Pawlikowski’s “Ida.” It is a tremendous, old-fashioned anti-war film, by turns touching, moving and suspenseful.“ (The Guardian, n.d.).

This movie tells about 1992-1993 Georgian-Abkhazian war by human stories. Events unfold in one of the villages of Abkhazia, in the house of ethnic Estonian Ivo who is a tangerine farmer. "They fear the fighting will destroy their entire crop. Disaster strikes and he finds himself having to offer tense hospitality to one wounded fighter from each side: Georgian and Chechen, who is fighting with the side of Abkhazians. His house becomes their demilitarized zone, Georgian and Chechen must suppress their hatred of each other while Ivo suppresses panic about all his unpicked tangerines going to waste. It is tremendous storytelling: engaging, intelligent, and with some lovely touches."(The Guardian, n.d.). This movie tells us that despite ideological differences, people still respect human values of hated ones and several days of living together is enough for this. Pedro Almodovar said that "Cinema is a language that speaks about the future, although the stories we tell are based on past." Exactly this does "Tangerines", it shows that after centuries of coexistence, Abkhazians and Georgians can/will still live together peacefully.

Music and Arts

In 2009 a well-known collector with the support of the Ministry of Culture and Monument Protection of Georgia implemented the project "Georgian-Abkhazian Album", which brought together the unique, ancient photo-material, historical facts and biographies of Abkhazian figures reflecting Georgian-Abkhazian relations. This is a natural chronicle of Georgian-Abkhazian relations, not moral history. The main leitmotiv of this album is the mutual respect and responsibility of generations. At the presentation, this book was called fairly "the message of love". According to confirmed information, one Abkhazian woman couldn't hide her emotion when she looked at the book and said that if young Abkhazians had seen the book, they would be proud of their past. "We've got it from here, this is the past where Georgians and Abkhazians are friends, they are one nation." Thus, the cultural product always contains the value that can not be replaced by political negotiations. (Kapanadze, n.d.)

In 2008-2009 famous Georgian singers recorded their famous hits in Abkhazian language. The fact that these songs were performed by Georgian singers didn't cause any limitations for Abkhazian people to play and listen to them. (Kapanadze, n.d.)

At the beginning of 2004 was created a group of friends called "Art-Gene", the main purpose of which was to present existing socio-cultural problems in the country. From the beginning, the priority of the group was to determine the family folklore and various indigenous traditions and popularize them. For this purpose, they decided to set up an annual public festival "Art-Gene", which traditionally started in different parts of the country with the expeditions and events, and the final part is held in the territory of the Tbilisi Ethnographic Museum, where different cultures from different regions are presented as exhibitions.

More than 100 concerts and events were held on the basis of 10 years of festival. Today it is one of the most famous and popular festivals in the country, which is attended by approximately 30-40,000 people annually. With support of „Ministry of Culture and Monument Protection of Georgia” during the festival there is special day, which is contributed only to Abkhazia. On this day Abkhazian traditions, their dances and songs are presented. It should be noted that Abkhazian singers and dancers are participating alongside with Georgian performers that is another step towards greater cooperation. (Art Gene, n.d.)

Literature

The same mission united Transcaucasian writers in their book "Time of Life" (2003) and "Bridge." (2006). This project is defined as a mission - to promote "peace among men" in the region. "Time of Life" is the initiative of Georgian, Abkhaz, Ossetian, Armenian and Azeri writers, whose literary contributions to humanity have been merged into one book as an example of successful dialogue of cultures. Their war, the portraits and feelings of the characters are remarkably similar to each other. Artistic allusion of writers, who are completely independent of different nationalities and ethno physics, in various state spheres concentrate on one common idea: the humanity around one truth should embrace the values that are based on the popular postulates of human love. (Kapanadze, n.d.)

From June till September, 2017, the project "Draw Boundaries of Georgia" is being held. The project is implemented with the support of the Ministry of Culture and Monument Protection of Georgia. The project aims to involve citizens living in conflict zone and living near the dividing line of the administrative border in cultural processes of the country. According to the Ministry of Culture, various cultural and educational events are planned in the regions along the dividing line of the Administrative Boundary of Georgia. The local population will meet with Georgian writers and scholars who will pay attention to the important Georgian writers (N. Baratashvili, I. Chavchavadze, L. Asatiani, T. Graneli) and also talk about the importance of deepening cultural dialogue; The writers will communicate with the reader in interactive mode. Various exhibitions and film screenings are planned, as well as concerts with participation of

Georgian performers. („შემოსაზღვრე საქართველო“ – კონფლიქტისპირა სოფლების მაცხოვრებლებისთვის," n.d.)

Within the framework of the "Inside of Georgia", population residing in the dividing line of the administrative boundary will participate in the project - "Write The Knight in the Panther's Skin"² organized by the Ministry of Culture and Monument Protection of Georgia. As this poem is a representative of Georgian heritage and culture, it will play a role of reminder the same past that was shared by Abkhazian and Georgian people.

Future Projects

At the administrative border, near the bridge of the Enguri River, modern, well-equipped hospital will be built. The mentioned medical institution will be implemented within the framework of the Prime Minister's Peacekeeping Initiative. In Abkhazia, there are huge health and medical problems. Even more, many Abkhazians are crossing the border exactly because health issues, as Georgian government provides free medical services for them. It is planned that Abkhazian people will receive free services in this hospital too. (Info9, n.d.). Even though building this hospital isn't defined by cultural organizations or ministry, I think it will have great cultural effect on cross-border cooperation and integrations. Except music, literature or arts, health also unites people.

Near this hospital there also will be multifunctional shopping centre. Construction of multifunctional shopping center for one kilometer from the Enguri Bridge connecting to Abkhazia was discussed at meeting of Economic Council. According to the information released by the Prime Minister's administration, in the center there will be located bank, veterinary clinic, post office, pharmacy, small refrigeration equipment and the recipient of agricultural products. (Info9, n.d.) It is obvious that Georgian side is making huge effort for Abkhazians to cross the border. The fact that even a few Abkhazians are already coming to Georgian side, means that these cultural policies and mentioned efforts are really working.

Conclusion. Culture is a huge concept that can't be fully expressed and defined only with words. It includes almost everything that is happening or that is given in our lives. It is a way of collaborating people, it is a way of uniting communities and it is a way of getting acknowledged without saying a word.

In this work I examined Georgia's cultural policies towards Abkhazia that is occupied by Russia. It was a different case as I wasn't investigating it not only cross-border but over the whole territory of the country.

After making a brief review of the Abkhazian history, it is clear that situation is extremely difficult. Russia is, was and will work hard to kill Georgia not only by "Ethnical Cleaning", but by the "Cultural Cleaning" as well. So, it is not surprising that many people in Abkhazia consider Russia as a rescuer and Georgia as an enemy. Thus, main purpose of Georgian side is to recover Georgian culture in Abkhazia. The culture, which altogether with Abkhazian and other regions' cultures, created Georgian Nation.

For this purpose Georgia is mainly focused on cultural policies that can be very important "cultural tool" for reuniting conflicting sides. After identifying many facts and information, I can answer both of my research questions: 1. what kind of cultural policies does Georgian side use towards Abkhazia? And "How do these cultural policies affect on Abkhazian and Georgian Society?" Georgian cultural policies mostly cover areas of theatre, movies, music, arts and literature. These are very important elements of culture and they have very big influence on people's way of thinking. They can be starting point of better Georgian-Abkhazian relations and of better integration that will affect on ongoing conflict very well. I mostly focused on main past, present and future events or projects that happened/are happening/will happen either cross-border or far from the border. I talked about several projects and events such as "Sea, which is far away", "Tangerines", "Art Gene", Books of Trans Caucasian writers, "Draw Boundaries of Georgia". Even though the future projects, which I mentioned aren't focused exactly on music or literature (they focus on health issues and markets), they still will have big cultural effects. When many people from Abkhazia will cross the border because of health or consumer needs, there will be cultural relations established as well. We should also consider that these future projects are created cross-border; so, this fact also strengthens the influence of them. It is obvious that noted cultural policies have a really good effect on both sides as they give Abkhazian and Georgian people chance to work, collaborate and integrate with each other, thus the relation between dependent and independent variables is positive as cultural policies are beneficial for the common connection of Abkhazian and Georgian societies. Maybe in a short-term period these projects don't have huge effects on both sides, but I believe that in the long-run it will decide many things in people's minds. In Abkhazia there still are many people that don't consider Georgia as the same nation, but there also are a few

² Georgian medieval epic poem, written in the 12th century by Georgian national poet Shota Rustaveli

people, who think differently. And this different, “healthy” thinking gives us hope for the better future. While culture is something that really unites people, the main mottoes or aims of these events/projects are subsequent: to build bridge between Georgian and Abkhazian Society.

To sum up, cultural policies have a greater impact on people, their feelings and their ways of thinking. When a country has occupied territories by strong enemy, it's essential for it to fight with “cultural weapons” as well. Georgian side is really trying to do so and in this process not only Georgian government, but civil society is engaged as well. The cultural policies that are implemented, organized and done by them, sooner or later, will play a big role in a resolution of the conflict.

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VALUES IN THE PROCESS OF POLITICAL MODERNIZATION OF UKRAINE

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Abstract: The article is focused on the analysis of value component and its functions within the political system of Ukraine. Based on the sociological new institutionalism and structuralism theoretical approaches, practical significance of values for the stable development of democracy is demonstrated. On the basis of empirical data analysis, the peculiar type of Ukrainian current configuration of values is defined. It is also shown that a purposeful and systematic work with values and their careful analysis are required to ensure an effective political modernization of Ukraine.

Key words: values, democracy, sociological new institutionalism, political modernization.

Introduction. The role that today is ascribed to values in the political process is simultaneously extremely fundamental and extremely marginal. What is meant first and foremost is that despite the intensive development of the so-called cognitive direction in social and political sciences, the most "legitimate" Post-Soviet prism of studying and explaining politics still remains the traditional analysis of the strategies and tactics of political players under the conditions of certain legal (constitutional) mechanisms [Fisun 2016; Chayes 2016; Kuzio 2015].

Currently the obvious characteristic of the Ukrainian political process are discussed from the point of view of the neo-patrimonial regime [Fisun 2016]. Such a regime is distinguished by two basic principles. Firstly, the political system is not oriented towards the production of the "common good" and thus the state's effective functioning, but is aimed at the political players' self-serving practices of rent-seeking and "state capturing". Secondly, a key role is played not by rational and legal relations within the framework of formal (legal) systems of interaction, but by client-patronage networks in which the most favorable and beneficial position (in terms of political status) is determined by the degree of proximity to the "patron" and the amount of available resources.

Another pivotal standpoint is the assertion of the ineffectiveness of Ukrainian state legal mechanisms. Moreover, these mechanisms are mainly preserved and operate within one electoral cycle. Most often, it is the weaknesses of legal institutions (the lack of a balanced system of checks and balances) that the responsibility is put upon for the current triumph of neo-patrimonialism.

What is still the vaguest and most uncertain aspect of modern political analysis? This is exactly what provides the basis for the logic of neo-patrimonialism or defective Ukrainian democracy. The problem of sustainable reproduction of this regime is not clearly explained either, concerning the phenomenon that despite the attempts of transformation (due to the revolutions of 2004 and especially in 2014) such a regime seems to be simply evolving, creating ever more stable forms.

Therefore, the topicality of the research is determined by the necessity to establish a new research focus for Ukrainian political process analysis, within a framework of which it could be profoundly explained how symbolic systems and cultural stereotypes provide sound justification for the political institutions whose functioning is not always adequate. Consequently, the object of the research is values in the broad sense of configuration of individual preferences, beliefs and interests. The subject of our analysis is constituted by the interrelation between social values and the specifics of political institutions which are formed on the basis of those values.

Thus, the main objective of research is to analyze what is the role of values in the process of Ukraine's political modernization, and to this end we set the following tasks:

- To explore the approach of sociological institutionalism to the investigation of values as the phenomenon;
- To analyze the practical function of values in order to create a specific social demand that particular political institutions should be established;
- To apply the methodological framework of values analysis to explaining the perverted nature of Ukrainian democracy.

The complex of materials that is used in the given research are represented by theoretical developments of such outstanding political scientists as M. Weber, P. Bourdieu, R. Inglehart, R. Putnam, D. North, G. Tabellini, S. Beugelsdijk, R. Maseland, O. Fisun, T. Kuzio et al. The methodology applied is based on the sociological institutionalism and structuralism approaches.

Discussion and Results. As D. North suggests, "We are concerned with the subset of beliefs that we call causal beliefs, which concern the causal connection between actions and outcomes in the world around us" [North, Wallis 2009: 27]. That implies that people are intentional: "how they behave depends critically on how they believe the world around them actually works" [North, Wallis 2009: 28]. In other words, value orientations in a broad sense of preferences, beliefs and interests underlie the individual actions. The individual action, repeated several times and by several people, later becomes a certain stable type of behavior, and eventually turns into a social institution. That is a major statement supported by the representatives of sociological institutionalism paradigm, which studies the influence of cultural beliefs on political structures and vice versa.

The key theoretical principles of sociological institutionalism are the following [Hall, Taylor 1996]:

- Culture itself is seen as a set of shared institutions and values.
 - Institutions provide conceptual meanings, through which individuals determine the meaning of their social life activity.
 - Institutions and values are mutually reinforced and affect the behavior of individuals.
- However, they do not simply determine what the individuals need to do in a particular situation, but rather "explain" how they should understand themselves in the context of this action. Thus, the specifics of identity directly depend on the characteristics of institutions.

- The most important thesis holds that the stability of institutions is ensured not by their effectiveness (utility or rationality), but by compliance with generally accepted social (cultural) practices, in which these institutions receive the status of "valuable".

It should be stressed so far that in the broadest sense value is anything that the individual finds a subjective utility in. This is not only, for example, the value of freedom or the moral value of respect for parents. Values, in general, are any motivational factors, which motivate people to behave in one way, rather than in another.

A classic work that illustrates the practical function of values is the study of R. Putnam "Making Democracy Work: Civic Traditions in Modern Italy" [Putnam 1993]. The main question raised by the scientist in this work is why, as a result of the reform of the 1970s, regional authorities (similar in their structure throughout the country) were much more effective in the north of Italy than in the south. And in general, what factors contribute to the creation of sustainable democratic institutions of power?

As a result of the study of the horizontal networks within the Italian society, R. Putnam determined the direct relationship between the number of public organizations and the quality of the regions development. He showed that those parts of Italy where civil society was formed as early as in the XIX century, today have the most successful democratic institutions. But what does the notion of a formed civil society mean? The answer to this question consists in the presence in society of the values of political activity, personal independence and interpersonal trust.

If R. Putnam explained the effectiveness of democracy primarily through the development of civil political culture, today researchers have significantly expanded the list of values that are complementary not only to democracy but also to economic development. The most common classification of such values is suggested by the R. Inglehart, who singles out the values of self-expression (favorable for the development of democracy) and the values of survival (hindering democratic processes) [Inglehart, Welzel 2005].

The values of self-expression or so-called post-material values motivate people to acquire the civil and political rights that underlie liberal democracy. It is postmaterialism that makes it necessary to create institutions that allow for the exercise of freedom of choice, to act independently in private and public life. The priority of post-materialism is not physical and economic security, but the values of self-realization and quality of life.

In Ukrainian society at the moment one can state the prevalence of another type of values: values of survival that, unlike values of self-expression, do not assume responsibility for anything other than people's own lives and, thus, contribute to the formation of a culture of conformism in civil and political spheres, preserving the minimum level of political will of political elites concerning the effective reforming of the system.

Those values can be characterized by such peculiar features.

1. Materialism. Monopolistically high food prices and low incomes lead to the situation when half of Ukrainians' revenues is spent on food and the rest is spent on utilities. As a result, while in Europe according to the study of Pew Research Center the greatest fears among citizens are ISIS, global warming and cyberattacks, the strongest fears of Ukrainians according to the research of the Institute of Sociology of the National Academy of Sciences of Ukraine conducted in July 2017 are a rise in prices (77%), non-payment of salaries and pensions (62%), unemployment (60%). Such empirical data clearly illustrates the tendency of Ukrainians to focus on primary, basic needs, on daily earning of means of survival. Obviously, in such conditions, there is no ground for a social demand for radical political reform.

2. Civil and political passivity and irresponsibility. Despite the development and strengthening of Ukrainian civil society over the past few years, Ukrainians are still hoping for everything to be decided for them "from above" and without their participation. This is evidenced, for example, by the results of the implementation of the decentralization reform, which is progressing at a very slow pace not only due to the resistance of local or regional leadership and for other formal reasons, but also owing to the reluctance of residents to take the initiative and responsibility.

In general, the interest of Ukrainians in the political sphere is extremely low. This conclusion is confirmed by the results of a sociological survey of the Razumkov Center, held in September 2017. 60% of Ukrainian citizens are not very interested in politics or are not interested in it at all, 33% are rather interested and only 5% are very interested in this sphere. For comparison, in Germany and the Netherlands, the level of interest of citizens in politics is 62% and 65% respectively.

3. "Limited morality". Lack of trust in society leads to the phenomenon when "codes" of conscientious and honest behavior are often limited to small circles or, as in the Ukrainian case, to networks of the "privileged" (relatives and trustworthy colleagues). Outside of this small network, opportunistic and selfish behavior is considered natural and morally acceptable. This is what distinguishes Ukrainian society from the West, where abstract rules of good behavior ("generalized morality") are applied in all social situations, and not only among relatives and friends.

A low level of social trust is a trend characteristic of Central and Eastern Europe in general. In the report for 2017 "Religion and Nationality in Central and Eastern Europe", published by the Pew Research Center on the basis of its own research, conducted in June 2015 - July 2016, the following data are presented. Only 28% of Ukrainians believe that most people can be trusted, while 54% of respondents say that you cannot be too considerate towards people. The highest indicator of trust in the society among the countries studied is in Estonia (39% of respondents believe that most people can be trusted), the lowest – in Bosnia and Herzegovina (only 6% of respondents agree to trust most people).

4. Conservatism. A high level of religiosity is another characteristic feature of traditional values, in contrast to the secularism of modern values. Modern Ukrainian society is very religious. The Church steadily retains its leading position as a social institution, which Ukrainians trust more than other state and public institutions. Thus, according to the Razumkov Center research conducted in October 2017, 64.4% of citizens trust the Church as a social institution. However, due to the activation of the volunteer movement, Ukrainians show the greatest level of trust to volunteer organizations (66.7% of respondents).

Nevertheless, the conservative views of the majority of Ukrainians significantly influence the attitude towards post-material issues related to gender and sexuality. 83% of Ukrainians according to the results of the aforementioned Pew Research Center study believe homosexuality to be morally unacceptable. The least conservative in this respect among the countries of Central and Eastern Europe is Greece (51% of respondents chose this option), the most – Armenia (98%). However, with regard to traditional views on the role of women in society, Ukrainian society demonstrates some "freedom from patriarchal stereotypes": less than half of the citizens (41%) fully or rather agree that the wife should always obey her husband.

Conclusions. Establishment of an effective and stable democracy is possible only if there is a corresponding social demand, "interest" in the society, when the priority requirement of citizens is the provision of civil rights and freedoms. That is why changes in the value-cultural sphere are an important and necessary process on the path of Ukraine's political modernization, whereon the quality and effectiveness of socio-political transformations depends.

The configuration of survival values prevails in Ukrainian society at the moment. Ukrainian citizens are characterized by suspicion, distrust, economic fears of unemployment and low salaries, anxiety related to security, caused by the conflict in the Donbass area and a low level of socio-political development in general. Such values alongside with the lack of political will of the state elite lead to the preservation of the existing political order, making any attempts of the radical transformations useless.

Nevertheless, it can be stated that the values of Homo Sovieticus gradually lose their dominant position, thereby creating favorable conditions for the value-mental revolution and borrowing the values of self-realization, which are complementary to economic and democratic development. However, a successful mental revolution is possible only in case of purposeful and systematic work with values and their careful analysis. Only by weakening informal restrictions in the form of cultural practices and survival values, creating conditions for the European political institutions and mass values to be mutually consistent, the Ukrainian political regime will have prospects for evolution towards a functioning democracy.

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THE TENDENCY OF SELF-MARKETING IN MODERN EMPLOYMENT PROCESS

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Abstract. This article considers how and why the concept of self-branding has become so prevalent in modern employment process. The article shows that, despite inherent tensions and problematic ironies, self-branding persists through the rise of Social Media Influencers and its importance in modern life. Research showed the main difference between self-marketing and personal branding and what challenges it provokes for the job-seeker. Analyzing the number of articles and research papers written by HR-specialists, Career and Branding Strategists, we determined the key strategy for everyone, who has a will to change current job place or even to start a new career in a different area. Previously mentioned strategy cannot be taken as an ideal one, but it creates a pattern for strategic development of one's competencies, knowledge and networks.

Key-words. Self-marketing, job market, personal branding, self-promotion

Introduction. Modern science witnessed so called self-management techniques which were aimed at self-improvement process in the previous years. Since 1997 the term self-brand has been suggested instead as a marketing perspective alternative of the new era of the employment market. The notion of self-branding has drawn myriad academic responses over the last decade. Self-branding has been criticized by some on theoretical, practical and ethical grounds, on the other hand, the idea has been endorsed and propelled the idea. The subject-matter of the analysis is the self-marketing influence on the quality of the labor force supply. The methods used in the research are as follows: analysis, induction and generalization. The main task for the research is to define whether self-marketing and personal branding techniques influence hiring process in modern economy. In this article were examined articles a number of modern HR-specialists, career coaches and career and personal branding strategists.

Discussion and Results. Modern hiring and recruiting process creates more challenges for the employers, as the main aim of recruitment is to find not just an appropriate workforce to produce values during company's operating process, but at this particular moment all attention of managers and recruiters is on the talent. Talented employees are the main targets of recruiting process. However, the issue of presenting oneself in a way to attract the employer has become crucial for the candidates for certain positions. Job market is challenging, competitive, and requires substantial effort in order to pursue successfully. The days of handing out resumes in person are all but over. The process of collecting and analyzing job applications has moved into a completely digital direction – and it provides richer insights into candidates than ever. That tendency to specification and explicit way of doing business is tracing down all the stages of the selection and recruitment process. Thus, the special need for highlighting person's qualification, skills and competences appears. The reason to stand out of the crowd is the main idea of self-promotion during employment process.

Self-promotion and personal branding are strategic marketing and branding techniques for designing, enhancing, and promoting one's professional image. Those activities are aimed at changing the attitude of the public towards a particular person. Like any other marketing, personal begins with the study of the market which determines the needs of consumers. Moreover, "consumer" in the job market is the employer, whose position and activity in the marketplace obey to the same market rules, has also a need to work on one's marketing strategy to attract future applicants for positions. The situation works equally for candidates and employers, they both use self-marketing to create a "Brand" to become a valuable job market player. Especially important question to answer in this article is about outlining the difference between self-promotion and personal branding. Excessive self-promotion in its most extreme form can mean pushing forward person's own agenda, promoting own self-interests, even bordering on bragging about one's accomplishment, hogging the spotlight, or grabbing attention at the expense of others. However, according to Joseph Liu approach, personal branding does not mean talking about oneself all the time, it also can't be comprehended as essentially "promoting" oneself. Thus, personal branding does mean having a clear sense of who you are and what you stand for, ensuring individual's behaviors and actions are in line with that identity; it means making an important step or decision on how person wants to describe oneself if the opportunity arises [Liu, 2015, Blog] .

Most important, having a clear personal brand allows a person to be intentional, consistent, and focused on the approach to his or her career and life, when describing oneself to others or interacting in situations when being clear on individual's unique value does matter. So part of it is tied in with being clear

about your identity, and when you do have the choice of imparting this to others, you can do this explicitly, or more implicitly— where you choose to focus your energies, what activities you prioritize, how you collaborate with others, and the gatherings or abilities you adjust yourself to support that personal identity.

Personal branding phenomenon is about a human being a product on the market [Montoya 2002, 6]. A person works as a source – the originator of the carefully packaged and projected public identity. That means that one’s personality does not equal personal brand. Peter Montoya in his book “The Personal Branding Phenomenon” emphasizes that personal brand is not the new product that can be produced or created. The specific feature of self-brand notion is that it already exists in every person and it could be only developed to a certain level due to the numerous tools that modern marketing science provides. In order to list the most popular characteristics, by which people are branded it is vital to name the following: personality, profession, accomplishments, possessions, lifestyle, abilities, interests, appearance and friends. However, the majority was branded accidentally, without any strategy and goal, thus challenging employment process. The studies of Peter Montoya and his colleagues are aimed to indicate and develop a number of methods for intentional building a strong personal brand.

The different approach to previously mentioned notion presents a short but whole idea definition, which is the following: “A career brand is an image that portrays you as an expert in your field, attracts your ideal employer, and reveals how you can help their business” [Warzel 2011, Article].

Matt Warzel also points out the main goals and steps for gaining one’s personal brand awareness in order to succeed during recruitment and selection process. Matt’s article offers some important tools to develop personal career brand and understand one’s self-marketing plan. Among number of the strategic marketing procedures it is lucrative to name the following, as they seem to be of great importance for self-marketing: networking with key industry players; identifying your transferable skills; resolving any setbacks that hurt your career and prevent you from getting interviews. Speaking of the latter, the first thing that can cause the rejection of candidate is the person’s Curriculum vitae, which sells to employer not the person as a unit, but the meeting with a candidate. The fundamental aim of CV to interest the customer, with the list of candidate's achievements, skills and to provide basic information about an applicant for the position. However, majority underestimates the importance of a CV and as a result, fails at a personal branding. Researchers from the top Ukraine recruitment agency Hudson claim that statistics of researching involves 80% of CV-rejection from the incoming correspondence. The second stage of employment process is the phone interview, which dismisses 30% of previously selected candidates. Statistics demonstrably shows the significance of proper creating Curriculum Vitae for promoting oneself to employer.

Overall promoting works closely with the process of tagging. Career branding is not an exception from the promoting mechanisms. Self-marketing is not just about selling individual’s specific skills, because everyone has skills. Therefore the question for the players at the labor market appears: How can person stand out as the “one”? And the answer for that, according to Matt Warzel, is developing a tag-line. A great tag-line tells people exactly what a product is and how they will benefit from using it. This is what employers want to know about the candidate. Specifically, how this person will help them make and save money. Creating candidate’s tag-line should tell employer how much money he or she helped a previous or current employer to generate or save on a given project, sale, or time period. Generally, assessment of individual’s achievements is the basis and the most valuable not only during employment process, but as well while creating self-marketing strategies. Career and personality assessments reveal consistent patterns in one’s traits, characteristics, strengths, preferences and skills. The assessment results may lead a person in a new career direction. If there are some doubts about establishing specific career, they tell how well an individual traits and branding messages align with his or her career path.

Five basic tactical steps or decisions are a necessity for building career brand, as defined by Dr. Randall S. Hansen in his article dedicated to self-marketing [Dr. Randall S. Hansen, 2016, Blog]. The first one is the following: gain experience and track accomplishments, the main idea of tactical suggestion from the expert is to gain as much different experiences, networks as possible. Dr. Randall S. Hansen advises students to take numerous internships and volunteer jobs for that reason. The next one is completing education or training, for that reason, getting additional education, training, or certifications can greatly enhance an individual career brand. The third one advises to promote oneself. One of the oldest tools of promotion for job-seekers is the resume, and person certainly needs to start there by listing all key accomplishments, skills, and education. An individual may even have his or her positioning statement or qualifications summary and a branding statement on one’s resume. The candidate’s portfolio should include all important brand artifacts: resume(s), mission statement, detailed accomplishments list, samples of work, articles and working papers, speech transcripts, awards and honours, testimonials, and more.

Becoming an expert should be taken as a motto for everyone whose will is to succeed on the market, however, in case of career branding it is also an important strategic step. “Nothing builds credibility in a career brand more than establishing yourself as an expert in your field. Start by writing articles that showcase your knowledge — and getting them published in the noteworthy media outlets. Consider self-publishing.” – advises Dr. Randall S. Hansen [Dr. Randall S. Hansen, 2016, Blog]. The last but not the least is to build relationship – an intention from the future employee, as nothing in marketing is more powerful than a promotion tool called word-of-mouth, which can be defined as what people say about you. Thus, nothing is more powerful in building your career brand than what your network of contacts — friends, colleagues, customers, clients, and former bosses — say about you and your set of skills, education, and accomplishments. Dr. Randall S. Hansen is strongly convinced that keeping one’s network strong involves nothing more than relationship building, which results into the powerful career brand.

Conclusions. In this article we considered what challenges and differences of the modern employment procedures, what they bring to job seekers and how to overcome those issues. The way to stand out from the crowd lies in creating a personal brand, using special self-marketing techniques and taking strategic decisions. Among the tools of personal and career branding the following are worth mentioning: gaining experience/tracking accomplishments, completing education/training, promoting yourself, becoming an expert and building one’s network. All these tips cannot be implied into realistic circumstances without strategic vision of job market situation. Therefore, examining the market and the following latest tendencies we have come to the conclusion that there is a strong possibility to succeed in the employment processes. Moreover, we differentiated between the notions of personal branding and self-marketing to avoid possible misinterprets and mistakes. Applying all the things considered as self-marketing tools to differentiate oneself within job market supply competitors has shown great results. Personal branding as a way of promoting your competences and values as an employee has become a significant tool for arranging modern employment processes.

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SOCIO-PSYCHOLOGICAL ELEMENTS OF AN EFFECTIVE PUBLIC SPEECH

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Abstract. The article concerns various features of the process of influencing of the elements of effective presentation on the audience in public speeches, both based on the views of various theoretical approaches as well as on the basis of the research of the author of the article, pointing to the considerable multifactoriality and complexity of the social perception that underlies this process. The article highlights the importance of the main elements of an effective speech, which are recognized by various authors and studies as most effective for influencing the audience.

Keywords: communication, image of perception, influence, public speaking, social perception.

Introduction: Subject-matter of the study is socio-psychological elements of an effective public speech. Object-matter: features of determination of perception of the audience by the characteristics of a speech. Main tasks of the research included analyzing problem of the influence of elements of an effective speech on perception of the audience from theoretical positions, selecting specific elements of public speaking for research on the basis of analysis of the literature, conducting an experiment with demonstration of presentations to the groups and evaluating the influence of the elements of effective speech on the perception of investigated groups. Methods for research included Cattell's 16 Personality Factors Test, author's questionnaire for rating public presentations; the Wilcoxon-Mann-Whitney Criterion represented mathematical methods of data processing in this research. Relevance of the topic of the research is introduced in the following paragraphs.

Since ancient times a public speech which represents a form of sharing ideas of one resident of a community with other members turned out to be a powerful instrument of connecting people, inspiring

them, controlling them and influencing them in many ways. Public speaking as one of the types of social communication necessarily includes all of the main components of any communication - these are informational, interactive, and perceptual components. Therefore, a complex process of interpersonal communication can never be created without any of these components, as they constitute this process the way it exists. It is important to understand that communication in public speaking begins before the interlocutor starts to speak; it starts with the fact that the audience forms certain feelings about the interlocutor, the situation in which this communication takes place, creates certain expectation based on the known information, etc. In this aspect it is important to understand that it is not the certain separate characteristics of the speaker, his clothes or his appearance, not the separate characteristics of the wallpapers of the room where the event is held, it is the complex and multifactorial perception of the moment of communication which is about to happen that will influence effectiveness of the public speech. This process involves not only the individual separate sensations of the world and people in it but also the combination, the synthesis generating new features, which are otherwise absent in separate sensations. The interaction and communication is present and possible only when we talk about perception in the described meaning.

Therefore, as we perceive the world around us and try to connect with it, the process of perception itself becomes a determining factor of establishing contacts and communication between people, according to certain psychological laws, which people do not always control or are even aware of. As this perceptual component determines further direction of the communication, we can see why it is important to understand its effects on public speaking. The image of perception, which is created in the process of perception, is the result of this complex activity and the embodiment of the factors that influenced this process. For this reason, it is significantly important to conduct studies, which would take this multifactoriality of the process into consideration when developing the course of the study.

Discussion and Results: In the research conducted by my scientific advisor and me our work was mainly aimed at researching the perceptual component of communication between the speaker and the audience, namely the influence of elements and components of speech on the formation of the image of perception by the audience. For this reason, this article abstains from discussing the complexity of perception in general and is concentrated on the social perception as a special kind of perception and its role in public speeches.

Social perception is significantly different from perception of the physical environment, namely, it is a specific process in which subject and object of perception perceive not only the physical characteristics of each other, but also behavioral ones. In addition, in the process of interaction people create judgments about the intentions, abilities, emotions and thoughts of the interlocutor as well as about relations that connect the subject and the object of perception based on their personal experience. The existence of such mediators of interaction uncovers the role of additional factors that do not show their influence on the perception of physical objects unlike perception of social objects. It is this process of social perception that occurs during public speaking. This process is determined by numerous components such as cognitive settings, emotions, intentions, thoughts, attitudes, motives and prejudice, etc. Perception of social objects takes place in two directions:

1. Perception of appearance and behavioral reactions of the object.
2. Perception of internal appearance of the object, that is, a complex of its socio-psychological characteristics. This is done through mechanisms of empathy, reflection, attribution, identification and stereotyping.

The process of social perception in the interaction of social objects is influenced by many factors and features such as age characteristics, perceptual effects, past experience, personal characteristics, and others. For this reason, many researchers have been relentlessly attempting to discover those verbal and nonverbal elements that determine or enhance the influence of a public speech on the perception of the audience. But study of this issue is complicated as during public communication multilateral mutual influence occurs and it happens through interpersonal and social relations (communicator has mutual influence with the audience, recipients of the message with each other and the communicator, etc.). That's why different scientist develop their theories about factors influencing perception of public performance efficiency focusing their attention on different aspect of social perception, which it depends on.

A scientific view of the problem of human perception throughout the history of scientific development of psychology and related fields of knowledge and research on this issue was heterogeneous, multilateral, complex and sometimes contradictory. For this reason, for holistic understanding of such a phenomenon as perception, it is necessary to understand this concept in different approaches, which sometimes define this complex concept by different definitions giving even opposing explanations based on various scientific grounds and conclusions from research.

For example, G. Lasswell studied the most effective means of linguistic influence on the audience through public speeches and created a linear model of communication, which describes a linear, "unidirectional" act of communication. [4]The model consists of 5 elements of mass communication, namely: source of information, information, way of information transmission, recipient of information, effect of communication. In his opinion, each of these elements in some way predetermines the latter, that is, the effectiveness of the whole performance. Thus, perception of a speech as successful (success of a speech in this case is understood as acceptance, not rejection of information, arousing interest and not the indifference to the material) is influenced by:

- purposefulness of the message (presence and observance of the purpose of interaction)
- personal characteristics of the communicator, which are manifested in the nature of interaction with the audience, his personal qualities, as well as non-verbal characteristics
- content of information (volume, complexity, composition, sequence of presentation), as well as familiarity of information.
- admissibility of the channel of transmission of information (visual, audio, etc.)
- relevance of the message to the characteristics of the audience (by age, gender, emotional state, values, motives, etc.)

Carl Hovland, in turn, studied the features of convincing communication, and therefore the criterion of effectiveness for him was the level of influence through which an individual (communicator) distributes incentives to change behavior of other individuals (audience) through public speaking. He developed a program for evaluating the effectiveness of various message elements in order to find out the most effective combinations. As a result, a list of parameters was created which, in his opinion, influenced performance of the speaker and features of the audience's perception. The list includes elements such as: nature of strategy of persuasion, as well as the desire to convince, characteristics of the source of information (familiarity, trust in the source), characteristics of the message (clarity, number and nature of the arguments (positive or negative arguments), positive reinforcement of the message, emotionality of the message, increase / reduction of fear, use of attention drawing techniques, presentation style, structure, including clear conclusion), characteristics of the channel of the message (interpersonal communication or media), characteristics of the recipient (intelligence, self-esteem, gender, needs, motivation, status).

Leslav Vojatysik, in his turn, studied the issues of psychology of political propaganda, so he drew attention to the following large groups of factors that influence perception of propaganda performance: external factors (place, physical factors of the environment such as air temperature, lighting, space, etc., presence of distracting factors and others), personal determinants of perception of the message to the audience (personal qualities, settings as the result of their own experiences and stereotypes, as well as selectivity of attention and memory), physiological state of the listener (fatigue, emotional state, health state), speaker's characteristics (personal qualities, language, nonverbal characteristics, knowledge, strategies of influence, erudition, appearance), impact of group processes, etc.[5]

The theoretical approaches to the study of factors that determine the effectiveness and success of perception of a public performance by the audience have many common elements, but discrepancies remain noticeable, which led to the need to continue studying this topic, that is, the absence of a single correct theory or model generates a huge amount of research and options on considering this issue.

For my own research on the basis of the analyzed literature, 5 main elements of effective speech were identified, which were intended to be examined in terms of influence on perception. The following 5 elements of presentation of a public speech were singled out for the study: involving audience into presentation, explicitness (through examples), call to action, characteristics of non-verbal communication, characteristics of intonation. Four of them were experimentally proven to have influence on perception of a speech and one element was found not to show any significant influence.

Such element of performance as a call to action did not show presence of influence on perception of the audience. Such results can be explained by many factors, above all there may be a negative reaction to the call to action as a way of manipulation or influence by the speaker, which causes the subjects to demonstrate a protective reaction in the form of denial of influence, rejection of influence, ignoring this element, however, results may also indicate the absence of influence of this element on perception of audience.

All of other elements showed significant influence on perception of the speech. The influence of such element of performance as involving audience into the speech can be explained by the fact that a public speech is a monologue of a special type, a monologue addressed to specific recipients, thus interaction between the speaker and the listeners throughout the speech is crucial as it is a basis of any communication. So using tricks of involving the audience in the content of the speech by having a dialogue in the process of

speaking, by making little quizzes, asking and answering questions from listeners helps to achieve the effect of empathy, both intellectual and emotional. That gives a full sense of involvement in speech, a sense of being a part of this communication creating a holistic atmosphere of the interaction.

Such element of a speech as explicitness through examples also showed its influence on the perception of the audience, which can be explained by the properties of memory, attention and thinking, which are conditioned by the features of human evolution and that lies in the fact that precise, concrete and simple visual information about practical activity with bright examples is perceived and remembered by the audience better than biologically more complex abstract theoretical information.

Such elements of speech as the characteristics of non-verbal behavior as well as intonation, as expected in the course of the study, have shown their influence on perception of the audience, and the influence of non-verbal behavior was marked by having the greatest influence on perception according to the research, which may be explained by the highest discriminativeness of this element, so that it is easy to visually identify it during the speech, given the tremendous importance of visual sensors for perception of the environment by a person. One explanation for this effect may be that poses, facial expressions, pantomime, intonation characteristics of speech contain a huge amount of information about a speaker as they are part of the inner world of this person, so other people in the communication process adapted to use this information for evaluation and correction of perception images in accordance to these impressions. Additional explanation of this effect is that nonverbal behavior is very informative for audience as it can not be completely controlled, especially behaviour which is based on the activity of the autonomic nervous system (like a change in the tonus of musculature, swallowing movements, cough). That is why non-verbal information can help people determine the truth or the falsity of information, which increases the effectiveness of speech.

Conclusions. As researchers try to discover the underlying factors of an effective public speech it is important to remember that the isolation of any models that capture only the formal structure of a public statement as a communicative act will be ineffective as the study of separate elements ignores the fact that the process of oral speech is involved in a more complex and coherent phenomenon - interpersonal communication, and through it is involved in the whole system of social relations, which indirectly influence the effect of any public speaking. Therefore any public speaking researcher should consider it as a coherent phenomenon, only in combination with all the factors that contribute to determining its nature.

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THE INFLUENCE OF JOURNALISM ON PUBLIC OPINION

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Abstract. The main focus of the issue is analyzing and understanding the power of journalism's influence on the public opinion. Everyone is aware that journalism has a powerful influence on the public opinion and public spirit; therefore this issue will give deep answers to some interesting and basic queries about journalism and public opinion. In spite of several researches, this subject is still actual and unknown for some people. The main reason for choosing this theme is significance and welfares of that question.

Keywords: journalism, public opinion, influence, society, mind.

Introduction. In the last five decades or so, the media and its influence on the societies, has grown exponentially with the advance of technology.

First there was the telegraph and the post offices, then the radio, the newspaper, magazines, television and now the internet and the new media including palmtops, cell phones etc. There are positive and negative influences of mass media, which we must understand as a responsible person of a society.

In present era of globalization, majority of people in the society depends on information and communication to remain connected with the world and do our daily activities like work, entertainment, health care, education, socialization, travelling and anything else that we have to do consequently journalism is one of the most important engines of society and the formation of public opinion. People need news/information for various reasons, on one hand it can be used to socialize and on the other to make decisions and formulate opinions. Entertainment would be the other function of the mass media where it is mostly used by the masses to amuse them in present day hectic environment. Educating the masses about their rights, moral, social and religious obligations is another important function of mass media, which needs no emphasis. Unconditionally all media uses different genres of journalism. And, as we know, there is a code of journalistic ethics, which includes the ethical principles of professional journalism. These positions are very important and must be steadfast, because journalism has a great influence on public opinion as a whole and on the consciousness of each person separately [Boykoff, Boykoff 2007: 4]. The main focus of the present study is to find techniques and ways of journalism's influence on the public opinion, investigate how and why journalism gets one of the leading positions in directing a society.

Object of this article is journalism. Subject – is analysis the influence of journalism on public opinion. The relevance of the topic is that journalism is a convertor of information for society, and sometimes even a toy in the hands of the government. It's very essential, for the reason that journalism conveys the news of the world to people and carries a certain "message". Therefore, the public opinion will be depending on how and what information will provide to the society.

Discussion and Results. During the existence of journalism it was studied by many scientists. Despite of this, we can't make certain statement so far. But I want to introduce you one of the most precise and obtainable statement of journalism. Journalism is the production and distribution of reports on the interaction of events, facts, ideas, and people that are the "news of the day" and that impacts society to at least some degree. The word applies to the occupation (professional or not), the methods of gathering information, and the organizing literary styles. Journalistic media include: print, television, radio, Internet, and, in the past, newsreels.

Journalism is a very important element of society. Journalism is the way of man to the world, a window in the present day. But, in modern society, the opinions of people on this matter differ. This is due to the fact that more and more often the society faces "corrupt" journalism. Such phenomena are unacceptable, because journalism influences the formation of public opinion [Hutton 2008: 12]. The formation of public opinion depends on what information and how the journalist will submit it.

There are several genres of journalism:

1. Information:

- Chronicle
- The note
- Sketching
- Interviews (monologue, dialogue, questionnaire)
- Report (general, thematic, with comments)
- Travel notes
- Overview
- Reporting (event, problem, cognitive-thematic, reportage-commentary)
- Journalistic investigation

2. Analytical:

- Correspondence
- Article
- Overview
- Review

3. Artistic and publicistic:

- Essay (narrative, descriptive)
- The feuilleton
- Pamphlet

The concept of "public opinion" has a large number of definitions because it was studied by many scholars. However, this term was first used for the first time by English statesman Lord D. Salisbury (XII century.). Then this term was used to indicate the support of the population to parliamentary action, that is,

the assessment, the reaction of people. Now "public opinion" can be defined as a specific expression mass consciousness, which is manifested in verbal and nonverbal assessments and as a characteristic of society's attitude to certain changes, phenomena, socially important events [Miller 1998: 3].

Public opinion has a definite structure:

- Rationality (the formation of knowledge about the object);
- Emotionality (formation of an emotional perception of an object expressed by certain feelings);
- Volitional component (the formation of the will of the individual who is the subject public opinion).

Public opinion has such characteristics:

- It is formed not by a mechanically formed group of people, but by such a group characterized by common interests and integrity;
- There is only a relatively important and relevant to society problems, phenomena;
- Stable, intensely distributed, weighty, socially oriented, competent;
- Can be expressed verbally and nonverbally;
- Sometimes it may be conflicting (often enough).

Also, public opinion has certain functions. Namely: informational, normative, expressive, directive, educational. To provide work of these functions of public opinion should be democracy, interaction of public opinion, power, media, politics [Miller, Dinan 2009: 20].

The influence of journalism on public opinion

The media has a huge impact on society in shaping the public opinion of the masses. They can form or modify the public opinion in different ways depending of what is the objective. For example, Pakistani media influenced the public opinion against the Taliban in Swat by repeated telecast of a video clip showing whipping of a woman by a Taliban. It is known many situations when journalism has an influence on political actions. Such example is "Watergate scandal" which led to Richard Nixon's resignation from post of president. It is commonly used the term "fourth estate". The term "fourth estate" means the influence of journalism and media on public opinion. In current use, the term is applied to the press with the earliest use in this sense described by Thomas Carlyle. Journalism is a very influential force in society.

Journalism brings to us all sorts of information. Often this information is not freely available to ordinary people. This is the fundamental factor of the influence of journalism on public opinion. It is a fact that the main weapon for journalist is information. Corrupt journalism is very common now. Bribery of a journalist is a mutual thing, especially on the eve of the pre-election campaign. We often do not even notice the hidden advertising, which affects our consciousness. Thus, journalism can really be called the fourth estate, for the reason that it is the engine of society and hides in itself a huge force of manipulation [Philo 2008: 53].

Conclusions. The media plays a prominent essential role in the formation of public opinion through several influential organs such as the press, radio, television, cinema, theater, books and social networking sites, which is one of the most important means of communication with the public.

This means of influencing work in combination, and in the consistency and integrity of the formation of public opinion on various topics and circumstances and situations and problems that present themselves on the mind and that relate to various aspects of political, social, cultural or economic.

In summary, the role of the press in the formation of public opinion and the formation of trends or change according to different systems of government, which views the press from different angles and take them different positions as well as different vary depending on the size of the freedom enjoyed by the press in each country. The media are in essence a contested space in which the most powerful groups can establish the dominance of specific messages.

Therefore it is very important to have non- corrupt mass media which relies on truthful information and transmit it to the public, defending all the viewers and the readers' rights.

This article as well examined the concepts of journalism, public opinion and the fourth power. Moreover were determined the types of journalism, the structure and characteristics of public opinion.

So, media is one of the strongest driving force to have public opinion and interest. The world of media has seen transformation since decades and in the present scenario is the strongest influential force.

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LACUNARITY AT WORK: LINGUISTIC PHENOMENON

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Abstract: The paper deals with the study of lacunarity. The concept lacunarity is considered from the point of view of its properties in the linguistic picture of the world. The method involved is ontognoseological. The objective concerns the problem of conceptualization and categorization. The materials involved are English dictionaries and belles-lettre texts. The conclusion is made that lacunarity is closely interacted with the problems of general and particular linguistics. Perspectives are outlined in the details.

Key words: categorization, conceptualization, lacuna, lacunarity, linguistic picture of the world, nothingness, sema, syncreta.

Introduction. The object-matter of the research is the metasign lacunarity, the subject-matter is interaction of its properties in the linguistic picture of the world, in the modi – language, speech and cognitive activities. The major method is ontognoseological, the syncretic integrity is made by objects and congruent analysis. The objectives concern the problems of conceptualization and categorization. The material involved in the investigation embraces the dictionary relevant articles and situations from the English belles-lettre texts. The novelty of the object and subject objectivizes paper topicality – urgent, actual, vivacious and updated. Comparability is available in the research. Macrosystems involved are the English and the Ukrainian modern languages. The investigation is based on philosophico-linguistic grounding of nothingness. The value of the paper is both scientific and practical.

Discussion and Results. Verbal and nonverbal signs mark the reference. They exteriorize mental and physical activities. Conceptualization is a mental cognition of worlds, the way people consider the things outside, motivate their etymology including ethnic charm [Pryhodko 2005]. Discursive representation is of syncretic nature in topical vicinity, dichotomy of talkers' regime, verbalization of text ideas, language and speech vectors, in verbal and nonverbal signs.

Thus, language is a product of people's activity. People make the hub of categorization. Cf.: measurement of time, space, cultural artifacts, social rules of behavior. The people's cognition is of secondary nature, the priority belongs to the denotata of the world outside. Language units refer to the instruments of cognition, its hidden energy. This syncreta involves language in further creation – speech activity reigns in communication [Pryhodko 2005: 95].

Etymology of the concept lacunarity is worded in “kernel”, “corn” – the predecessors of “harvest” [Longman 2005: 674]. Language is an ethnocentric phenomenon, recognized in people's activity (both mental and physical). Conceptualization works in the assessment of values (temporal, spacious, attributive, symbolic, hidden and unhidden). Concepts change with time, civilization, evolution and involution processes. The term lacuna is a great proof herein. In its before terminological status lacuna was of landscape nature (“lake”, “pond”, “pit”, “uncultivated land”, “swamp”, “empty place” etc.) [Webster 1993: 801]. Later on lacuna came to be in status of interlanguage allonyms and lemmas. By nowadays it has acquired the power of head-word in the lacunar system. The concept of lacunarity works on. It is a phenomenon of special make and validity. It should not be omitted in the research. It should be linguistically focused upon. It is not so chaotic as it has been assumed within some trends and by some scientists, its symmetry works on horizon and vertical vectors, in the triad of language, speech and speech modi [Anokhina 2017: 10]. Its syncretism is polyfunctional. It should not be underestimated in its scientific value and practical application. Linguistic analysis of lacunarity opens a page of nothingness and its whereabouts. We agree with the alternative to be or not to be. Alternation works in both ways: words come and go. They change their semas. They disappear and vice versa, they come back again – changed, modified, unrecognized, distorted, distant and delacunized. They are echo-effecting. They (words) use the language resources, economizing people's efforts. Dichotomy yields to trichotomy. Formula (a + b) is substituted by multiplication (ab). Cf.: phenomena of idiomacy, phraseology, syncretism, folketyymology, vertical processes, language games, stylistic devices of zeugma, oxymoron type. Words lacuna, lacunarity have much in common: having not

only the root morpheme lacun-, but also etymological and actual semas. At present the above mentioned units (lacuna, lacunarity) adhere to the scientific picture of the world, to the lexico-grammatical field of lacunar units, to the problem of nothingness. Lacunae are semiotic unilateral signs devoid of outer structure, their implied deep senses are sought. The delacunization consists in the search of the hidden meanings within questions, conditional forms, negators, hidden texts, riddles, situations, contexts – multiaspected ways to extiorize the idea of lacunarity [Selivanova 2008: 501-502].

Delucanization is being involved in discovering the linguistic mystery of lacunology. There work some linguistic delacunizers of expressive, verbal nature like affixes un-, dis-, im-, non-, -free, -less. Cf.: unimportant, discover, salaryfree, meaningless, nonsense etc. [Shvachko 2014: 150].

The linguistic analysis of the English belles-lettre texts objectivized the data of mononegation, polynegation, explicit and implicit negation, their diversity parts of speech presentation. See the tables.

Table 1

Negation at Work				
Analyzed situations	Mononegation	Polynegation	Implicit negation	Explicit negation
1000	864	136	133	867

Table 2

Diversity of Parts of Speech vs Negation							
Verb	Noun	Adjective	Adverb	Pronoun	Conjunction	Preposition	Particle
60	30	148	151	134	25	14	438

Table 3

Syntactic Charge of Communicative Units Blocks of Lacunarity				
Predicate	Subject	Attribute	Adverbial modifier	Object
587	62	121	171	59

The dynamics of lacunar units is cyclic: one stage yields to other modifying seme-shifts from something to nothing. In the linguistic picture of the world we have got the eyewitnesses of dynamics – groups of existent referents – non-existent or quasi-existent. Trichotomy works in symbols +, -, +/- . Cf.: everything, something, nothing, stability, stagnation, non-stability. The cyclic lacunar move is not a way aside, it is common for universal laws in real life and in conscience.

Negation works in language and speech, these modi are traced in conditional mood, questions, in words of negative indications. Negative indicators are available in words with implied negation. Cf.: reluctantly, hate, refuse, wrong, ignore, lack, fault etc.

Syntax-oriented lacunarity of negation works in sentences, in communicative blocks of subject, predicate, object, attribute, adverbial modifiers. Cf.: Nobody would dream of looking in a bus terminal for a man who had just stolen a hundred thousand dollars. I hadn't stuttered once all morning. I had no lease and was on a month-to-month arrangement. Your ageless heart as you move through time, layer on layer, tender sequoia... I had never done anything to make enemies [Connor 1998: 30-38].

Conclusions. Lacunarity is being closely interacted with the problems of general and particular linguistics, namely: interdisciplinary connections of terminological subsystems; evolution of the scientific picture of the world; naïve and scientific pictures (wordmaking, wordbuilding, borrowings and semantic shifts); universal laws of linguistics (alphabetic succession in dictionaries, the close ties with colloquial neutral words in the process of determinologization); conceptualization (divergence and convergece, polarity of semantic designs, attraction laws, categories of lexicalization and grammaticalization); syncreta (thinking before saying) as a motto of translationability. Lacunarity is authentically worded in the lexicographical clusters, universally constructed by lemmas (head-words) and their allonyms (ideographic synonyms). The scientific picture of lacunarity units is verified by terminological nature, working terms, status, valency with relevant subsystems. Lacuna is a term of secondary derivation, its etymon is mostly from the naïve picture of the world. Lacunarity mirrors the universal laws of terminology in their divergence and convergence. Horrorhows of lacunarity work with nominative (NU) and communicative units (CU). The above-mentioned problems are prosperous for further investigation of lacunarity.

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THE SCOPE OF ARBITRABILITY THROUGH THE RULES OF UKRAINE'S NATIONAL LEGISLATION

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Abstract. The article deals with the analysis of arbitrability's scope through the rules of the national legislation and the main international legal acts. There is an analysis of disputes' categories that can be solved by international commercial arbitration, in other words they can be arbitrable. Due to this analysis, the generalization of the scope of arbitrability and the lack of a unified list of arbitrable disputes are highlighted.

Key words: Arbitration, arbitrability, alternative way of dispute resolution, scope of arbitrability.

Introduction. Today more and more attention is paid to international commercial arbitration (hereinafter – ICA) in our country and the number of cases which are tried by ICA every year increases. This may indicate that there is definitely a certain trust to international arbitration in Ukraine, but it is desirable that the coefficient of such trust constantly grows. In this article, we propose to pay attention to arbitrability for Ukrainian legislative purpose and main international legal acts.

The works of the following scientists form theoretical basis of the question considered in this article: T.G. Zakharchenko, B.R. Karabelnikova, S.A. Kurochkina, K.K. Lebedeva, Y.D. Pritica, T.V. Slipachuk, A.I. Minina. It is worth mentioning the foreign specialists such as P.M. Baron, K.P. Berger, M. Hunter, G. Kegel, A. Redfern.

Object-matter is a legal relationship that arises in connection with the dispute resolution in international commercial arbitration.

Subject-matter is arbitrability of disputes in accordance with national legislation and main international legal acts.

Objective is the search for problems of legal regulation of the mentioned subject in national and international legislation to avoid ambiguous interpretation of the relevant rules.

Tasks consist of carrying out an analysis of domestic legislation and legislation of foreign countries.

Methods: comparative-legal, formal-legal, methods of synthesis, deduction, etc.

Discussion and Results. In Ukraine, the activity of international commercial arbitration is regulated by such legal acts as Law of Ukraine on International Commercial Arbitration, Economic Procedure Code of Ukraine, Civil Procedure Code of Ukraine, and Law of Ukraine on International Private Law. It is also impossible to ignore the following main international acts, which are the basis of the national legislation on the investigated subject: UNCITRAL Model Law on International Commercial Arbitration (1985), Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, 1958), European Convention on International Commercial Arbitration (Geneva, 1961). Below, we will analyze the scope of arbitrability in the mentioned legal acts in more details.

1) Ukraine's Law on International Commercial Arbitration states that by an agreement of the parties, the following disputes may be referred to international commercial arbitration: disputes resulting from contractual and other civil law relationships arising in the course of foreign trade and other forms of international economic relations, provided that the place of business of at least one of the parties is situated abroad; disputes arising between enterprises with foreign investment, international associations and

organizations established on the territory of Ukraine; disputes between the participants of such entities; disputes between such entities and other subjects of the law of Ukraine. (p. 2 art. 1) [1].

2) In accordance with part 2 of art. 12 Economic Procedure Code of Ukraine subordinate to economic courts the dispute can be transferred to the parties to the arbitral tribunal, except for disputes about the invalidation of acts, as well as disputes arising during the conclusion, amendment, termination and execution of economic contracts related to the satisfaction of state needs, cases arising out of corporate relations in disputes between a legal entity and its participants (founders, shareholders, members), including the withdrawing participant, as well as between the participants (founders, shareholders, members) of the legal entity be associated with the creation, activities, management and termination of such person, rights and obligations of participants (founders, shareholders, members) of such people other than labor disputes and other disputes by law [2].

3) Civil Procedure Code of Ukraine on the competence of civil cases has the provision that courts review cases of appeals against arbitral tribunals, the issuance of enforcement orders for the enforcement of arbitration awards, the challenging of decisions of international commercial arbitration, and the recognition and granting of permits for execution of awards of international commercial arbitration (art. 15) [3].

4) Article 77 of The Law of Ukraine on International Private Law defines the exclusive jurisdiction of certain types of cases, namely, the jurisdiction of the courts of Ukraine is exceptional in such cases with a foreign element:

1. - if the real estate in respect of which the dispute arose, is in Ukraine, except for cases about the conclusion, amendment, termination and execution of contracts within the framework of public-private partnership, concluded by the Cabinet of Ministers of Ukraine, according to which real estate is the object of such partnership, and the dispute does not concern the occurrence, termination and registration of property interests to such an object;

2. - if in a case involving the legal relationship between children and parents, both parties have a residence in Ukraine;

3. - if in the case of inheritance an heir is a citizen of Ukraine and had a place of residence in it;

4. - if the dispute is related to arrangement of intellectual property rights, that requires registration or issuance of a certificate (patent) in Ukraine;

5. - if the dispute is connected with the registration or liquidation on the territory of Ukraine of foreign legal entities, individuals - entrepreneurs;

6. - if the dispute concerns the validity of notes in the state register, the cadastre of Ukraine;

7. - if in the cases of insolvency the debtor was established according to the legislation of Ukraine;

8. - if the dispute relates to issuance or cancellation of securities issued in Ukraine;

9. - cases relating to an adoption that was or is being carried out on the territory of Ukraine;

10. - in other cases, determined by the laws of Ukraine [4].

5) UNCITRAL Model Law on International Commercial Arbitration (1985) states that this Law will not affect any other law of this State by virtue of which certain disputes may not be submitted to arbitration or may be submitted to arbitration only according to provisions other than those are in this Law (p. 5 art. 1) [5].

6) Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, 1958) states that each Contracting State will recognize written agreement under which the parties undertake to submit to arbitration all or any differences which have arisen or which may arise between them in respect of a defined legal relationship, whether contractual or not, concerning a subject capable of settlement by arbitration (p. 1 art. 2) [6].

7) European Convention on International Commercial Arbitration (Geneva, 1961). This Convention shall apply:

(a) to arbitration agreements concluded for the purpose of settling disputes arising from international trade between physical or legal people having, when concluding the agreement, their habitual place of residence or their seat in different Contracting States;

(b) to arbitral procedures and awards based on agreements referred to in paragraph 1(a) above (p. 1 art. 1) [7].

Conclusions. The scope of arbitrability is a list of categories of disputes that may be solved by ICA. These international legal acts, as well as The Law of Ukraine on International Commercial Arbitration, provide a general definition of disputes on which legal relationship may arise. Commercial Procedural Code contains categories of disputes that are not arbitrable. The rule of The Law of Ukraine on Private International Law regarding the category of cases referred to the exclusive jurisdiction of the courts of Ukraine is also considered a list of non arbitrable cases by some scientists, but in our opinion such a statement cannot be accepted because the concepts of jurisdiction and arbitrability cannot be identical.

The rules of Civil Procedural Code of Ukraine determine the scope of arbitrability through the disputes over challenging awards of ICA, also the recognition and granting of permission to execute awards of international commercial arbitration that is, there is a border of the scope of arbitrability mentioned in Civil and Procedural Codes of Ukraine.

So today there is no legal act in Ukraine that could provide a unified exhaustive list of categories of cases that can be solved by ICA, there are only generally defined lists of non-arbitrable categories of cases. First, due to the concept of public interest and the general rule of the case in which the public interest is directly cannot be solved by ICA.

However, it should be noted that each state independently decides which cases may or may not be solved by ICA in accordance with its political, social and economic policy [8].

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AESTHETIC EDUCATION. DEVELOPMENT OF ARTISTIC SKILLS

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Abstract. The article is dedicated to the definition and the significance of aesthetic education in the development of the individual in the 21st century, the aims and the ideas of aesthetic education and what they are based on, its challenges and problems which are relevant to the modern reality. A variety of opinions on the problem are also described. Special attention is paid to the necessity of the formation of aesthetic attitude of the individual towards the art and the reality.

Key words: aesthetic education, aesthetic development, the beauty, individual

Object-matter. Every child needs planned, aesthetic education in order to influence the experiencing, feeling and enjoying of beautiful things as a counterbalance to our currently rationalized world. Since the contemporary school strives for the development of professional knowledge and skills on the basis of intellectual actions, while (at the same time) neglecting other dimensions of the child's personality (emotions, feelings, etc.), it is one of the most important tasks of the education of young people to develop the ability to enjoy art and beauty, and in one's inner and outer life to act in accordance with a sense of proportion, harmony and beauty.

Although since antiquity, aesthetic education has been an indispensable composite part of the upbringing or education of the free man [Plato], nowadays its importance is determined by the fact that modern education should be closely connected to the needs of our daily life. The emergence of new goals in individual development and aesthetic perception means that different methods are to be used in education. A German philosopher Johann Friedrich Herbart stated that the child's personal integrity can be maintained through aesthetic culture.

Subject-matter. Aesthetic education and its ideas are based on the statement of philosophers of materialism that the object of aesthetics is the beauty. The development of young people's intelligence and their aesthetic attitude towards the art and reality is a process that cannot be controlled. Moreover, the problem is that they do not realize the aesthetical essence of objects as the development is taken as entertainment.

Demands made in the field of aesthetic education emerge in the curricula only from the general goals, which are more or less realized in the course of various subjects. We all know that each subject offers opportunities for the development of aesthetic abilities. However, the question is to what extent teachers are aware of the importance of forming goals concerning the aesthetic dimension and if they are capable of implementing the goals of aesthetic education in the planned and implemented school curricula [Denac 2011: 121-132].

State institutions and various government documents or professional literature offer mostly theoretical starting points about the importance and role of aesthetic education, which are also taken into account by curriculum designers; however, they do not provide any concrete didactic approaches to teaching arts and cultural education. Our pedagogical theory and practice lack such aesthetic thought. Individual types of artistic education are not determined on an aesthetic-theoretical basis; frequently, special didactics of artistic subjects draws on artistic techniques and does not include either the goals or processes of the aesthetic dimension, such as aesthetic perceiving, experiencing, creating, evaluating and developing aesthetic sensibilities [Denac 1994, 1999]. This is why there is an excess of theorising at the expense of experiencing, creating and evaluating within the educational process.

Tasks. The aim of aesthetic education is to initiate students into the art, form a creative individual; develop aesthetical receptivity, the ability to express individual's emotions, thoughts, attitudes opinion, «the aesthetic sense for the beautiful» and a sense of harmony. It is worth to highlight that the formation of creative abilities through arts is an essential part of aesthetic education of any individual. The idea of education of the 21st century in general is to give a student an opportunity to observe and create the beauty.

Art plays an important role not only in the development of the young individual's sensitivity but also in the development of his personality, which should be separated from education in the artistic fields, which are narrowly professional and aimed merely development of artistic abilities. The concept of aesthetic education strives at introducing various forms of art to students and stating that art can become a important part in the culture of the individual only in this way. Kroflič points out that «the value of arts ought to increase in the spirit of postmodern epistemology and value orientations because it is a key instrument that allows emphatic recognition of various value perspectives and raising existential questions» [Kroflič 2007: 14]. It is also claimed that individuals can find a way out of emotional and physical isolation with the help of the humanities and literature. Aesthetic education is a requirement of the main idea of aesthetical development which is to form an individual. Artistic experience can guide us to become the humanistic ideal of personal perfection.

Discussion and Results. According to the requirements of modern life the teacher is supposed to create optimal conditions to form aesthetic attitude towards art as a systemic education. The initial basis of formation of an individual develops at the early age and this process continues at school [Nasrullaeva]. One of the reasons for the mentioned difficulties is that «the relationship between pedagogy, general didactics and special didactics should be constructed in such a manner that more attention be paid not only to psychology, pedagogy and sociology, but also to aesthetics as the science of the beautiful and the artistic» [Dietrich 1996]. General didactics forms overall, socially essential aims, which should also include aims of the aesthetic dimension, while it leaves the concretization of the latter to special didactics. Otto [1995] reflects on whether aesthetic education is really (only) the problem of special didactics. He states that this problem should be dealt with as a general curricular problem. It is also necessary to emphasize the relationship between the general pedagogical goals of the aesthetic dimension and the professional goals of individual subjects. It is most important to be aware of the general goals and consider them throughout the planning, realization and evaluation of the educational process. However, we should be aware of two potential dangers in the process of goal formation: if we do not deal with the general pedagogical goals of the aesthetic dimension and subject them to specific professional-subject goals, this can frequently lead to children losing interest in activities involving music, arts, movements, literature, etc. and ceasing to enjoy them; while if within the subjects we merely follow the general pedagogic goals, the individual subject can lose its autonomy, which means that it can be replaced by another subject field, e.g. children can choose among singing, drawing, dancing, etc. It is thus necessary, particularly in comprehensive schools, to link the professional goals with the general pedagogical goals of the aesthetic dimension.

Conclusions. Education should provide the individual with the possibility of a responsible, independent and meaningfully complete existence, so that they can contribute to free democratic society. It is also worth to strengthen the role of art in schools so it receives an equal, independent status in relation to other subject areas. In this situation students will be able to actively participate in the learning process. The aim of aesthetic education is to introduce us to art, undergoing aesthetic experience, and not just acquiring knowledge of art [Reimer 1998]. In order to develop aesthetic sensitivity, the teacher should encourage

young people to actively notice, experience and create the beauty in art, nature and interpersonal relationships; the teacher should also provide them with a variety of ways to express and realize oneself. School should be a foundation for the achieving the goals of aesthetic education within a variety of school subjects. Appropriate guidance from teachers in schools and kindergarten and work with artists, elevates the cultural level of the individual and whole nation [Nevanen, Juvonen, Ruismaki, 2014]. The international “European Multiple Choice Identity Project” offers the original use of a different methods in order to develop youth identity, also utilising the artistic sphere as a tool to understanding oneself and reality, which can guide us to appropriate behaviour. There are many examples of practicing in education, particularly, in early education, where the programs often highlight the aesthetic component and connect the cognitive and emotional fields of a child’s personality. Reggio Emilia schools and early education programs such as the Montessori Method pay special attention to art and creative expression.

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GENRE PECULIARITIES OF THE FILM REVIEW TEXTS IN THE HISTORICAL PERSPECTIVE

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Abstract: The article deals with the development of the genre of film review and the ways of actualizing evaluation – the category that forms film review as a genre and a text type. The article highlights the points of the evolution of evaluation, entwined with the history of the film review genre, and accentuates the main stylistic and cognitive features of film reviews.

Key words: film review, evaluation, discourse, genre, author.

Introduction: The critical genre of film review appeared as soon as cinematography was born. Ever since 1907, when the first movie review has been published, the popularity of film reviews has been growing relentlessly. The reason for such demand in film reviews was that the readers were in a need of evaluative information and assistance in film choice.

The object-matter of the research is the film review genre. The subject-matter is the evaluation in the film review genre, respectively. The specification of the main peculiarities of the film review genre presents the objective of the research. The following tasks have been assigned in order to accomplish the objective:

- define the film review genre;
- analyze the peculiarities and historical overview of the film review genre;
- examine the essential elements and the structure of film reviews;
- define evaluation as the text category of film reviews.

Discussion and Results: Evaluation is often understood as a formation of a value-based attitude, and a genre and text genesis of a film review. The distrust of subjectivity and skepticism towards evaluation go hand in hand. From the point of view of the critic, however, evaluation is not simply something one might do, something optional; it is intrinsic to the viewing experience. This is how the text makes sense to us: what it means to us. For film criticism, the tension between a film’s aspiration or potential and its actual achievement is as palpable to a viewer as that generated by plot or character or composition. The viewer

monitors the success with which the film handles its elements, and this is not of supplementary interest, but of pressing importance every step of the way. It affects the moment-by-moment viewing of the film [Clayton, Klevan 2011 : 12].

The evaluative utterance has to consist of three elements: the object, the subject and the cause of evaluation. For instance, on the dawn of the 20th century, the subjects that were evaluated were the technical innovations of cinematography and the possible ways of its impact on art. The second decade of the 20th century gave rise to the pioneer full-length feature films, which attracted a large number of theater critics. As the art of cinema evolved, so did the genre of film review, that expanded the aspects that underwent critical evaluation (sound effects, wide-vision screen, 3D effects). In the 1930s, cinematography had been acclaimed as a form of visual arts, and critics focused on the artistic value of movies, instead of their technical aspects.

Evidently, the technological progress not only had an impact on the contents of the film review but also on its form. Throughout the 20th-century film reviews belonged mostly in well-known newspapers and magazines, or in subject-oriented editorials. Later, however, some of them migrated to television or radio, but they couldn't manage to gain popularity.

Thanks to another technology – the Internet – film criticism in most quarters has been revitalized. Due to the economic demands of print publication and the concomitant rising cost of subscriptions, many print journals have moved online, a shift that has enabled them not only to survive but to thrive. The focal point of the reviews has shifted as well – the objective evaluation of the film has been replaced with the personal opinion of the critic. Emotional response has taken over the rational interpretation, based on logic and social norms.

The Internet has given an immense boost to the mainstream film review. It helped revive and broaden writing about film in this terrain. High levels of evaluation, relation to an average viewer, social commentary, usage of slang terms and colloquialisms are indicative of a mainstream or amateur film review.

According to Timothy Corrigan, the main traits of an academic film review are the professional orientation, neutral evaluation criteria, aesthetic richness and sophistication, philosophical contemplations, stylistic detachment [Corrigan 2001 : 36].

Between these “unofficial” blogs and “official” on-line journals are publications that are not strictly speaking academic, but that speak to academic as well as non-academic readers, further bridging these two poles of critical discourse. Since the readership of the online film includes the non-academic film specialist as well as the academic, it is less jargon-ridden than in years past, while still maintaining a high degree of critical sophistication. Inevitably, the writing style and concerns of non-academics seem to be informing the discourse of scholars every bit as much as the reverse. [Corrigan 2001 : 142] For instance, bloggers and users of such resources as IMDb are deeply invested in the history of cinema, description of film style and aesthetic evaluation, and their concerns are influencing academic discourse.

After several decades of scholarly writing that was mainly focused on asserting the aesthetic value, this modernized interest in the close analysis in the service of evaluation is most refreshing. The emergence of DVD technology, the expansion of the internet and the emergence of a number of sophisticated cinephile bloggers has coincided with a revival in academic circles of the kind of “expressive” criticism devoted to close reading and evaluation [Clayton, Klevan 2011 : 59-60].

The modern film review fulfills the two main functions: film evaluation and impact on readers' opinions. G. Stegert points out multifunctionality as the outstanding feature of film reviews and specifies its functions: information (presenting the reader with the latest news and information about the most recent film releases, the cost of the production, the aspects of production itself etc.); advertising (publicizing the film); evaluation (providing a brief description of the film as well as focusing on the analysis and evaluation of the film's artistic merits) and motivation (convincing the readers to go watch the film) [Stegert 1993 : 145-146].

David Bordwell suggests, that there are four key components present in film reviews [Bordwell 1989 : 77]. These components consist of a condensed plot synopsis (a brief description of the film's plot that emphasizes the most important moments of the film without revealing the film's ending); background information (records about the stars, the director, the production staff of the film, the film's source material); a set of abbreviated arguments about the film (the focus of this component is to point out what does and does not work in the movie and why), and an evaluation. The modern reviewer's evaluation generally includes a recommendation to either see or avoid seeing the film. The evaluation is based on the reviewer's arguments about the film and, as a rule, is backed up with their comments regarding the film's background. The subjects of evaluation in the modern film reviews include some, or all, of the following: the motivation for what happens in the film, the film's entertainment value, the film's social relevance, and social value, and the film's aesthetic value.

According to the film review's main functions, we can observe their structural peculiarities. The vast majority of film reviews have the following composition:

- 1) the title that catches the reader's attention;
- 2) introduction that provides some basic information about the film and a brief plot summary. In this paragraph, the author begins to evaluate the film, and it should allude to the central concept of the review;
- 3) description that may include the author's personal impression of their particular cinematic experience watching the film;
- 4) analysis that incorporates the critique of the following aspects of the film (formal techniques such as cinematography, editing, mise-en-scène, lighting etc. as well as the thematic content like history, race, gender, sexuality, class, or the environment). Besides this, the author is to compare the film to the previous works of the director or to the works of other directors and to highlight the film's best and worst moment;
- 5) conclusion that has to remind the reader of the author's general thoughts and impressions of the film; the author is also allowed to implicitly or explicitly state whether or not they recommend the film [Holopirek 2007 : 100-102].

Moreover, the majority of positive film reviews begin with the brief summary of the film's weaknesses, whereas negative film reviews tend to acknowledge the strong points first. The overall evaluation is always subjective and can contradict the general text of the review. The category of evaluation constitutes the specific stylistic feature of any review since the evaluation of the objects of speech is elevated to the principle of the text formation. A wide range of linguostylistic devices serves as the realization of evaluation in film reviews, for example, qualitative and evaluative adjectives, phraseological units, expressive syntax etc. In order to realize the evaluative content, reviewers often use neutral lexis with the rational-evaluative connotation that is known to the speakers of a certain language.

Author's evaluation can be rational by implication and extensive by form. In such case, they are expressed through the separate microtexts and are included into the text's logical scheme as the separate logical theses. In film reviews, author's evaluation is scattered throughout the entire text, herewith, evaluative units are embedded in the microtexts, which provides the evaluative connotation to the film review.

As a category, evaluation is characterized by the plurality of criteria that form it, which makes the description of the devices of its actualization more complicated. Evaluative devices can be observed at all language levels. In the texts of film reviews evaluation is actualized with the help of lexical, lexical-stylistic, stylistic, and grammatical devices.

Conclusions: In conclusion, we would like to affirm that despite the number of researches, the genre of film review requires further examination. This is explained by the rampant development of the genre. As the trends are changing, so are the opinions on art and culture, and it has become clear that the film review is a link between cinematography as art and form of entertainment. Consequently, art will require a cultural medium at all times. The reflection of reality is considered the subject of the film review. Every author correlates their personal opinions and the content of the analyzed material. We relate the more profound study of lexical, lexical-stylistic, stylistic, and grammatical devices of evaluation actualization to the further perspectives of our research.

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INDIVIDUAL DIFFERENCES OF MEMORY

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Abstract: The article deals with the individual characteristics of human memory. It concerns the dynamic manifestations of individual quantitative and qualitative differences, the integration of which forms

the memory differing in each person. The unique abnormalities of human memory, which acquire the character of outstanding opportunities are considered in connection with the individual differences.

Key words: abnormalities, differences, individual, memory, syndrome.

Introduction: Memory problem is traditional in psychology. Psychologists have been studying it since ancient times. The nature of memory, its typology, the characteristics of its processes, the methods of highly effective work of these processes and individual manifestations of memory are investigated. Being a unique structure and the basis of mental processes, memory will be of great interest for researchers for a long time.

Object-matter: individual differences of memory.

Subject-matter: quantitative and qualitative differences of memory.

Objective: theoretical analysis of individual characteristics of memory.

Tasks: 1. to determine quantitative and qualitative differences of memory;
2. to consider the phenomena and abnormality of memory.

Discussion and Results: There are ambiguous views on the concept of memory, its specificities and typology. Memory is defined as a complex cognitive process which provides memorizing, retaining, retrieval and forgetting of information and past experience by a person. [Granovskaya 2007: 170] It is the process influenced by goals, motivation, settings and desires of a subject, that is, by any subjective factor of memory performance. All the components are related to personality and form individual differences of memory. Memory is the basic structure in the system of personality activity, connected with the stable individual characteristics of a person. The type of a higher nervous activity, temperament, peculiarities of upbringing and learning, the development level of certain memory processes have a direct effect on the differences in memory. The type of a higher nervous activity and the level of the development of memory processes form unique cases in human life connected with extraordinary memory abilities.

It has always been difficult to determine the norms of memory, but what goes beyond the borders of the common meanings is the reason to deal with abnormalities. The term "abnormality" denotes significant deviations of subjects' memory from the norm, from the average level, which characterizes the majority.

Having studied the people with extraordinary abilities, five main abnormalities of memory were formed: "S" and "V.P." cases, giftedness syndrome, the syndrome of absolute memory and the syndrome of forgetting.

O.R.Luria studied S.Shereshevsky ("S"), the man with unusual abilities, who never made any notes and was able to remember huge amount of information for a long time. The investigations of "S's" memory were not quantitatively analyzed; his memory could not be measured, so Luria was engaged in the description of "S's" memory to compile a report of its structure. [Rolls 2005: 33-54] "S" memorized information using images or drawings. In spite of the type of information, he turned it into visual images. "S" used the mnemonic method of geometric places, involving the imagination of a familiar street, placing the perceived information, for example numbers, along the street. Each digit remains in one place - at the house, on the bench, on the balcony. Going along the imagined street, a person seems to be collecting the numbers. Luria concluded that "S" possessed synaesthesia. Hearing sounds, he saw images; when he heard notions - he saw their colour or smell.

Another case is "V.P.", [Gippenreyter, Romanova 2000: 562- 586] whose uniqueness was in the ability of structuring, though the volume of memory does not differ much from the amount of an ordinary person's memory. "V.P." was able to scan all the information in the short-term memory simultaneously. These abilities worked in long-term memory as well. "V.P." used the mnemonic system of verbal reception. He had the ability to capture the details, giving impetus to the rapid use of mnemonic device. The ability to compose mnemonic schemes to unrelated information led to the unique results in memorization and reproduction.

Giftedness syndrome is one of the most famous cases, as Alexander the Great, Julius Caesar, Mozart, Kim Peek had it. Its essence is the phenomenal abilities of a person in some activity. Kim Peek [Rolls 2005: 174-189] or "rain man" was able to keep more than ten thousand books in memory, reproduce an excerpt from the book at any moment, remember the calendar for two thousand years. His abnormality in memory was caused not by the use of mnemonic strategies, but by the lack of a corpus callosum. The hemispheres were not divided into left and right and thus his brain functioned as one unit. The researchers failed to study Kim Peek's phenomenon completely as his fantastic abilities left the world with him.

The absolute memory syndrome is in absolute memory itself. A person remembers everything - from the midwife's face at birth to the place of a point on the last page of the book read a few years ago. The most famous woman with this syndrome is AJ. The researchers hypothesized that emotions and hormones

contributed to the emergence of AJ phenomenon but the hypothesis appeared to be wrong. The study of AJ memory is going on.

Such quantitative differences as memory rate, accuracy, strength, readiness for reproduction, and the qualitative differences, distinguished by the domination of a definite brain area (visual, auditory, motor, emotional and their combinations) are considered while studying the individual memory differences.

Memory rate includes a number of repetitions required to memorize the certain volume of material. Accuracy is the degree of compliance of the stored material with the perceived information. It can be calculated by the percentage of correctly reproduced material to the entire volume of the reproduced material. Durability is the preservation of material in memory and the speed of its forgetting, that is the actual duration of the preservation of certain information. The readiness for reproduction is characterized by the simplicity and speed of recollecting of what is required at the proper time.

Taking into account that each of the indicators characterizing a certain memory process: memorizing, storing, retrieval, and forgetting is based on the fact that these quantitative characteristics are individually distinct, general memory typology was compiled. It includes four types of memory, namely: fast memorization along with slow forgetting; slow memorization along with slow forgetting; fast memorization along with fast forgetting; slow memorization along with fast forgetting.

The qualitative differences of memory are characterized by the dominance of certain areas of the brain. People with a clear domination of the visual cortex of the brain perceive information by the visual analyzer better, those with the domination of the auditory cortex - by the auditory analyzer, and the like. A combined type, that is, visual-motor and other combinations are more frequent.

The considered individual differences of memory are in certain dependence and are connected with the nature of a person's human activity. It determines the leading type of an analyzer and its type of memory.

Memory differs both in dynamic characteristics and the features connected with protective mechanisms. S.Freud claimed that some facts of forgetting are connected with displacement. The events unpleasant for a subject or having a detrimental effect on his psyche are pushed out of consciousness.

The representatives of different social groups differ in memory. There are age characteristics and norms of memory, which are no longer relevant with the transition to the next age category. A high level of memory development of a child does not correspond to a high level of adult memory development.

Memory of the representatives of different professions differs as well. A person working in the area of high level of memorizing and keeping information has more developed individual memory characteristics than a person working in such a field as mining. It is characterized by the phenomenon of professional memory.

The place of residence is also an important factor in the development of individual memory differences. Depending on the country, its economic development, external conditions, general intellectual level of the population, the subject's memory develops adapting and responding to the requirements that ensure the existence in the area.

Conclusions: 1. Individual features of human memory are represented by quantitative and qualitative differences. Quantitative differences include rate of memory, accuracy, durability, readiness for reproduction, duration of memory, volume of memorization. Qualitative differences are dominated by a certain area of the brain. 2. Abnormalities are noticeable deviations of a subject's memory from the norm, which characterizes the majority, presented in psychology as syndrome of giftedness, syndrome of absolute memory, and "partial cases".

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THE PROBLEM OF TERRORISM IN MODERN SOCIETY

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Abstract: This article is devoted to one of the most important social problems in our world – terrorism. In this work we consider the aims of terrorism, its reasons and characteristics as well as give the terrorist's social portrait. Terrorism as a social phenomenon is considered as part of the average level of the

theory – sociology of deviant behavior. We also analyze empirical data concerning terrorism both in Ukraine and on the global level.

Key words: act of terrorism, deviant behavior, terrorism, terrorist.

Introduction: We have to say that today terrorism takes one place with other dangerous phenomena like diseases, hunger, poverty and wars. Humanity cannot afford to ignore these processes: more developed and rich countries should help stop military operations and protect disadvantaged people. Why do we think so? Terrorism does not distinguish individual victims. They can be anyone, regardless of material condition, skin color, religion, gender or age. One cannot buy out terrorism or escape it.

The worst thing about this is that Ukrainian society is not in the best of times. Apparently, now for the Ukrainians, terrorism is the most painful topic. Hundreds of citizens die in the Anti-Terrorist Operation Zone. Young people are forced to take weapons, and their parents only have to fear for their children. Fluctuations, lack of stability, fear – these are the cruel realities of the present.

The choice of this topic is not accidental. These days, the words ‘terror’, ‘terrorism’, ‘a terrorist act’ are firmly established in the minds of modern humans. Terrorism as a manifestation of violence takes the form of criminal acts that lead to senseless deaths of people and loss of property, to intimidating the population with the aim of obtaining the highest possible international or regional response or significant amounts of money. But in fact the only thing that brings into the terrorist attack is a huge number of deaths. What are the common people to blame for? What were they guilty of? Why have they become weapon in the hands of terrorists which is used for bullying others? In the course of this article, we try to answer these questions.

The **object-matter** of this article is terrorism as a social phenomenon. The **subject-matter** is signs of terrorism and its subject.

Despite the fact that terrorism received a negative meaning on the intuitive level in the masses, it is difficult to say that society understands it correctly, therefore the **objective** of the work is to gradually study the phenomenon of terrorism, to find out its features and purposes.

This article considers the following **tasks**:

1. to reveal the main features of terrorism;
2. to define the subject of terrorist activity;
3. to prove the dependence of terrorist actions on how they are covered in the media;
4. to define behavior of terrorists as deviant;
5. to carry out the analysis of empirical data with the purpose of studying terrorist influence within Ukrainian society and in the world.

The **methods** used in work:

- the secondary analysis of data (was used when studying the research conducted by the International Institute for Economics and Peace [5] and also Ukrainian Institute of Research of Extremism [3]);
- generalization (was used for establishment of similar signs among representatives of terrorists for the sake of the correct formation of the subject of terrorism);
- synthesis (was used when detecting characteristics and purposes of terrorism).

Material of research is scientific developments of Tseluiko M. [7] and Antonoyan Ju. [1], according to which, the key aspects of terrorism, its subjects and essence in general were investigated.

Discussion and results: In the Great Explanatory Dictionary of Sociology, we can find a definition of terrorism that is sufficiently familiar to many people: “the use of force or violent acts against people or property to intimidate power, formal organization or the civilian population for the sake of fulfilling certain political, religious or social conditions” [Devid 2001: 132]. The Ukrainian law “On Combating Terrorism” assigns the following definition to terrorism: “socially dangerous activity that consists in the conscious, purposeful use of violence by taking hostages, arson, murder, torture, intimidation of the population and authorities, or committing other infringements on the life or health of innocent people or threats of committing criminal acts with the aim of achieving criminal goals” [8].

As we see, the key points in the above definitions relate primarily to the fact that terrorism is an illegal conscious act committed to intimidate the population and power, to aggravate the life of society. However, we believe that it will not be absolutely correct to consider the phenomenon of terrorism only in this context, since if we take the terrorist actor, we agree that he never considers his physical motivation to be a physical reprisal against the civilian population. Most often his goal will be related to his personal ideological values, the dominance of which he wants to establish in society. It is another matter what methods he uses for this. They are manifestation of real cruelty, and not the primary goal of the terrorist. That is why we would like to use the definition of terrorism of Tseluiko M. in the course of our article, since it most of illustrates our propositions.

The researcher in her article considers terrorism as a kind of socio-political struggle of non-state groups that consist in systematic, ideologically grounded, public, generally dangerous violent actions or the threat of such actions against the whole population or individual social groups for the sake of achieving the goals relating to state policy [Tseluiko 2013: 109].

The main features of terrorism include the ideological trend of terrorism, the persecution of its actors by certain targets, the use of illegal methods (kidnapping, capturing people, murder and physical violence), dependence on the media, independence of terrorists from a certain territory and independent extraction of necessary resources.

An obligatory element of the offense, without which there is no basis for criminal responsibility, is the subject of the crime, that is, a terrorist or a terrorist group. The Law of Ukraine "On Combating Terrorism" defines them as follows: a terrorist is a person involved in terrorist activities; a terrorist group is a group of two or more persons who have come together to commit terrorist acts [8].

It can be argued that the only motivation for a terrorist to engage in terrorism is to achieve the set goals. However, in addition to motives for the purposes pursued by the terrorist, one can single out a motive connected with a thirst for attention to one's personality or a motive for self-actualization. Antonoyan Ju. argues that such a motive is manifested in any kind of terrorist behavior [Antonoyan 2006: 81]. In the terrorist act itself, the criminal demonstrates what he is capable of, and what he would like to show to others (for example, fearlessness, dexterity, technical skills, intelligence, cunning) and thus assert himself and prove to himself that he possesses these qualities.

Another motive that can be managed by junior representatives of the terrorist camp is the search for romance, the vision of himself as a hero, the liberator of all people from bondage and total misfortune. As well as vice versa, the identification of oneself as a thief who seeks to take revenge on all his enemies. In search of heroism and romance, there is often a lot of excitement: without noticing, the terrorist is engaged in his terrorist activities, how he plays the game, looking for options on how to get to the next level. Also an important motive, more pragmatic and understandable, can be considered a decision to receive a purely material income, that is, the transformation of terrorism into a way of financing a terrorist's life.

In our opinion, it is important to consider the motivation of terrorists in the context of the fact that many of them can engage in terrorist activities because of their wishes toward death. That is, death seems as attractive as life to them. Here it would be appropriate to recall Fromm E., who in his work "The Soul of Man" considered the attraction of man to death. The researcher rightly remarked that a person with a necrophilous orientation feels the attraction to everything inanimate, to everything dead: to corpses, rot and dirt [Fromm 2010: 31-32].

We also put forward a hypothesis that terrorists need media support to carry out their criminal activities. We also suggested that most terrorists would cease their participation in the organization and conduct of terrorist attacks if the sanctions against them were not made publicly, but secretly. Terrorists need to spread the information about their crimes among the masses in order to speed up the social reaction in the form of fear and panic. This also confirms their motivation for self-actualization.

We claim the behavior of terrorists as deviant in the vein of the concept of deviant behavior of Merton R., according to which the individual behaves deviantly (that is illegally) because of the impossibility of realizing his goals by legal means [Merton 1966: 299-305].

The data obtained from the World Institute of Economics and Peace [5: 33] show that Ukraine ranks 17 in the TOP of countries that received the greatest negative impact from terrorism. In addition, Ukraine is the leader in this ranking among European countries and countries that left the USSR. In addition, the influence of terrorism in recent years has been clearly revealed in our society: today we occupy the 154th place in the rating of peace-minded societies of the world, this means the existence and aggravation of internal conflict in society. The latest monitoring of terrorism and extremism has proved the existence of separatist-minded people not only in the antiterrorist operation zone, but within the territory of the rest of Ukraine [3].

Conclusions: We can draw the main conclusion that sociologists need to conduct constant surveys of society for the existence of radical, separatist, terrorist and extremist sentiments in order to prevent them in time and stop them from developing in the future. Otherwise, they can lead to rather lethal outcomes, such as open fighting in territories where civilians live, or in general – to a hybrid war and a huge number of victims.

In addition, it must be said that in Ukrainian society the problem of terrorism is unusually acute: from a peacefully-minded country, our state has fallen to 17th place in the TOP of the most terrorist-troubled countries in the world. Sociologists cannot ignore such indicator, so since 2014 the number of works

devoted to this topic has increased, which explores the very concept of terrorism, the causes of its origin, its subjects and its characteristics.

In summing up the conclusions on this article, it is important to say that we have presented the notion of terrorism, which most accurately describes its essence. In addition, we derived the main features of terrorism (its ideological orientation, spontaneity, mass destruction, physical violence, dependence on the media, persecution of political goals), and also examined the motivation of its subject in the context of the theory of deviant behavior. Thus, we can call the behavior of terrorists a social pathology, with which the whole world is obliged to fight.

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TOPICAL PROBLEMS OF FORMATION OF CONSTITUTIONAL BASES FOR INTERACTION BETWEEN A HUMAN AND THE STATE IN THE CONDITIONS OF INFORMATION SOCIETY IN UKRAINE

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Abstract: The article deals with the formation of the constitutional bases for interaction of a human and the state in the conditions of information society in Ukraine. The analysis of the constitutional basis of information society in Ukraine has been carried out. In conclusion, the key directions of development of information society in Ukraine have been outlined.

Keywords: constitutional bases, constitutional state, human rights, information society.

Introduction. Constitutional bases for interaction between a human and the state are constantly evolving, acquiring unique features at each stage and emphasizing considering those or other needs of the development of society. Today is the age of technological progress which is characterized by the transition of social relations to the information sphere. The introduction of such institutions as "e-democracy" and "e-government" in developed countries is evidence of the creation of information society.

On the other hand, at the turn of the millennia emerged qualitatively new, revolutionary by its nature expansion of the "living space" of human and citizen's rights: together with the transition from the industrial to the informational state of society they made a "leap" into cyberspace, becoming an important element of the new, e-reality. Therefore, cyberspace has become a new platform for interaction between a human and the state.

In recent years, issues related to formation of constitutional bases for interaction between a human and state in conditions of information society in the general context, have been analyzed by many home and foreign scientists, among which the following should be mentioned: V. Subochev, V. Ryabev, A. Gayda, I. Petriv, V. Petrik, O. Shtokvush, V. Kalnish, V. Polevoy, V. Ostrouchov, M. Prisyaznyk, I. Aristova, O. Oliynik, V. Stepanov, S. Kandzuba, T. Mishlyaev, E. Makarenko, J. Dumorte, D. Banisara, K. Xarina, V. Dorofienko, V. Amitan, S. Chukut and others.

Object-matter is public relations between a human and the state in the conditions of information society in Ukraine.

Subject-matter is presented by the norms of constitutional and international law about interaction between a human and the state in the conditions of information society in Ukraine.

For achieving the objective the following tasks have been set:

- To investigate the norms of constitutional and international law about interaction between a human and the state in the conditions of information society in Ukraine.
- To consider the restrictions of constitutional and international law about the interaction

between a human and the state in the conditions of information society in Ukraine.

- To analyze constitutional law norms of Ukraine.
- To make the conclusion of research.

Materials of the present research is such norms of law as:

- Universal Declaration of Human Rights.
- Constitution of Ukraine.
- Law of Ukraine "On Information".
- Law of Ukraine "On State Secrets".
- Law of Ukraine "On Scientific and Technical Information".
- Law of Ukraine "On Access to Public Information".
- Law of Ukraine "On Protection of Personal Data".
- Law of Ukraine "On Citizens' Appeals"
- Philosophical work of most popular researchers.

Methods of the research are general and special scientific ones, among which are dialectical, comparative and systematic ones are the main.

As a result of numerous and diverse research it was proved that the new reality opens up entirely new possibilities to ensure human rights in the state, but at the same time it generates new threats to these rights. After all, the emergence of cyberspace as a special environment for human existence has already led to irreplaceable changes in the archetypes, mentality, rhythms of functioning, aesthetic images, models of economic activity and forms of social interaction. Have appeared the new forms of deviant behavior inherent in users of computer networks have appeared.

Relevance for development of human and state of relations in the information sphere naturally causes the need to form adequate constitutional basis for interaction between them, not only in the habitual reality, but also in the cyberspace.

Eurointegration processes in Ukraine make research of constitutional bases of interaction between a human and the state in the conditions of information society. Especially relevant state, as a form of public political power, has a tendency to the preservation of socio-political institutions and as a consequence, to slowing down the reaction to change in socio-political realities. Authorities are often intolerant of internal criticism, among officials there is a code of silence, often the possibilities of the information society are used by governmental bodies not in the public interest, but in the interests of transnational corporations and large financial-industrial groups, subjugating the whole apparatus. Citizens are often defenseless against the abuse of governmental bodies, including corruption. All this leads to the fact that the existing information society without proper state support does not solve social contradictions, but brings social tensions to a qualitatively new level and into a qualitatively new environment.

Ukraine can not afford to wait for decades for self-improvement of a human, for unhurried establishment of the rule of law and civil society. In the conditions of rapid development of scientific and technological progress, intellectual, information and cognitive technologies, on the one hand, and the preservation of archaic ways of social coordination, a high level of inequality, on the other hand, Ukraine is doomed to non-competitiveness. Improvement of the existing mechanism of interaction between a human and state in the conditions of the information society on the level of developed countries and consolidation of the basic principles on the constitutional level will allow Ukraine to become a more competitive state. It is necessary to talk about the "constitutionalization of cyberspace" about the effective use of the possibilities of constitutional law for the transition to intensive and progressive development of Ukrainian society and the state.

It should be noted that certain steps in the formation of constitutional bases for interaction of a human and the state in the conditions of information society in Ukraine have already been made. It is a question of both the Constitution and the constitutional legislation of Ukraine, as well as a number of international acts ratified in the appropriate order by the Verkhovna Rada of Ukraine and determining international legal standards in this sphere. So, for the first time on the international level, the human right for information has been declared in Art. 19 of the Universal Declaration of Human Rights of 1948 [Universal Declaration of Human Rights, 8]. The human right for information (not just information, but reliable information) is the fundamental right of society which is capable of creating conditions for harmonious interaction between a human and the state and creating a new level of the information society.

In its turn, the Constitution of Ukraine contains a number of principles of information interaction between a human and the state, which are recognized by the world community and contribute to the formation and development of the information society, namely:

1. Censorship is prohibited (Article 15).
2. Everyone is guaranteed secrecy of correspondence, telephone conversations, telegraph and other correspondence. Exceptions can be established by court only (Article 31).
3. The collection, storage, use and dissemination of confidential information about a person without his/her consent is not allowed, except in cases stipulated by law, and only in the interests of national security, economic welfare and human rights (Article 32).
4. Every citizen has the right to familiarize in the bodies of state power, local self-government bodies, institutions and organizations with information about themselves that are not state or other secrets protected by law (Article 32);
5. Everyone is guaranteed the right for freedom of thought and speech, to freely express their views and beliefs (Article 34).
6. Everyone has the right to freely collect, preserve, use and disseminate information verbally, in writing or in any other way — at their choice (Article 34).
7. Everyone has the right to send individual or collective written appeals or to personally appeal to the bodies of state power, bodies of local self-government and to the officials and officers of these bodies (Article 40).
8. Everyone is guaranteed the right for free access to information about the state of the environment, the quality of food and household items, and the right to distribute it (Article 50).
9. Everyone is guaranteed freedom of creativity (Article 54), etc. [Constitution of Ukraine, 1].

To protect constitutional rights, there is a specific implementation mechanism, in particular a number of initial principles and legal guarantees for the implementation of the declared rights and freedoms, namely:

1. All people are free and equal in dignity and rights; human rights are inalienable and impersceptable (Article 21).
2. Everyone is guaranteed judicial protection of the right to refute untrue information about himself and members of his family and the right to demand the withdrawal of any information, as well as the right for compensation for moral and material damage caused by collection, preservation, use and dissemination of untrue information (Article 32).
3. Human rights and freedoms are protected by court. Everyone has the right after using all national remedies to apply for protection of their rights and freedoms to the relevant international judicial institutions or to the relevant bodies of international organizations of which Ukraine is a member or participant (Article 55).
4. Everyone has the right for legal assistance (Article 59), etc. [Constitution of Ukraine, 1].

It should be noted that most of the norms of the Constitution of Ukraine are of common, basic character, and therefore require development and explicitation in the current legislation. The legislative base for streamlining information relations in Ukraine began to be formed already in the first years of independence (in the early 90s of the 20th century), when a number of laws were adopted such as: "On Information", "On State Secrets", "On Scientific and Technical Information", etc. [Law of Ukraine "On Information" 4; Law of Ukraine "On Scientific and Technical Information" 6; Law of Ukraine "On State Secrets" 7]. Today, a "new wave" of updating the information legislation is being formed, as evidenced by the adoption of laws "On Access to Public Information", "On Protection of Personal Data", making amendments to the Law of Ukraine "On Citizens' Appeals" that allow to form an electronic appeal and an electronic petition [Law of Ukraine "On Access to Public Information" 2; Law of Ukraine "On Citizens' Appeals" 3; Law of Ukraine "On Protection of Personal Data" 5].

At the same time, the Constitution of Ukraine contains a number of restrictions on the implementation of the rights established on the constitutional level. In particular, Art. 34 establishes that implementation of these rights may be restricted by law in the interests of national security, territorial integrity or public order with the aim of preventing disorder or crime, of protecting public health, of protecting the reputation or rights of others, of preventing the disclosure of information obtained in confidence or ensuring the authority and impartiality of justice [Constitution of Ukraine, 1]. But in conditions when the state is inclined to preserve existing socio-political institutions, and officials of the bodies of state power are prone to arbitrariness and corruption, there is a threat of distorted interpretation and unlawful application of the relevant restrictions. Society should remember that according to the Constitution of Ukraine, the main social value in the country is a human, not a state, that in Ukraine exists "δημοκρατία", that is, the power of the people, and not "κράτοςδῆμος" power over the people and every restriction of constitutionally established rights in favor of the state must be accompanied by unconditional evidence.

Conclusions. Thus, the improvement of the constitutional foundations of interaction between the state and a human in the conditions of information society, the formation of a doctrinal basis for implementation of "e-democracy" and "e-government" is one of the most important tasks of the home constitutional science that will be researched in the following works. Legislative and research data are satisfactory for developing relations between a human and the state in the conditions of information society in Ukraine. Recent changes in Legislation of Ukraine show the positive way of forming the constitution

bases but bureaucracy is inhibiting such development.

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TRUST IN PRINTED ADVERTISING IN MODERN UKRAINIAN SOCIETY

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Abstract: The present paper deals with the question of human trust in printed advertisements. Different sociologies have examined trust as a socio-cultural phenomenon in their works. A great amount of marketing researchers have investigated what kind of advertising is more trustful. Moreover, I have made my own pilot research, where I wanted to know whether the universal formula AIDCA really works.

Key words: trust, printed advertisement, text markers, universal formula AIDCA, pilot research.

Introduction. Nowadays printed advertisement plays a significant role in promotion of specific services and products. But in spite of using the Internet and product placing advertisement there, it still remains the source of trust for most people. It can be explained by the fact that print advertising is handy for consumers, because everyone has an excellent opportunity to reapply to it, at any case read the advertisement and analyze it carefully. By the way, printed advertising is more informative and capable to concentrate people's attention on a specific product or service than the Internet advertising, which is too huge and which one can be ignored. Moreover, the market of painted advertisement is growing, but the question which source of advertising is trusted by Ukrainians remains open. In 2015, a world-named marketing company Nielson has conducted a global research for trust in advertising. More than 30,000 online respondents from 60 countries, including Ukraine took part in this investigation. During the poll, it turned out that among traditional media the most trusted advertisements are: the first place is the magazines - 34%, the second place is advertising on television - 32%, and the third place is occupied by the newspapers - 31% [The Nielsen Company 2015: 5-7]. That's why the problem of my article is to find the reasons of people's trusting to printed advertisement and to know why this source of advertising is still popular in Ukraine.

The object-matter of the paper is to trust in advertisement as a socio-cultural phenomenon.

The subject-matter of the research is to trust in print advertisements.

The objective of the present paper is to analyze the role of trust in print advertising and find the reasons of faith to printed advertising text in the Ukrainian society.

The tasks of this paper are:

- to examine basic theories of trust;
- to consider the structure of the advertising text according to the formula AIDSA;
- to identify the markers of trusting in printed advertisement which are based on my own pilot study;
- to determine the reasons of Ukrainians' trust in print advertising.

Materials for the present paper were taken from the following empirical studies:

- The results of global trust in advertising, which were researched by marketing company Nielson, in 2015.

Also, some theoretical materials were taken from the following studies:

- Nazaikin A. N. and his book «The Practice of Advertising Text» which helped me to make my own pilot research in finding the trust's reasons to printed advertisements;

- The works of famous sociologists were to help in describing their main theories of trust. Among them were Luhman N. «Trust and power», Fukuyama F. «Trust: Social Virtues and the Way to Prosperity», Bourdieu P. «Capital forms».

To solve the problems of the research the following methods were used: online questionnaire post card «Which kind of advertisement sources do you trust among the tradition media?» (The Nielson Company). And the method of content analysis, which I have used for my pilot research.

Discussion and Results. Nowadays, trust is a basic element of stability in social relationship. This social phenomenon is complex and has a multi-stage structure. That's why there are a great amount of different theoretical approaches to study of the problem of trust. I propose to consider the main trust theories of well-known sociologists. F. Fukuyama (October 27, 1952) is a prominent American politician. He thought that trust originates from the observance and enforcement of ethical norms and principles that exist in society. And family bounds relations are the forms that provides the organization of trust [Fukuyama 2004:730]. For example, if a member of your family has bought an advertised product and told you about it, there is a high probability that you will also buy this product. Even if you are not a potential user of a specific product, for instance, motor oil for the engine, you will be automatically inclined to trust it, because your relatives are using it. N. Luhman (1927-1998) is a famous German sociologist in his work «Trust: Social Virtues and the Way to Prosperity» has clearly distinguished between trust and confidence. He thought that the latter was a good way to construct future and connected it with a stable situation when there were no alternatives for choosing. In turn, trust is a risk associated with the fact that someone is enforced to choose among a great variety of options only one thing. Moreover, a person is unable to control the consequences of his choice [Luhman 1979:22-25]. In other words, confidence is when you choose from the multiplicity of advertisement only one thing appropriate for you, it means that you trust these promotional messages and expected that they will exactly satisfy all your needs.

P. Bourdieu (1930-2002) is a well-known French sociologist of the twentieth century. He identified trust with a social capital. According to his concept, the holder of the largest social capital could make a contact with a stranger in a romp and change their acquaintance into a long-term and profitable relationship. Usually people tend to trust those, who are authoritative and well-known personalities *vide licet*, such people are the owners of a big social capital [Bourdieu 2005:65]. For example, any brand is working on its name recognition, using PR-technologies and advertising companies. And, becoming a social capital owner, other brands will be equal to it and looking for an opportunity to interact with this brand. It goes without saying, that the secret of trust is hidden in the structure of advertising text. That's why, let's examine the formula AIDCA, which is used to compose the advertise message. AIDCA, where A is attention, I- interest, D - desire, C- confidence and actually A is an action, that is require to the consumer to buy this product [Nazaikin 2003:175]. So, I decided to apply this formula in my research and find out the text markers, which use to mold a trust to the advertising product. In my pilot research I have analyzed the degree of trust to advertisement posters. I have used such criteria as research results, reference to the authority or public opinion, using the words "you", "for you"; reference to the year of the brand's establishment; mention about the lack of goods. I think these criteria should be used in the text, because they help to create a trusting atmosphere between the owner of the product and the consumer. Having analyzed 7 advertising posters, which were completely different in terms of goods, it turned out that 5 of them had used the mentioned text markers. Most of advertising texts had references to authority, research results, year of product foundation. Some texts were mentioned about the harmfulness of the product. It is worthy to mention that all these text markers were used in one promotion message and complemented each other. You can see all the details of my pilot research on the table.

For example, in the toothpaste advertisement, there was a link with the research institute that tests this product, and the authority of the famous singer who uses it. In another advertising text about preventive measures it was mentioned only about the research's result of this product. And the text of Realtor Company has reflected only the picture of real life. So, all these criteria are using in the printed advertisements, that's why the formula AIDCA works and helps to conquest the consumer's trust and meets their ears to the advertised product.

And now I want to tell you some reasons why people trust in printed advertisements. First of all, people's trust in print advertisements can be explained by the concept of social action by M. Weber. This theory gives us an opportunity to suppose that trust in newspapers and everything that it contains is a well-established tradition. It turned out that many years ago with the development of the Gutenberg's printing machine, the press become an integral part of every person's life. Moreover, the habit of reading and trusting has been survived nowadays (for this day) [Zborovsky 2004:145].

The second reason of trusting to printed advertisement can be connected with the high professionalism of content creators, because every printed edition has a chief editor, who selects the material and promotional messages that will be printed in this journal. Thus, he rules out the possibility to place poor-quality and false advertisements [Kazak 2007:72].

Unfortunately, there is another situation in the Internet network, where no one controls the flow of

advertisements. So, everyone can place an advertisement on a network site and it will be published. By the way, there is no censorship in the Internet network. That's why, every user is not insured from the advertisements that contain the scene of violence, obscene language and use some pornographic materials [The Internet Censorship Map of Shame 2017].

Conclusions. Having analyzed the role of trust in printed advertising, I can say that the printed press is of prime importance for Ukrainians both traditional media and as a carrier of promotional messages. The main reasons to trust to printed advertisements are convenience, the ability to re-appeal, informative value. Thus, even under the conditions of globalization and intensive growth of information technologies, a significant percent of people still continue to trust print media, including advertising in it.

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VIRTUAL REALITY: HISTORY AND INFLUENCE ON MODERN SOCIETY

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Abstract: The article discovers the roots and history of virtual reality technology, shows its present and future, empathizes and researches several main models of VR headsets and explains how the technology itself works. The article also discovers how virtual reality can be used in gaming, medicine and military practice as well as in education and teaching kids and teenagers.

Key words: 6DoF system, HMD, LED, stereoscope, VR.

Introduction: The technology of virtual reality is extremely young but it makes huge steps in development and starts to influence more and more spheres from gaming to medicine and military. First VR experiments 1838 started with the invention of the stereoscope, but there is no way it can be called virtual reality in the way we know it now. The biggest leap in development and growth happened during latest decade. And now virtual reality becomes easier, cheaper and more user friendly so soon everyone could have a headset connected to a console or a PC at home. It is also important to mention that VR has enormous influence on educational process in schools, medical and military spheres. It cheapens training of soldiers and doctors and lets kids learn as they never could learn before. The relevance of this article is obvious. The technology of virtual reality began to develop only several years ago so it's not widespread and well-researched.

The object-matter is the virtual reality technology; the subject-matter is its influence on modern world.

The objective of our work is to research the history of virtual reality technology and analyze its influence on world today.

This article considers the following tasks:

- to research the history of first VR headsets;
- to find out which models of headsets are available on the market;
- to learn about technology of virtual reality and how it changed during past years;
- to research ways to use VR in different spheres.

Research methods: Theoretical analysis and generalization of scientific literature and periodicals devoted to comparison, formalization and analysis of roots of virtual reality to follow the process of its development and growth of popularity.

Material: Empirical basis relies on research of different Internet resources and companies like ‘Google’, ‘Oculus Rift’, ‘VisitU’, ‘ClassVR’ and so on.

Discussion and results: Nowadays the technology of Virtual Reality (or, shortly, VR) is gaining more and more popularity in different spheres. Many people have no idea how VR headsets work, what the history was and what are examples of first experiments which tried to create the illusion that we are present somewhere we are not [1]. Some of the earliest attempts are murals, like “Battle of Borodino”. They were drawn like 360 degree panoramas to make viewer feel like he or she is present at the battlefield.

The next leap in progress was made in 1838 by Charles Wheatstone, who showed that the brain can process different pictures to get the illusion of 3D space. If you put two stereoscopic images side by side and look at them through stereoscope, you can get the sense of depth. In a year a new stereoscope was patented. It was called View-Master and was used for “virtual tourism”.

- 1838 : The stereoscope (Charles Wheatstone).
- 1849 : The lenticular stereoscope (David Brewster).
- 1939 : The View-Master (William Gruber) [1].

In the following years scientists were making slow but sure steps in improving this technology.

In 1929 one of the virtual reality pioneers – Edward Link – created a device named “Link Trainer” that was the first flight simulator ever and was fully electromechanical. It was controlled by motors that linked to the rudder and steering column to modify the pitch and roll. A small motor-driven device mimicked turbulence and disturbances [1].

During 1930s VR technology of touch and smell diffusor were introduced, however it’s still difficult to represent these feelings.

The huge leap in progress was made in 1960s with the release of “Sensorama” – the first multimodal technology device. It had stereo sound, 3D display and vibrating seat. The machine even simulated smells to have deeper involvement in virtual reality [2].

In 1965 Ivan Sutherland created “The Sword of Damocles” which considered to be the VR headset. The system was very complicated because of need to precisely track player’s movements and his head position.

The next step in progress happened in 1990. Virtuality Group released its headset which was used for video arcades. Users could experience real-time gaming due to stereoscopic visor, joysticks, and networked units for multi-player gaming [2].

In 1987 Jaron Lanier created the term “virtual reality” to describe this field of research and the technology itself [1].

In 1995 Nintendo, the well-known console company released its “Virtual Boy” which wasn’t popular and had to be cancelled in a year after release. In 1999 SEOS 120/40 HMD was released. This device is impressive by all means. The weigh was approximately 1 kilogram. The device was equipped with two LCD screens and had 120-degrees field of view. Even most of modern headsets cannot reach this number. In 2011 Palmer Luckey showed the first prototype of Oculus Rift, which is widely used nowadays. After two years Proteus VR Labs released “Freefly VR”. It was one of the first VR headsets for smartphones with enormous field of view – 120 degrees. The huge progress of mobile virtual reality began from 2014 with the announcement of “Google Cardboard”. It is the simplest and cheapest VR headset for smartphones [2].

During next three years many companies began to release their own VR headsets and were working on improving the experience and feel of immersing into artificial reality. There is very high diversity in different models from different manufactures. But how does this technology work?

First of all, it should be mentioned that VR headsets are divided in two categories: HMD (head mounted display) and the ones for smartphones. Despite the differences in picture source, the main concept stays the same – the picture is divided into two streams for left and right eye. Next, there are a pair of lens between the screen (or two LCDs as in case of HMD headsets) and user’s eyes. That’s why they are often called “goggles”. The lens has specific shape to distort the image and create the illusion of real world. For better involvement computer or gaming console, which produces the image, should show it with 60 FPS (Frames Per Second) or more. Otherwise, if the video stream has lower frame rate, it will cause loss of quality [3].

VR headsets have 6DoF system (six degrees of freedom) which captures head position and shifts the picture correspondently. This allows user to look around. To implement this feature, headsets use gyroscope, accelerometer and magnetometer. For additional accuracy, some systems such as Sony PlayStation VR and

Oculus Rift use a set of lights – nine LEDs in case of Sony and 20 in Oculus. To fully immerse the user into the world of virtual reality, developers can add 3D sound and use head-tracking technology to give the sense of surrounding sound [3].

The biggest advantage of some more expensive systems such as Steam VR or HTC Vive is motion tracking. It helps the user to interact with virtual world. To make this possible, developers use a pair of ergonomic controllers with buttons, triggers and thumbsticks. They also have motion tracking to calculate the position of user's hands in virtual space. To capture the physical position of the player, most systems use special sensors which cover a square of certain size and determine where is he or she now [3].

The most intriguing technology used in VR headsets is eye tracking. Most of modern headsets don't have it except FOVE VR which will be released in future. Inside of the headset there are special infrared sensor which captures eyes position. This is used to give the feel of real world and depth of field. So, if you look on the object in front of you, the background will be blurred and vice versa. This also tricks the brain to think that this is the real world [3].

The technology of virtual reality is widely used in different spheres. The most obvious one is gaming. VR games are considered to be the future of gaming industry and every day they make bigger steps in conquering market. VR headsets become cheaper, easier to setup and more user-friendly. Dozens of VR games are released every year and their genres vary from shooters and horrors to educational and kid games.

However, gaming is not the only sphere which uses VR. For the last several years it had influence on medicine. For example, first operation with VR was performed April 14, 2016 at the Royal London hospital by Shafi Ahmed who removed cancerous tissue. Everyone from any part of the world could watch this in 360° using special app or website [4].

VR headsets are also used to help chronic patients relieve stress and experience something new during their treatment. They can draw or watch relaxing videos without getting out of hospital bed. What is more important, company named VisitU designed a special technology which lets patients virtually visit their homes and communicate with their relatives, friends or loved ones [5].

Other sphere which uses VR technology is military. Equipment and training fields are necessary for classic army training special classes, but with virtual reality all this can be modelled much faster and will cost much less. Future soldiers can experience fears of war and learn about basics of first aid using only VR headset and a couple of controllers [6]. Developers can use Oculus Rift and Unity gaming engine to create training courses which will cost much less and will be easier to deploy.

VR also has huge potential in education. Students can study history, biology, astronomy and even geometry or math in simulated 3D virtual world. Kids and teenagers will be more encouraged and interested to learn using VR opposing to traditional lectures and classes. This also solves behavior issues. Kids are so involved in the process that they have neither time nor interest to misbehave [7]. Such technologies might be used for teaching kids with ADHD before or during their treatment so they could get an opportunity to perceive maximum amount of information.

Conclusions. Right now we can say that Virtual Reality is one of the most innovative and progressive technologies. Considering all the effort companies put in its development it's clear that VR niche will soon become even more widespread and everyone will have a headset with a console at home. Even now VR offers huge opportunities for entertainment, education and training. In the next several years this technology will become even more advanced and will receive unbelievable features.

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THE CONCEPT OF “CONTAMINATION”

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Abstract: The article is devoted to the phenomenon of “contamination” and its philosophical interpretation within the learning process. The “contamination” concept content is shown and six stages of human development on the way ‘from the student to the lecturer’ are suggested. Two methods such as cathartic and mimetic, which contribute to the optimization of the educational process and the qualitative information, are given. These methods are suggested to be introduced using the author’s own project called “lunch with a lecturer”. A series of such events will ensure the harmonization of relationships both between students and between students and professors, and will also ensure the rational use of the academic time.

Key words: “contamination”, education, philosophy, project, university.

Introduction. When it comes to philosophy, a person in this sphere will readily agree that philosophy is not just a science but also a special way of thinking, a unique way of perceiving information and even life. The object matter of the given article is the philosophical educational process (and its philosophical consideration in the context of the concept of “contamination”) and students’ evolution during this process. The subject matter is the phenomenon of the “contamination”, its philosophical meaning and its relations to the educational process. The objectives are improving of the effectiveness of the educational process and the harmonization of relationships both between students and between students and professors, and also the rationalization of using the academic time. The tasks are the systematization of the student’s stages during the educational process and the creation of the experimental project which will improve the quality of the educational process. The concept of “contamination” was studied by De Lacy O’Leary who considered it to be the historical term. Though a new and contemporary approach connected with the educational process is presented in the given article in a slightly different philosophical way. It should be also noted that this issue was considered by such great philosophers as Basil the Great and Diogen Laertius. The methods are: theoretical – classification, analysis, synthesis, analogy, study and analysis of literature; practical – observation, mental modeling and description.

This article proposes the concept of “contamination”, which can be applied both to philosophy studying (the article will consider the features related to the study of philosophy in particular), and to comprehend other disciplines presented at a university of the classical type. In addition, the idea of a pilot project “lunch with a lecturer” was developed in the framework of the article. Its aims are to unite students and university professors informally to improve the effectiveness of educational activities, exchange of information and successful scientific matter mastering by students. Based on this, the article is divided into a theoretical part (explaining the concept of “contamination”) and a practical one (outlining the essence of the project).

Discussion and Results. Several stages should be distinguished in the process of student understanding philosophy as a science, namely:

- 1) “gathering” stage;
- 2) “pseudo-aggressive” stage;
- 3) “contamination” (coverage) stage ;
- 4) “acceptance” (awareness) stage ;
- 5) “cathartic-mimetic” stage;
- 6) “practical” (independent) stage.

Even through the prism of theology Basil the Great (one of the Cappadocian fathers) argued that the philosopher is like a bee that collects nectar from flowers and leaves everything superfluous [2, p. 721]. Therefore, it’s not worth disdaining the sources, it is necessary to gather wisdom bit by bit as much as possible, wherever possible.

In our case it is the first stage that arises within the framework of the concept: a person tries to expand the boundaries of his own knowledge by collecting information. This period of “gathering” is incredibly important for people studying philosophy, since the amount of knowledge depends on the amount of information required and the further quality of their application and implementation in practice.

Unfortunately, the question of the practical application of philosophical education is being questioned in today’s world for our culture and mentality. Though unreasonably. After all, philosophy is not only syncretistic in itself, but, as it is well known, it originated from routine practice [1]. One can find the evidence in the history of ancient philosophy: shipbuilding, viticulture, olive industry, the adaptation of dysfunctional Greek lands for growing the necessary crops. They all are natural sources of Western European philosophy originating in Ancient Greece [3].

Over time the stage of “gathering” is exacerbated i.e. a person has a desire to find more and more information, acquire a large amount of knowledge. And the student already seems to have been evolved from

the “collector” to the level of the “invader”. This is the second stage, called the “pseudo-aggressive” one. After all, at some point a person realizes that he is not an active figure, he is not an invader – he is embraced by philosophy, he is gripped by the desire to acquire new knowledge. This stage and state was called “contamination”.

If it is a matter of philosophy, then in this case it [philosophy] is simultaneously both the “contamination” and the “contamination environment”, which contributes to it. The environment of infection also includes inspirers (those who are already inspired) called “vectors”, capable to “contaminate” the student rewarding him with that very knowledge seizure.

Mentors, inspirational philosophers (e.g. the ghost of Nietzsche), like-minded people, friends should be mentioned among such “vectors”. They show by their own example how great it is to be “contaminated”, to be embraced by philosophy (they light the fire in a vessel). And in this case it’s good. You will agree that it is much more pleasant (if it is appropriate to say so) to catch, let’s say, the flu from your friend than from an unpleasant stranger that sneezes into your face in public transport.

The awareness of contamination is always “acceptance” (the fourth stage), i.e. launching the mechanism of thinking which tries understand how to deal with this contamination, whether it is worth fighting with it and how to live with it then? And in this case, the figure of the “vectors” is one of the most important in the conception; after all, the “vectors” is someone who is “familiar” with the state of contamination longer than the freshman himself. Thus, his experience is very important. This is a special paradigm of relationships which is built into a triangle: “contamination” – “vectors” – “freshman”.

In our case, this “contamination” should not just be resisted when it comes to knowledge, the ways of comprehension and the ability to use it. It is necessary to learn how to live with it, and, moreover, to realize what practical benefits it can bring.

The communication with the “vector” makes it possible both to expand the stock of theoretical knowledge and to acquire your own, practical experience. And here we suggest two methods that are necessary to guide this “contamination” in the right direction. The exchange of personal experience in the process of communication leads us to the fifth cathartic-mimetic stage, the basis of which is the hidden didactics and two didactic methods: the cathartic and the mimetic ones.

The “vector” (who is a mentor) can share both negative and positive experience. The discussion and the analysis of failures, correcting mistakes are vivid examples of the cathartic method, during which the freshman feels mixed feelings. He is simultaneously depressed and empathized, but at the same time feels joy because he knows now how to avoid such failures.

The study of positive results and correct actions is the first step on the way to the mimetic method. Having successful outcomes influences students convincingly and inspiringly, encourages them to try to do something similar, imitate their mentor. A person uses other people’s methods in this imitation, but applies them to his own tasks and intentions. The imitation gives rise to independence: at the final “practical” stage a person embodies his own ideas, uses his methods and faces his own mistakes (but of a somewhat different nature, not primitive), but he already knows how to eradicate them.

The practical part of the concept is a project called “lunch with a lecturer”. “Lunch with a lecturer” is a semi-academic event. It is not obligatory for all students to attend, the students do not receive marks, they enjoy the opportunity to communicate with a person, a professional who gives lectures and holds seminars at the university.

The professors are often forced to present exclusively the material from the course program and because of the lack of time cannot highlight other useful, but inappropriate topics that do not directly concern the discipline. Communication in out-of-lecture time is reduced to a minimum (and sometimes even to the absurd “Hello-Hello” in the corridors of the university until the end of the studies), and communication by e-mail may seem bothersome and intrusive to someone. But there are a lot of topics that concern the disciplines and the educational process which for some reasons hang in the air in a way of unasked questions.

Thus the project “Lunch with a lecture” is a series of events that can be visited by any student interested in the subject. The nature of these events is semi-informal i.e. without evaluating and marking those present at the meeting. Moreover, tea, cakes, salads, cookies may be offered. (It can also be natural). For each “lunch” a “lecturer” is chosen. The students ask him their questions. These may be the questions about how to succeed in teaching or how to become a specialist in the discipline that he teaches, how not to drop a brick, what mistakes can be made and what is necessary to be done so as not to be mistaken. These may be the questions that relate to the subject under study, a controversial issue, a problem that is difficult to solve; the questions about what to read, where to watch and where to go, also where is the most delicious coffee in the city and why pizza is better to eat in a small cafe.

Such events have long become traditional in the countries of Europe, America, Japan, and China. First, they inspire students to academic and social activities, they are encouraged to be active and communicative, share experiences, not be afraid to talk about their mistakes and recognize them. Secondly, it raises the authority of the teacher. The students want to attend the lectures of a sociable, intelligent person with a sense of humor, who is an expert in his field of studies. Thirdly, everyone wants to be like this lecturer.

The example of a teacher within the concept of “contamination” plays an important role. A freshman faces directly the two above-mentioned methods: cathartic and mimetic. The cathartic one is when the “vector” shares his failures, negative experience, mistakes, the listener experiences a kind of catharsis. The mimetic method is a method of imitation, which starts from the positive experience of the “vector” and at first helps to adapt and then to get used to the environment and start acting independently, stuffing your own bumps, but in a smaller quantity (due to the cathartic factor) and achieving your own success.

It is difficult not to pay attention to the fact that every year the education system in Ukraine is undergoing changes. Students are the first who feel these changes on themselves and experience them very painfully. The reduction of budget places, and changes in the evaluation system and the innovations associated with the rating system should be mentioned here. A healthy competition among students turns into interpersonal struggle, the pursuit of knowledge turns into a pursuit of points. Thus, the question of the quality of scientific matter mastering is no longer worth it. Someone manages to keep afloat and someone loses the motivation to take further steps.

Within the conception such a structure is formed that reveals the “ideal student” who knows why he entered the university correctly sets his goals and understands what he wants to learn. The conception of “contamination” describes the formation of a specialist on the way of his journey from the starting point to the destination, where he himself can inspire others and become a vector of “contamination”.

Conclusions Thus, within the framework of the concept of “contamination” a pilot project called “lunch with a lecturer”, which will allow us to optimize the learning process at the universities of Ukraine was introduced. This project will improve the effectiveness of the educational process. Everything related to the topic of the lecture will be discussed directly at the lectures or seminars. Additional questions will be discussed at “lunch with a lecturer” where it will be possible to communicate not only within the framework of the “student-teacher relationship” but also as “personality-personality” approach.

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INNOVATIVE POLICY OF THE STATE AS A MEANS OF REDUCING INNOVATIVE RISKS

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Abstract: The article is devoted to the issue of innovative state policy, which is part of the technological and socio-economic policy of the state and is a necessary means of maintaining the competitiveness of the country's economy. The essence of the term "innovation policy" and the current state of innovation activity in Ukraine are considered. The reasons, which determine the necessity of state innovation policy, active coordinating and regulating role of the state, are formulated. It is proposed to create a structure of "innovative incubators", which should accompany the process of creation, improvement and serial production of innovative products.

Introduction. The system of world economy is constantly proceeding through the improvement of technologies, the emergence of radically new innovations and the transition to new level of technological structure, each of which is characterized by a core of interconnected and complementary technologies, which are the engine of growth of new branches of economy of the new technological system, which have the highest growth rate of all other branches. Nowadays a new technological structure is being formed, the nucleus of which is the rapidly growing industries of nano-, bio-, IT technologies and development of artificial intelligence.

Changing the technological structure and the ongoing process of improving the technologies used requires economic agents to maintain their competitiveness, namely, the development and implementation of

innovative solutions both in the production process and in the structure of management and organization of the activities of economic entities. Such actions continuously lead to an increase in innovative risk, the risk of losses in the development and implementation of innovations, because there is always a possibility of failure of the implementation of innovative solutions.

The level of implementation of innovative improvements determines the further place of the country's economy in the system of global division of labour. That is why innovation policy is an extremely important, strategic task of any modern state, which tries to maintain the competitiveness of its economy.

Problems of the role and functional components of innovation policy are devoted to the work of both overseas and domestic scientists. Jakob Edler and Jan Fagerberg [Edler, Fagerberg, 2017: 2-23] considered a rapidly growing area of innovation policy, with emphasis on the definition of innovation policy, theoretical grounds (why an innovation policy is needed); and how innovation policy is being developed, implemented and regulated. Diana Farrell and Thomas Kalil [Farrell, Kalil 2010: 1-8] analyzed the structure of the Strategy for American Innovation, which was established by the US government as the main US document in the innovation field. Lebedeva L.V. [Lebedeva 2014: 1-7] systematically analyzed the state, deficiencies of Ukraine's innovation policy and ways to improve it. Golovinov O. M. [Golovinov 2013: 16-21] systematically analyzed the problematic issues of the state's innovation policy and the possibility of creating conceptual approaches to the formation of a coherent state policy for the development of an innovative economy. Anisimov I. E. [Anisimov, 2015: 255-261] considered the state of the innovation sphere in Ukraine and emphasized on the necessity of development of a purposeful regulatory function of the state in the field of research and development works, its responsibility for the overall strategy of technological development, for support science-intensive technologies and fundamental research. But insufficient attention is paid to the forms of implementation of the coordinating and regulatory role of the state in the field of innovation and mechanisms for supporting innovation activity.

The purpose of the article is to analyze the components and optimal structure of the state innovation policy and to formulate practical forms of implementation of the state coordination and regulatory role in innovation policy in the conditions of the current state of the world economy and the development of innovations.

Methods: analysis, synthesis and data aggregation.

Subject-matter: public policy in the field of innovation in a market economy.

Object-matter: state economic policy and state influence on the real sector of the economy.

Discussion and Results: Scientists give different definitions to "innovation policy" term. For example, Yelets O. P. [Yelets 2011: 1-10] characterizes innovation policy as: "... a set of forms and methods of state activity aimed at creating interrelated mechanisms of institutional, resource support and innovation development, formation of factors of activation of innovative processes". And Lysyuk V. M. [Lysyuk, Skrypnyk 2013: 147-152] gives the following interpretation: "Innovation policy includes a system of measures to stimulate, manage, plan and control innovation in the field of science, technology and production." In our opinion, the innovation policy of the state is an action system of state authorities aimed at organizing and coordinating the process of creation, improvement and implementation of innovations in order to achieve the most effective result in the quantity and quality of the existing modern innovative technologies. Innovation policy is part of the socio-economic, industrial, technological and scientific policy of the state, whose task is continuous technological renewal of industry and introducing innovative developments in batch production.

The constituent of tax incentives for innovative industrial enterprises in Ukraine that create material innovative technologies is currently insufficient. In addition, in developed countries preferential taxation is applied to technological processes: investments in research, purchase, creation of new or modernization of existing equipment and other processes. Also common practice is to give financial grants or concessional loans for innovative projects, to promote venture capital funds activity, etc. Since 2000, Ukraine has not had a fiscal year, when the norm was fulfilled on the provision of state budget funding of scientific and technical activities in the amount of not less than 1.7% of Ukraine's GDP, as defined in Article 48 of the Law of Ukraine "On Scientific and Scientific-Technical Activity" [Law of Ukraine "On Scientific and Scientific-Technical Activity"].

Ukraine took the 50th place in the Global Innovation Index 2017 [Global Innovation Index] 2017 among the 127 surveyed countries. The share of enterprises engaged in or introducing innovative technologies into production remains inadequate. Thus, according to the information of State Statistics Service of Ukraine [State Statistics Service of Ukraine], the share of enterprises engaged in innovation technologies is 16.1% in 2014 and 17.3% in 2015, but the methodology for calculating this indicator has changed, so it is not possible to trace the dynamics of its change. The share of enterprises introducing

innovative developments in production hasn't changed significantly: over the period from 2010 to 2013, this indicator gradually increased from 11.5% in 2010 to 13.6% in 2013, in 2014 - 12.1% and in 2015 - 15.2%. This is a low indicator, taking into account the speed of the introduction of innovations in other countries and the need to maintain the level of competitiveness of domestic producers' products.

The scope of innovation activity objectively has a higher level of risk than ordinary business activity; there is the risk that the innovation being developed will be unsuccessful or more costly than it was planned by the economic entity.

Usually the idea of the role of the state as a regulator of economic processes including in the innovation sphere in the conditions of a market economy system is widespread in the world economic science. However, in the period of changing the technological structure, when the business community has not decided on a change in the direction of investment yet and is searching for promising areas, the role of the state is not only as a regulator but also as a coordinator of innovation policy, which has specific opportunities to assist economic agents and to direct their efforts in the perspective direction. Also, the coordinating role of the state is necessary, when the level of development of the innovation sphere of the country's economy is insufficient.

If we consider innovative technology as a separate category, then it has the following stages of the life cycle at the stage of formation:

1. the stage of innovation development creation and initial testing;
2. the stage of innovation technology testing and improvement;
3. the stage of patenting and introduction into batch production (in the case of the promise of new technology);
4. the stage of stable serial production, expansion of technology application within the production segment.

Proceeding from the stages of the life cycle of innovation, we will formulate the functions of the coordinating role of the state in the field of innovation and types of assistance that the state can provide to economic entities. The need for the development and implementation of state innovation policy, as an instrument of active participation of the state in the innovation process, is due to several moments:

1. The process of introducing innovations is characterized by the length of the scientific and production cycle, high costs and uncertainty of the final result (innovative risk). The market can not solve the problem of long-term risky investments in many perspective areas of research.

2. Only the state can make bulky long-term strategic decisions taking into account all possible consequences. In the context of these solutions, concepts, strategies, programs are developed, for which the state provides the necessary resources.

3. The state provides legislative regulation of innovation activities, contributes to the formation of an innovative climate.

4. Only the state is capable of initiating and implementing the development and effective dissemination of basic innovations, taking on a start-up investment in the development of new generations of technology. To solve this problem, the state can enter into partnerships with private business, gradually increasing its share and transferring in its management a stream of improving innovations.

5. Also, the state responsibility in carrying out responsible state innovation policy is to promote the creation of innovation infrastructure.

The state has scientific and organizational resources to identify the priority directions of perspective research and innovation, provide training for specialists in advanced innovative specialties and financially support the development of new technological solutions at stages when they have not gained economic profitability yet by providing financial assistance at the stage of initial testing and improvement of innovation technology. In addition, the state may grant preferential loans for innovative projects and tax incentives for innovative enterprises. The broad field of activity of the state is in the field of public-private partnership and participation in venture funds, which should implement and produce promising innovative technologies in batch production.

For countries that are significantly behind in technological development, the coordinating role of the state is necessary on a permanent basis to maximize the effect of the implementation of state innovation policy. As the international experience shows, the worse is the initial situation in the innovative development of the state, the greater the coordinating influence of the state in the innovation sphere should be at the initial stages. An effective mechanism for activating innovation activity is the structures that promote and accompany the process of development and improvement of innovations (techno-zones, techno-parks, etc.).

In our opinion, in the current state of innovation activity in Ukraine, it would be advisable for the state to create structures of "innovative incubators" that would have the following functions:

1. Provision of conditions for work for small innovative companies, scientists and inventors. 2. Provision of financial assistance (public funds) at the initial stage of technology development. 3. Assistance in the patenting of innovation technology. 4. Estimation of innovation in terms of prospects of its serial production. 5. Possibility of organization of test and serial production of innovations involving venture companies and funds of state and private property. 6. Separating production of successful technologies with the allocation of ownership interests between the inventor of technology and investors (venture capital companies and funds).

This system approach of support of innovation allows maintaining the innovation process in a comprehensive manner. Another measure of innovation support is the macroeconomic decisions: loans at moderate rates, tax and customs privileges and others. Typically, in the conditions of Ukrainian economy such forms of support are needed for economic entities of medium and large size that have a stable market position and independently engage in innovative activities without which it is impossible to maintain competitiveness in a market environment.

Conclusions. In order to reduce the innovation risks that economic agents are encountering, as well as to increase the pace of creation and implementation of innovative technologies in production, an active innovative policy of the state is needed, which should include the creation of innovative strategies and regulations, the regulatory role of the state (macroeconomic support) and the coordinating role of the state, which includes coordination of the cooperation of innovators (scientists, inventors, innovative companies) and investors, creation of structures for supporting innovations (innovative incubators, techno-parks, etc.). Only such comprehensive innovation policy can have a significant positive effect. Further promising areas of research are the analysis of best practices of the regulatory and coordinating role of the state in the innovation field based on international experience.

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TYPES OF PRESS IN GREAT BRITAIN

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Abstract: The importance of this work is to highlight the growth and influence of press in Great Britain. Regardless of the form of the government, the press being a sufficient part of media is also a political weapon of tremendous power. The objective of the present work is to cover the types of newspapers in Great Britain, their background and principles. The object of the study is printed press in Great Britain. The subject of the study is types of newspapers in Great Britain.

In Britain more national and regional newspapers are sold per head than in any other Western country, a fact which emphasises the important role of the press in forming public and political opinion. Newspaper reading is also part of the traditional British Sunday. The national newspapers, which are distributed throughout the country, are traditionally classified as either 'quality' newspapers or 'popular' papers. It is important to state that the striking difference between them reflects the gap between Britain's social classes.

National Daily and Sunday Papers. The British people buy more newspapers than any other people in European countries. All over Britain most people read national papers, based in London, which altogether sell more copies than all the eighty-odd provincial newspapers combined. In a democratic country like Great Britain the press, ideally, has three political functions: information, discussion and representation. It is supposed to give the voter reliable and complete information to base his judgments. It should let him know the arguments for and against any policy, and it should reflect and give voice to the desires of the people as a whole.

All the newspapers whether daily or Sunday, totalling about twenty, can be divided into two groups: quality newspaper and popular papers. Quality newspapers include "The Times", "The Guardian", "The Daily Telegraph", "The Financial Times", "The Observer", "The Sunday Times" and "The Sunday Telegraph". Very thoroughly they report national and international news.

In addition to the daily and Sunday papers, there is an enormous number of weeklies, some devoted to special and professional subjects, others of more general interest. Three of them are of special importance and cover a large and influential readership. They are: the "Spectator" (which is non-party but with Conservative views), the "New Statesman" (a radical journal, inclining towards the left wing of the Labor Party) and the largest and most influential – the "Economist" (politically independent). These periodicals resemble one another in subject matter and layout. They contain articles on national and international affairs, current events, the arts, letters to the Editor, extensive book reviews. Their publications often exert a great influence on politics [4, p.112-115].

The distinction between the quality and the popular newspapers is one primarily of educational level. Quality newspapers are those newspapers which are intended for the well educated readers. All the rest are generally called popular newspapers. The most important of them are the "News of the World", "The Sun", the "Daily Mirror", the "Daily Express". The two archetypal popular papers, the "Daily Mail" and "Daily Express" were both built by individual tycoons in the early 20th century. Both had a feeling for the taste of a newly-literate public: if a man bites a dog, that's news. The "Daily Express" was built up by a man born in Canada. He became a great man in the land, a close friend and associate of Winston Churchill, and a powerful minister in his War Cabinet. The circulation of "The Daily Express" at one time exceeded four million copies a day. Now the first Lord Beaverbrook is dead, and the daily sales are not much more than half of their highest figure. The history of the "Daily Mail", with its conventional conservatism, is not greatly different.

Local and Regional Papers. Local morning newspapers have suffered from the universal penetration of London-based national press. Less than 20 have survived in England in general and their circulation is much less than "The Sun" alone. Among local daily newspapers there are some published in the evenings and moreover, they are much more important. Each of about 70 towns has one, selling only within a radius of 50 to 100 kilometers. "The London Evening Standard" has a circulation of 528,700. It covers national and international news as well as local affairs. Local weeklies include newspapers for every district in London, often in the form of local editions of an individual paper. Wales has one daily morning newspaper, the "Western Mail", published in Cardiff, with a circulation of 76,200 throughout Wales. In north Wales "the Daily Post", published in Liverpool, gives wide coverage to events in the area. "Wales on Sunday", published in Cardiff, has a circulation of 53,100. Evening newspapers published in Wales are the "South Wales Echo", Cardiff; the "South Wales Argus", Newport; "The South Wales Evening Post", Swansea. Northern Ireland has two morning newspapers, one evening and three Sunday papers, all published in Belfast with circulations ranging from 20,000 to 170, 567. They are the "News Letter", the "Sunday News", and the "Sunday World". There are about 45 weekly papers.

The truly local newspapers are weekly. They are not taken very seriously, being mostly bought for the useful information contained in their advertisements. But for a foreign visitor wishing to learn something of the flavour of a local community, the weekly local paper can be useful. Some of these newspapers are now given away, not sold out but supported by the advertising. The four most famous provincial newspapers are "The Scotsman" (Edinburg), the "Glasgow herald", the "Yorkshire Post" (Leeds) and the "Belfast Telegraph", which present national as well as local news. Apart from these there are many other daily, evening and weekly newspapers published in cities and smaller towns. The present local news and are supported by local advertisements [5, p 16-18].

The Weekly, Periodical and Daily Press. Good English writing is often to be found in the weekly political and literary journals, all based in London, all with nationwide circulations in the tens of thousands. "The Economist", founded in 1841, probably has no equal everywhere. It has a coloured cover and a few photographs inside, so that it look like "Time" or "Newsweek", but its reports have more depth and breadth than any these. It covers world affair, and even its American section is more informative about America than its American equivalents. Although by no means "popular", it is vigorous in its comments, and deserves the respect in which it is generally held. "Spectator" is a weekly journal of opinion. It regularly contains well-written articles, often politically slanted. It devotes nearly half its space to literature and the arts.

The best-known among the British national weekly newspapers are as follows. "The Times" (1785) is called the paper of the Establishment. "The Times" has three weekly supplements, all appeared and sold separately. The "Literary Supplement" is devoted almost entirely to book reviews, and covers all kinds of new literature. It makes good use of academic contributors, and has at last, unlike "The Economist", abandoned its old tradition of anonymous reviews. "New Scientist" published by the company which owns the "Daily Mirror" The popular newspapers are now commonly called "tabloids". This word first used for pharmaceutical substances compressed into pills. The tabloid newspapers compress the news, and are printed on small sheets of paper. Usually they use enormous headlines for the leading items of each day, which are one day political, one day do with a crime, one day sport, one day some odd happening.

New Printing Technology. The heavy production costs of newspapers and periodicals continue to encourage publishers to look for new ways of reducing these costs, often by using advanced computer system to control editing and production processes. The "Front end" or "single stroking" system, for example, allows journalists to input "copy" directly into video terminal, and then to transform it automatically into computer-set columns of type.

In conclusion. In the twenty-first century the production of news, and journalism of all kinds, is big business. Alongside the globalisation of journalism which 24-hour channels have delivered, regional and local news has expanded in the UK, especially in the print sector. Cultural globalisation does not reduce the need for local media; on the contrary, it increases that need, and the robust health of regional publishers in the UK proves that fact.

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GAPS IN LAW

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Abstract: The article analyzes such a phenomenon of legal reality as the gaps in rights. In the article we focus attention on the legal nature of the gaps in the law regulation and ways to overcome them. The place and role of the analogy of law are determined when overcoming gaps in the law.

Key words: legislation, gaps in law

Introduction. As practice shows there are gaps in law in any state and its legislation, but the main guideline which the lawyer should be guided in solving gaps is the rule of law. This problem is basic to all existing legal systems. Changes in our society lead to the emergence of new social relations, and there is the necessity for their legal regulation.

Object matter is to highlight the role and place of gaps in the law, to draw attention to some examples of the gaps in Ukrainian legislation.

Subject matter is the legal system of Ukraine.

Materials: works and laws of Ukraine were studied.

Methods: analytical and empirical methods and method of system analysis were used during the research.

Discussions and results. The word "gap" has two meanings, which in different ways reveal the essence of the concept. First, you can consider the concept in the literal sense id est as a blank, empty space or in an [extended sense](#) as a defect or oversight. The latter is characterized by the failure to perform necessary procedures, a mistake in negligence or an irresponsible attitude, and the disadvantage is imperfection, defect or incomplete fulfillment of something.

A gap can be a non-negative part of an object without which it will cease to exist or lose its natural essence, or an empty space is a disadvantage when it is created, and therefore it needs to eliminate, process or make adjustments. So the gap in the law should be used mainly in an [extended sense](#) as the imperfect law or absence of its part [2, 300].

Gaps in law mean cases where there is no law, by-law, custom, or precedent, and entirely new social relations, which had earlier counterparts and require regulation are subject for consideration [1, 113].

Sometimes the law is distinguished as "awareness" of gaps using this term in the literal sense. It is said so when the legislator specifically leaves the issues open to be resolved over time or to give the decision of the executive. Or the legislator does not explain the issues that lie outside the legal regulation and relates to the moral side of society (excessive cruelty, special harassment, etc) [2, 301].

Having analyzed scientific literature, we can define such causes of gaps:

1. a mistaken idea that relationships do not require legal regulation;
2. a mistaken idea that one can do without specifying, [in reliance on](#) insignificant changes to existing regulation (for example, with the advance of mobile phones criminal penalties for talking while driving was not foreseen, but after the aggravating of a problem the appropriate law was adopted);
3. publication of the rules, that are not required;
4. issues are not resolved in the necessary form;
5. inability of the legislator to reflect all everyday situation in regulations (detachment from the realities of society);
6. lack of skills in anticipation of new situations that are a mandatory part of the normal development of society;
7. technical errors of the legislator made while developing regulations and applying methods of legal technique [2,303].

There are a lot of approaches to classify legal gaps. They are based on different aspects of the gaps emergence in law. In order to identify the gaps one should:

1. study the contents of the existing system of law;
2. consider material and social factors that have led to the necessity to complement the legal act or supplement;
3. enforce legislative activity of state and public bodies;
4. determine legal relations, associated with a certain act;
5. correspond the spirit of law [3].

Detecting gaps is not a purposeful search. During practical activity, it comes from the objective: law enforcers have faced the lack of the legal instrument for solving a particular case. The same legal practice focuses on the existence of imperfections in existing law and the need for their elimination.

On the basis of the analysis of the scientific literature, we can suggest such ways to overcome gaps in law:

1. Lawmaking - by making changes and amendments to the existing laws, regulations and other things, publication of new, improved legal acts or creation of legal precedent or signing legal contract.
2. The operation of courts which helps overcome gaps should have strictly subordinate nature and be regulatory. All regulations that do not meet the law should be considered void. The courts have no authority to amend existing regulations.
3. The analogy of law means to apply rule of law to unregulated relations.
4. The analogy of jurisprudence means to apply general principles and rules of law to regulated relations.
5. Subsidiary application of law (lat. subsidium - help, support and protection) is an additional application of law of individual institutions or area of law to relations governed by institutions or other close branches of law.[2, 345]

Having considered the gaps in law in general, we would like to give some examples of gaps in Ukrainian legislation. Such is the issue of "amber" legislation in Ukraine as the leader in amber reserves in

Europe. It should have been resolved many years ago. But although this issue was raised years ago, amber is 10 thousand dollars per kilogram. Moreover, the environment is affected by illegal mining and the budget loses huge amounts of money. But to deal with this problem we only have the bill “On production and sale of Amber” from 26.12.2014 [4].

Another area where the rules of law are not perfect is the market of organic product. The Law of Ukraine “On production and turnover of organic agricultural products and raw materials” has general provisions according to organic category, but it still does not meet the international and European standards [5].

And the last but not the least is the area of intellectual property rights to industrial designs. Legislation concerning intellectual property needs significant improvements. Under the Article 14 of the Law of Ukraine “On Protection of Rights to Industrial Designs”[6] formal examination of the application and the stated objects is conducted while the novelty examination is not performed.

These gaps in Ukrainian legislation are just a small part of the existing imperfections, ways of avoiding the law and manifestations of the problems of legislation.

In conclusion, we would like to notice that legislation should be more consistent despite constant changes and transformations in social relations, the emergence of new types of interactions and gaps in the law are to be overcome and eliminated.

The current state of the problem of gaps should be considered taking into account the particular legal system of a particular country. Remedies which are typical for some countries, may not be favourable to others (the use of a judicial and administrative precedent is more characteristic of the Anglo-Saxon legal family).

Although the precedent is a quick way to overcome the gaps, it has the complexity of operational using in the future, since the existence of a large number of precedents has complicated the ability to guide them.

Thus, the only way to eliminate gaps is law-making, but the legislator can not always react in a timely manner to the new relations that arises in society. There are a lot of gaps in different branches of law but let`s hope that there will be less of them in future.

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MEDIATION AS AN INTERDISCIPLINARY SCIENCE AND SOCIALLY IMPORTANT INSTITUTION

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Abstract: Mediation is becoming one of the most popular and dynamically embedded procedure in public relations extrajudicial methods of conflict resolution. It is characterized as an interdisciplinary field of knowledge. In this article the definition of this phenomenon is given; the process of mediation is considered and analyzed; the role of mediation is social interaction is defined.

Key words: mediation, mediative approach, alternative dispute resolution, law.

Introduction. In modern globalized world disputes and conflicts are becoming more difficult, and the level of their destructiveness are becoming more serious for individuals and business. Disagreements, potentially capable of escalating into conflict, arise constantly and concern the most different areas of human activity, and their settlement becomes one of the priorities of the economy, political activity, and law. Simultaneously, the quality of dispute settlement is becoming more important.

Object matter is the social relationships which arise in the field of negotiations.

Subject matter is the legal basis for performing mediation objective.

Tasks 1. To analyze the definition of mediation;

Task 2. To describe the process of mediation;

Task 3. To show the role of mediation in social interaction.

Materials: The works of on mediation were studied and analyzed.

Methods: During the research we used analytical and empirical methods, and method of system analysis.

Discussions and results. In the last two decades, the need for methods and approaches that can create conditions for a real settlement of disputes and disagreements has been constantly increasing. Against this background, mediation is becoming one of the most popular and dynamically embedded procedure in public relations extrajudicial methods of conflict resolution. It refers to the system of funds designated as «alternative dispute resolution» (ARS). The key difference between mediation, which is the lack of the right of the expert to make a verdict, and the maximum focus of the procedure on the interests and needs of the parties, makes it the most preferable way to resolve disputes in the current situation. Its development and growing popularity are due to other reasons. The most discussed advantage of the method is its cost-effectiveness, especially in comparison with the usual ways of resolving disputes. Thus, the duration of the procedure is generally not more than a few weeks (and usually from one to several days), and the costs for conducting it are insignificant and mostly consist of payment for the organization and conduct of the procedure itself and registration fees [2].

The mediation procedure is conducted with the participation of a neutral, impartial assistant - a mediator. The parties enter into the procedure and participate in it only on a voluntary basis, in conditions of confidentiality and equality, the parties take decisions themselves and exclusively on the basis of goodwill, which, accordingly, also contributes to the voluntary implementation of the agreements reached. The high level of viability and voluntary implementation of mediation agreements is explained by the very nature of such arrangements, which creates the conditions for empowering the disputing parties with power and the power to influence the process of its settlement and its outcome. In the mediation process, the parties remain the «owners of their conflict» and retain control over the process of its resolution, including the stage of developing a solution and formulating agreements. Moreover, these agreements, vested in a mediation agreement, should reflect the interests, and needs of the parties to the maximum. Relying on such fundamental principles, mediation creates a lot of advantages for those who want to settle problems.

Nowadays, the success of entrepreneurial activity and business processes are assessed, among other things, by the ability to qualitatively prevent and manage conflicts [3; 5; 7] [lock; pp.38-56, 60-65, 44-65].

Thus, in the postal service of the United States in the first year after the full implementation of the mediation program for the settlement of disputes, the number of complaints has decreased by 24% compared to the previous year. The number of complaints was reduced and the next year the program was implemented by 20%, which resulted in huge savings [1]. The use of mediation as a way of developing solutions based on consensus to find more and more supporters in the system of state and municipal management.

According to L. Saskind, in the public arena, the obligation to follow the principle of consensus building can bring other advantages (along with those traditionally attributed to the ARS): more just, wise, more effective, and more stable results [6] [lock : 35].

Mediation allows discussing and coordinating complex issues in situations that require the consideration of diverse points of view, sometimes caused by diametrically opposed interests.

The opportunity to participate constructively, on the terms of respect and equality of all the parties concerned, without exception, in making meaningful decisions, created by mediation and the process of building consensus, is a guarantee of realism and viability of projects implemented on the basis of these decisions.

What are the disciplines which can prove promises in the formation of scientific knowledge about mediation? Our review of scientific literature has shown that analytical studies on this topic have not yet been proposed. At the same time, there are a lot of scientific areas in which disputes and possibilities for their settlement are discussed in one way or another. This includes both social and human sciences, as well as natural and even technical disciplines. However, the greatest volumes of theoretical knowledge of potential interest for mediation can be found in the following areas: psychology and socio-psychological sciences, logic, cybernetics, mathematics, semiotics, culturology (including studies of subcultures), sociology, anthropology, evolutionary biology, linguistics, history, ethics, pedagogy, political science, regional studies, law, ethnography, psychophysiology, and neurobiology. Summarizing the literary information accumulated in the above disciplines, we can distinguish three main areas of scientific research that can provide adequate analytical, scientific, and theoretical support for mediation.

Over the past two decades, mediation has increasingly been used not only as a method for resolving disputes, but also as a way of social interaction. The prerequisite for such a broad view of mediation is its fundamental principles, which create the foundation for empowering the parties with power and power of influence, autonomy, freedom of expression, and responsibility. The development of mediation in the XXth century was dictated by the challenges faced, above all, by western civilization.

Mediation has a huge potential to improve the quality of public relations. With the aim of revealing the possibilities of mediation in everyday communication and professional interaction, a mediative approach was developed, based on the possession of the skill of a positive informed communication. It is built on mediative principles and phenomenological perception of the individual and it considers the interaction of a person with the surrounding world as a value [4] [lock; 3-21]. Communication is necessary for the full existence of the personality, being the source of its self-knowledge and development. One of the most significant areas of application of the mediative approach is the integration of it into the education and upbringing system.

It is found that the integration of the mediative approach in socially important spheres of activity, such as health care, social assistance to the population, various types of legal aid, the system of state and municipal management, and the interaction of society and government is of no less importance. Today, the mediative approach is gradually being integrated into corporate and organizational activities. The multilevel system application of the mediative approach allows to increase the effectiveness of the organization, enterprise, and corporation. To implement these goals, a complex integrated media approach (IMSP) has been developed, creating conditions for the systemic application of mediation as a way to prevent and successfully resolve disputes. KIMP allows a balanced, optimal result to realize the constructive goals of the organization (in the broadest sense of the word) and its employees.

Conclusions: thus, mediation is a social tool that has significant applied value. At the same time, it relies on various fields of knowledge, which ensures its effectiveness. Consideration of mediation as an interdisciplinary science and the formation of its scientific base are a prerequisite for its further successful integration into various spheres of society in the XXI-st century.

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THE IMAGE OF DIONYSUS IN ANCIENT GREEK RELIGION

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Abstract: The paper deals with different aspects of the influence of god Dionysus on Greek religion. The image of Dionysus considered alongside with the deity is studied from the point of view of the origin of the cult of this god. Different hypostases of Dionysus are investigated. Attention is paid to the mechanism of celebration of Great Dionysia as an important event in the history of ancient Greece. The conclusion is made that Dionysus is a controversial figure in ancient Greece, a promoter of cultural achievements. The peculiarities of the origin of the cult of Dionysus make it possible to find out important data about the appearance of tragedy as a necessary condition for the theatre.

Key words: ancient Greece, the cult, deity, god, Great Dionysia, Greek religion, hypostasis, the image of Dionysus.

Introduction. The paper is devoted to the consideration of the image of Dionysus in ancient Greece. The relevance of the study is due to the fact that at present the image of Dionysus in ancient Greek religion is

quite interesting for research, and controversial because the question about the origin of the cult of this god is remained unsolved. The evidences of Dionysus are presented mainly in the historical monuments of ancient Greece. The study of the deity Dionysus gives us extensive material for studying the mechanism of the celebration of Great Dionysia in ancient Greece, and also the appearance of the theater as an important event in the history of the world culture. The object-matter of the research is the image of Dionysus. The subject-matter is the influence of god Dionysus on Greek religion. The objective of the work is to study the various aspects of the image of Dionysus in order to determine the role of this god in ancient Greece. The tasks are to study the origin of the cult of Dionysus, to investigate the hypostases of this god in ancient Greek religion. The materials are narrative (Plutarch, Gigin, Euripides) and some iconographic sources. The methods of the research are as follows: a comparative-historical method and descriptive analysis. Discussion and Results. The cult of Dionysus took roots in ancient Greece with the spread of winemaking. It was adopted by the Greek people early enough and it combines both Thracian and Phrygian elements of religion. Dionysus played an important role in Eleusinian religion, in which the god acted as the image of Iakha and was associated with the underworld. Dionysus is considered as «the leader of the mysteries of Demeter» [Apollodor]. Demeter resurrects Iakha when he was torn to pieces. He often appears as a son of Great Goddess. The resurrection of god Dionysus is a symbol of the restoration of «cut grapes for blossoming». In the Eleusinian tradition, Dionysus is the dying and resurrecting god of vegetation and vine, which is closely connected with the forces of the earth and fertility. The patron of wine was Zagrei in Crete, where his symbol was a wineskin with wine. Such additional symbols as honey and milk were used in the rituals dedicated to Zagrei [Kereni, 2007: 17].

Sabaziy (Old Greek Σαβάζιος or Σάβος) is the Thracian-Frahan hypostasis of Dionysus, embodying the fertility of the plant world. Its origin can be associated with the pantheon of gods of ancient population of Asia Minor. The bronze tablet from Bogazkeia found in the 15th century BC contains a list of gods worshiped by the Hittites. The name of Sabazia is not directly mentioned in the sources, but there is a god of vegetation, a prototype of Sabaziy mentioned there. Penfey, the mythical king, the descendant of Semele's sister (Dionysus' mother), is one of the images of Dionysos. Penfey was torn by Bacchantes and his mother and became a victim of religious ecstasy. Dionysus punished the king by reason for not accepting his cult. In Greek myths Penfey appears as a sufferer. Anyway, Penfey is the prehistory of god Dionysus.

The festivities in honor of Dionysus are not just events of glorification of the god of winemaking, but also a way to achieve a state of euphoria. The myths associated with this deity often tell of the loss of mind. Dionysus sends madness to the king of Lycurgus, who rejects him, and the latter killed his son. Hera inspired insanity into Dionysus and he left the Oared who brought him up, wandering in Egypt, Syria, India, Asia Minor and Thrace, and got to Thebes. Wherever he came, he was accompanied by madness and violence. With the name of the Cretan Dionysus – Zagrei, many descriptions are associated, for example, Ὠμήστης (Old Greek) which means «savagery», «raw-hearted» identified as a lion. He was considered as the patron saint of goats and eaten in his honor. As a consequence, he was called Melanaigis or Aigobolos – «goat fighter» [Vidal-Nake, 1989: 14-15].

Many elements of description of Dionysus points to «vegetable fruiting». Almost all the Greeks made sacrifices to Dionysus Woody – Δευδρίτησ (Old Greek). This god was often portrayed in the form of a vertical pillar with no hands in a coat and with a bearded mask instead of a head and with deciduous shoots making their way from the head or from the body. Dionysus, with the tide of time, became the patron of cultural trees, the discoverer of apples and fig [Freyzer Dzh. Dzh]. One of his names was Φλοιός (Old Greek), which means Abundant or Revealing, and in Attica was called Blossoming. Ivy was also devoted to Dionysus, because it covered Dionysus from the fire with his herbs during a fire caused by the appearance of Zeus in the palace of Semely. Therefore, there is another description – Βρόμιος Εὔτιος (Old Greek). We have received numerous images of Dionysus in the form of a branchy tree. In Akharny – one of the villages of Attica – there was, for example, Dionysus-ivy, in Sparta – Dionysus-fig tree. Also Dionysus Λυαίος (Old Greek) – «liberator», who frees people from worldly worries [Plutarh].

Dionysus was personified as the god of farming and bread. Myths say that this god was the first to harness the bulls to the plow, which people had been pulling by hand before. That's why he is often represented in the form of a bull. Thus, he was named Βουγένης (Old Greek «born of a cow», «bull», «bull-shaped», «bullhead»). The myth says that the titans tore it to pieces, the Cretans were torn to pieces by a living bull, playing the passions and death of Dionysus [Freyzer Dzh. Dzh].

It is worth emphasizing that Dionysus was portrayed as a horned child, whether they were the horns of a goat, a deer, a bull or a ram. It must have been depended on a particular place of worship. Apollodorus describes Dionysus as Ἐριφός (Old Greek) – a kid, corresponding to the cult of «pre-Dionysus» Zagrea. In Athens and in the Argolid city in Hermigon, there was a cult of Dionysus,

«wearing the skin of a black goat». In the wine area of Fliunte, since ancient times there have been a bronze statue of a goat. To protect the vineyards from damage, the local wine growers covered it with a gold slick. This statue may have depicted Dionysus himself. He could also appear in the image of a deer [Apollodor].

On the attic black-figured amphora of Vulci, Dionysus is depicted in four of his hypostases: as Δευδρίτης «woody» – the deity of vine, as κίσσος «ivy» – a curling ivy, as λέων «lion» – a beast staring at God, and as an anthropomorphic deity of wine (in the center of the composition).

J. Harrison was the first to point out that, according to one of the myths, the god of wine Dionysus later became the god of beer Dionysus, also called Sabaziy. The researcher believes that, firstly, the nymph fed the newborn Dionysus with honey. Secondly, the maenads had tiers (wands of pine branches twined with ivy). This proves that another intoxicating drink had been used before. Although V. Burkert says that the word «tragedy» comes from two Greek words: «tragos» – a goat and «ede» – a song, and thus denoting «the song of goats», J. Harrison believes that it could be spruce beer flavored with ivy and sweetened with honey. [Harrison, 1922: 350, 360].

After all, Dionysus himself was often portrayed as a goat. Since Dionysus was considered the son of the Great Zeus and goddess of the earth, it is not surprising that he did not confine himself to dominion over winemaking. He was also the god of heaven and earthly moisture, and the god of the sun heat of the living force of nature. Conclusions. The conclusion is made that the cult of Dionysus represents a synthesis of various attributes and elements of description formed during Greek cultural historical process. Dionysus is considered as a cultural figure, a promoter of cultural achievements in ancient Greece. Dionysus facilitated not only the living conditions of people, but also had a profound impact on their consciousness.

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HIGHER EDUCATION IN UKRAINE: PROBLEMS AND SOLUTIONS

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Abstract: The article observes the position of higher education in Ukraine, describes its main problems and suggests to take up definite measures to solve them. The research covers combating with such education phenomena as corruption, poor teaching methods and lack of qualification which hinder the whole economic and social development of Ukraine.

Key words: corruption, higher education, quality, teaching, Ukraine.

Introduction. The problem of the topic consists in the fact the system of higher education in Ukraine doesn't contribute to the growth of country's competitiveness on international arena because it faces lots of problems that require fast resolution. The relevance of the research is reflected in the current critical condition of the higher education system which needs renovation. This process is affected by the fact that the country is suffering from the economic and political crises. Therefore, the objective of this research consists in searching for solutions to problems in the sphere of higher education.

The object-matter of the article is higher education system of Ukraine, while the subject-matter focuses on current problems in the higher education system of Ukraine and solutions to them. The tasks of the article consist in studying the trends in modern higher education system of Ukraine, revealing pressing problems and determining ways to solve them and ensure further development of the system.

The article is based on results of the opinion poll, scientific literature, media reviews and official reports. All the materials give an opportunity to observe the topic in different points of view. The methods of the research involve qualitative, opinion based, observational ones and also analysis.

Discussion and Results. Ukraine's education system has always been ranked on the par with large European Union countries. The score for the higher education index puts Ukraine in the 33rd place of 138 according to the World Economic Forum Global Competitiveness Report [Schwab 2017: 350].

Unfortunately, Ukraine has achieved this status only due to the basis inherited from the Soviet period of our history. Modern education system in the era of independence faces a lot of problems which should be taken into account by the government to enable further sustained development of Ukraine. What do these problems consist in?

Firstly, the online survey of 2011 revealed that 26% of Ukrainians considered teaching methods to be outdated [Gazeta "Delo" 2011]. Obviously, these poor methods are influenced by the use of materials which have lost their relevance and don't fit with achievements of technological and scientific progress. For instance, writing down long notes takes students' time and doesn't guarantee understanding of the material. Teachers can reduce the amount of notes given to students if they collect copies of notes with the use of a storage device and let students put these copies into their personal laptops. Due to this approach teachers can find more time to explain the material.

Moreover, using projectors and interactive boards should be taken under consideration to help teachers in presenting their notes in digital form because visualisation gives an opportunity to learn the material more effectively.

Nowadays the teaching methods are getting more and more diverse to provide better understanding of a particular topic. Such approaches as brainstorming and case method are aimed at this purpose. The internet should also be used as a source of the most relevant information. It can help students to broaden their horizons and gain more knowledge on various topics.

Another significant problem consists in the fact the quality of education in Ukraine doesn't meet the needs of the business and modern competitive labor market. Universities don't provide students with thorough training and don't develop skills important for further efficient work, that's why workers and executives can't successfully handle all the challenges of a market economy. The solution of this issue involves improving case studies in the learning process. Students should have an opportunity to gain practical skills in their area of knowledge by preparing some projects and conducting surveys to deal with different situations and make their knowledge applicable in the workplace.

Students also face such a problem in universities as unqualified teachers. They use poor teaching methods and experience the lack of constant professional development through seminars, workshops and refresher courses. Lack of motivation by teachers also causes great harm to students because these teachers don't care about the intellectual feelings of students and they just teach reluctantly. As a result, students don't receive proper training and they have to deepen their knowledge practising self-education. The solution to this problem consists in constant teacher improvement which implies attending refresher courses, implementing new teaching approaches to learning process and maintaining friendly atmosphere in a classroom. In this way students won't get frustrated at the subjects been taught and they will stay inspired to carry on studying.

The position of the free higher education has been also seriously shattered by the growing corruption in admission, learning process and graduation. Ukraine was put among the three most corrupted nations of the world together with Colombia and Brazil [Tkachuk 2012]. In 2015 48,7% of students claimed a bribe had ever been requested of them or their family members [Kiev International Institute of Sociology 2015: 42]. Actually this problem has some suppositions. Teachers and professors in Ukraine have low salaries in comparison with other professions, so they have to take bribes to make their living. Students in their turn have to navigate a complicated and unfair education system to get good grades, so they are ready to do it by all means. For example, students are required to pass a large variety of subjects to proceed from one academic year to the next. If a teacher needs money, he will make sure students not to pass the exam, that's why the latter are obliged to pay.

So, bribery sets negative standards and norms that influence the behavior of young generation. "Corruption in education hinders economic and social development by affecting access to and quality of education... Societies with high levels of corruption have low-quality education and poor educational results of students – funds for education are stolen, teachers and students are not well prepared, and schools are built with low-quality materials." [Duchak 2015: 111-112].

How can the government combat with bribery of both teachers and students? That's difficult enough to eradicate corruption at all as the Ukrainian society needs hundreds of years for this. However, the government can give a boost to this process by toughening anti-corruption legislation, increasing teachers' salaries and making the education system more transparent. Moreover, students should be interested in the learning process in order to get good grades by fair means.

Overall Ukraine has poor quality control for its education system. "The Ministry of Education, universities and schools are assessed using quantity rather than quality factors. Educational institutions get funding based on the number of enrolled students rather than on the quality of provided knowledge and

skills.” [Foundation for Effective Governance 2011: 29] Unfortunately, these funds are used inefficiently. Universities spend this money on paying salaries and utility bills and have little opportunity to invest in scientific activities and equipment quality. That’s why an important aspect of improving the education management system is making management decisions considering the data from the education quality monitoring. This will allow to optimize the government expenses for education and find the most efficient ways of improving the quality of given training.

Conclusions. Further development of Ukraine as a European state isn’t possible without improving the quality of higher education based on European standards, so Ukraine needs to solve many urgent problems in the system of higher education. They are caused by poor teaching methods and staff training, corruption and lack of practical skills which leads to alumni’s non-competitiveness on the labor market. That’s why such proposed changes as using modern technologies and innovative education approaches, paying more attention to practical application of received knowledge and taking up strict measures to fight with corruption can make Ukraine move to a higher level of its development on the global stage.

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CONTEXTUAL PARADIGM IN TEXTS OF SONGS OF UKRAINIAN PERFORMERS

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Abstract: The paper deals with the analysis of contextual paradigm in texts of songs of Ukrainian singers on the basis of category of informativeness. The concept song is defined as a combination verbal means and music. The concept contextual paradigm is considered from the point of view of functional and communicative stylistics of text. The connotative meaning of contextual paradigm is studied alongside with the denotative one. Attention is paid to the context as a necessary condition for functioning contextual paradigms. The conclusion is made that contextual paradigm is of great importance in a song genre of modern pop-music. It is interpreted on the basis of implicit information.

Key words: connotative meaning, context, contextual paradigm, denotative meaning, functional and communicative stylistics of text, implicit information, song text.

Introduction. The object-matter of the research is a contextual paradigm. The subject-matter is functioning a contextual paradigm in Ukrainian song texts of the XX-th and XI-st centuries. The objective of the work is to study contextual paradigms on the basis of interpretation of implicit information. The tasks are to investigate the importance of the concept contextual paradigm, to study the influence of contextual paradigms on the sense of song texts, to trace the interpretative meaning of contextual paradigms in song texts. The methods of the research are descriptive (description of various contextual paradigms in song texts), comparative (comparing different meanings of the contextual paradigm). The materials of the research are song texts in the creative activity of Ukrainian singers of the XX-th and XXI-st centuries Sophia Rotaru and Alla Kudlay.

The distinctive feature of modern song texts (ST) is the use of contextual paradigms (CP) within the theory of functional and communicative stylistics of the text. The relevance of the study is due to the fact that at present there are quite a lot of works considering contextual paradigm from the point of view of the

connotative meaning of the word. A linguistic review of the concept of contextual paradigm is presented in the research.

Discussion and Results. At present many researches are devoted to the analysis of song texts [Грачев 2008; Motschenbacher 2016]. Modern researchers are sure that words and music are closely connected in the song [Плотницький 2005: 6; Шевченко 2009: 5]. A song is a synthesis of verbal means of communication (verbal signs) and extralinguistic (musical signs). We present a fragment of the song text «Одна калина», 2004 performed by Sophia Rotaru.

E Am Dm
Одна калина за вікном,
 Am
Одна родина за столом,
 G C
Одна стежина, щоб додому йшла сама.

The lexical content plays a great role in interpretation of ST. In the process of interpretation of contextual paradigm it is possible to find out in it the implicit meaning transmitted by different stylistic devices, rare meanings of words, whereby the author emotionally influences the listener.

Realization of a system-language concept of word in a contextual paradigm is considered in the following works [Новиков 2002; Савельєва 1987]. Language unit due to a certain context acquires a new semantic meaning. The same word in different communicative situations can express different concepts in speech. It is a realization of the concept of word in a contextual paradigm. When the concept is expressed in language, language means used for this purpose become means of verbalization, language representation, language objectification of the concept [Грачев 2008].

Contextual paradigms are described by language units that condition various possibilities of variable denotation of reality. CP functions due to connotation and acquires additional sense due to context. We consider contextual paradigms as a method of emotional perception of information in ST by an addressee, from the point of view of the interpretation of implicit information and creation of the image of personage in texts of songs performed by Ukrainian singers Sophia Rotaru and Alla Kudlay.

Contextual paradigms одна калина, одна родина, одна стежина, одна любов, одна журба on the basis of hyponymic repetition калина, родина, стежина, любов, журба – Україна in a specific context acquire a unified meaning, uniting in the concept батьківщина in the following song text: Одна калина за вікном, одна родина за столом, одна стежина, щоб до дому йшла сама, одна любов на все життя, одна журба до забуття. І Україна, бо в нас іншої нема! [Одна калина 2004, С. Ротару].

The realization of contextual paradigm in the following song text is the use of the language unit вода in the meaning of transience, fleetingness of life on the basis of exact repetition вода – вода and contextual synonyms вода – літа: Тече вода, тече бистра вода, Тече вода – і минають літа [Тече вода 1985, С. Ротару]. Together with a personage it gives an opportunity to the listener to remember the past and to think of the future.

The word музика also acquires a new meaning in the following ST: Верни мне музыку, без музыки тоска. Мы расстались, но осталась наша музыка [Верни мне музыку 1977, С. Ротару]. Contextual paradigm музика is perceived by a listener as любовь. It is a symbol of "beautiful" love, creating the image of personage who lost love, but infinitely loving and saving love in soul.

CP поздняя весна on the basis of the category of informativeness can be interpreted as поздняя любовь: Я знала, что настанет моя поздняя весна [Поздняя любовь 1976, С. Ротару]. In this context the word весна acquires the meaning of hope and expectation, that creates the image of personage who hopes to be loved.

Also the change of the meaning of word can be traced in ST Половина саду квітне. On the basis of antonymous repetition квітне – в'яне there created a contradictory image of the garden: Половина саду квітне. Половина саду в'яне. Щось мені шепоче вечір. Та чомусь не вірю сподіванням [Половина саду квітне 1984, Алла Кудлай]. In this context CP сад acquires the meaning of faith in love, in spite of disbelief.

The song Не поверну човен can serve as the use of contextual paradigm. CP човен means impossibility to return love, former feelings in the context: Розумію я, що не поверну човен – Бистра течія доли мчить у світ [Не поверну човен 1991, Алла Кудлай]. But a personage expects something brilliant to happen in the future: Бистра течія доли мчить у світ.

In ST Червоні вишні [Червоні вишні 1991, Алла Кудлай] CP вишня on the basis of contextual synonyms любов – вишня and antonymous repetition минула – не забула is interpreted as the place of the dating of lovers and love, a feeling greater than happiness, but unhappy love: Любов колишня ти, любов минула. Та наша вишня нас з тобою не забула. The author creates the image of personage who desires to meet his love in future.

On the basis of the category of informativeness as a result of interpretation of contextual paradigms taking into account a connotative meaning there appear new meanings different from dictionary ones. Unraveling intention of the author, expressed in implicit information, the listener creates various images of the personage in his/her imagination.

Conclusions. The conclusion is that contextual paradigm plays a significant role in the process of interpretation of song texts. Contextual paradigm is an important means of the formation and transformation of implicit information in modern vocal and instrumental space. The perspectives of the work are to develop the idea that the contextual paradigm influences the interpretation of song texts and to study the meaning of contextual paradigms in various genres of modern music.

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ANALYSIS OF THE SEMANTICS AND TRANSLATION MEANS OF ENGLISH FOR-TO-INFINITIVE CONSTRUCTION

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Abstract: This article studies English for-to-Infinitive constructions and their Ukrainian translations based on the novel "The Martian". Semantic roles of nominal parts of the constructions are in focus. Various aspects which determine the choice of the translation means are provided. Ch. Fillmore's theory of case grammar is overviewed. The original units and their translation equivalents are analyzed as for semantic cases agreement.

Key words: infinitive, non-finite form, semantic role, predicative construction.

Introduction. In the contemporary world translation is extremely significant as it enables people of different nations to understand one another. The main aim of the translation is to convey the content of the source text using meanings available in the target text. However, the structures of languages are not similar, so problems may occur. For example, English is an analytical language in which the grammatical relations between words are expressed by means of form words and word order. Ukrainian is a synthetic language and inflections convey grammatical relations [Kaushanskaya 2006: 11]. The system of verb forms for these languages also differs. Despite the fact that in Ukrainian such a non-finite form of the verb as the infinitive is present, its usage paradigm is not so wide. In English the infinitive may function as a part of the syntactic unit of a special kind. It is called the predicative complex. Such constructions cannot be found in Ukrainian but are commonly used in English. Scientists have discovered how to translate such syntactical units using means of Ukrainian.

Since the main task of the translation is to convey the content itself, it is worth investigating Ukrainian correspondents that reflect the semantic content of predicative constructions. For this purpose, as a tool was chosen the case grammar theory. This is a theory of structural linguistics created by Charles Fillmore. The object-matter of this research is for-to-infinitive constructions and their Ukrainian equivalents. The subject-matter is semantics specifics involved in the process of predicative complexes translation and interpretation. So the objective of this research is to evaluate the coincidence of semantic roles for nominal parts of English for-to-infinitive constructions and their Ukrainian equivalents.

The realization of this objective involves solving the following tasks:

- 1) to provide the characteristic features of for-to-infinitive constructions;
- 2) to give various aspects which determine the choice of the translation method;
- 3) to consider case grammar theory;
- 4) to build models of semantic cases matching and to give a semantic analysis of English predicative complexes and their Ukrainian equivalents.

The solution of the tasks requires the application of a number of methods. Among the main methods, determined by the specifics of the study is the method of vocabulary definitions analysis, complex analytical method, descriptive method, transformational method, quantitative methods. To establish grammatical and semantic equivalents in the process of meaning reconstruction of the source text, the method of translation transformations was used. To summarize the results of the analysis, the modeling method was used.

The materials of this research are the novel "The Martian" written by Andy Weir and its Ukrainian translation.

Discussion and results. All forms of verbs in the English language are divided into two groups: finite forms and non-finite forms. The latter cannot perform the syntactic function of a predicate, but non-finite forms which include the participle, the gerund and the infinitive form structures of secondary predication. In these structures, non-finite forms of the verb are in predicative relation to nominal components. All infinitive predicative complexes have their own specifics. As a part of for-to-Infinitive Construction, infinitive forms predicative relations with a noun in the common case or with a pronoun in the objective case preceded by the preposition for. This construction is used to emphasize that different doers relate to actions, expressed by finite and non-finite forms of the verb [Kachalova 2007:86].

Leading Ukrainian scientists in the field of the theory of translation Karaban W., Korunecz I. provide the most common translation means for complexes of this kind such as a bare infinitive, an infinitive clause with the preposition «щоб», a verb in a finite form and a subordinate clause. The method of translation is most often determined by the syntactic role that this construct performs in the English sentence [Korunecz 2003: 257]. In the novel "The Martian" 63 for-to-Infinitive Constructions were found. Most of them were translated according to the above principles.

Translation of units at any text level requires a lot of attention to the wide style context. Translation of fiction holds lots of difficulties, as the translator should not only convey the content but also create an appropriate artistic image. Vosresenska A. points out that Ukrainian equivalents are not always able to convey the stylistic shades of English infinitive formations. The researcher notes that for-to-Infinitive Constructions are translated into Ukrainian in fiction using the method of sentence division and compression. So that the tension of the English sentence may be conveyed in the most compressed form [Vosresenska].

However, the main objective of the translator is to convey the contents. It is rather difficult to compare the contents of syntactic units written in different languages. For this aim, one needs some universal theory, which may be used for both languages. The theory of case grammar serves this purpose. In the work "The Case for Case" Charles Fillmore described semantic roles that can be applied to any language [Fillmore 1981]. Semantic relations are established between a verb and its actants or arguments. Case grammar is based on the notion of a case which, unlike the traditional definition through the morphological form of a certain nominal paradigm, acquires primarily a meaningful interpretation and captures the specific roles of the actants or participants of the situation, which in the language description of this situation are presented in the form of special arguments of the predicate sentence [Kubryakova 1997: 11].

Semantic cases can be somehow expressed in any language, so if we consider them in no relations to the way of expression, then it can be noted that they are a certain universal system within meaning units. Deep cases in Fillmore's theory are categorized as a universal system in which the semantic roles of names (actants) are represented in relation to verbs (predicates) which in one particular language have one or another formal means of possible realizations.

Having analyzed nominal parts of for-to-Infinitive Construction and their Ukrainian translations, it is possible to identify such semantic models:

1. Benefactive in the source text, agent in the target text

"There was no way for me to get out without detaching the bedroom, and no way to attach and pressurize the bedroom without being inside the rover" [Weir 2011: 239]. – «Я не можу вийти, не відчинивши її, і не можу прикріпити й надути спальню, коли сам я не в планетоході» [Weir 2016: 304].

In the course of translation, there is a loss at the level of sense. The semantic meaning of the benefactive stresses the existence of some benefit, the usefulness of having something. As the benefactive transforms into the agent, the subject takes responsibility. The source text does not express this semantic

stress (compare: There was no way for me to get out – Я не можу вийти). In the English sentence, the person is completely exonerated from responsibility, lack of a way out is taken here as fundamental truth. In the Ukrainian equivalent, one can observe the modal verb that expresses an opportunity but physical inability to find a way out. As a result, we have semantic stratification of modality.

The replacement of syntactic roles in order to preserve the image is quite typical for fiction texts.

For a fiction text quite typical is the replacement of syntactic actants in order to preserve the image:

“The bedroom gives me enough space that I don’t feel cooped up, and the computer has plenty of shifty TV returns for me to enjoy” [Weir 2011: 256]. – «Місця в спальні достатньо, щоб не почуватися в ув’язненні, а в комп’ютері повно клятих серіалів, які передивляюся вже по другому разу» [Weir 2016: 325].

In the target text the agent is implied, however, it can be easily renewed due to verb personal ending.

2. Benefactive in the source text, patient in the target text

“It’s amazing how much red tape gets cut when everyone’s rooting for one man to survive” [Weir 2011: 342]. – «Просто диво, скільки правил можна обійти, коли всі навколо намагаються врятувати одну-єдину людину» [Weir 2016: 308].

In this model, there is also a kind of reinterpretation as the semantic role of the benefactive is absent, but the extent of this reinterpretation is smaller than in the previous model. The presence of some benefit is seen from the semantics of the full phrase.

3. Experiencer in the source text, agent in the target text

“It would endanger the MAV way too much for Lewis to allow it” [Weir 2011: 146]. – «Це занадто небезпечно для МЗА – Луїс нізачо б цього не допустила» [Weir 2016: 154].

The shift of the theme-rheme division is presented. The translator has transformed the English sentence with the structure of secondary predication into two simple semantic units. This equated the semantic stress of these syntactic parts.

4. Experiencer in the source text, benefactive in the target text

“They want to see if there were any avoidable mistakes that led you to being stranded” [Weir 2011: 134]. – «Хоче знати, чи не було у ваших діях помилок, які можна було б уникнути, щоб ти не залишився у пастці на Марсі» [Weir 2016: 171-172].

Benefactive in the target text adds the undesirability of the action.

5. Patient in the source text, patient in the target text

“Now I’m just waiting for the batteries to recharge” [Weir 2011: 90]. – «Залишилося дочекатися, поки зарядяться акумулятори» [Weir 2016: 93].

In the English sentence, two actions are presented, according to the semantic roles of nouns they can be schematically depicted as Agens1 Action + Patients1Action. In the Ukrainian equivalent of this sentence, the agent is eliminated: Agens0Action + Patiens+Action.

6. Complete elimination of all the semantic roles

“There is nothing for him to go around” [Weir 2011: 90]. – «Нема там чого оминати» [Weir 2016: 93].

In the source text nominal part of for-to-infinitive construction serves as the patient. In the target text, only the role of locative («там») is presented. Such a transformation can be described by specifics of literary translation, which is characterized by increased attention to the image and unrestricted equivalents.

Conclusions. After analyzing the semantic roles of for-to-Infinitive Construction and their Ukrainian translations, one can observe that deep cases of source sentences and target sentences do not coincide. We can conclude that the significant semantic stress of the predicative complex is concentrated in the syntactic structure itself. The transfer of the content of predicative structures in the Ukrainian language is carried out at the expense of lexical means. Further investigation in this field is crucially important as inventory procedures, applied to translation methods and techniques are the pledge of systematicity in the translation process.

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SPECIFICITIES OF DEFINING THE STATE IN THE FRAMEWORK OF MODERN REALITIES

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Abstract: The present paper concerns different approaches to defining the phenomenon of state depending on the historical and methodological frameworks. Special emphasis is made on the role of such concepts as force and authority in the issue of defining the state. Order as an important factor of assessing the state's activity has been analyzed.

Key words: authority, force, order, power, state.

The question connected with the conceptual-categorical apparatus, one way or another related to such a political phenomenon as the state, rises throughout the whole history of the existence of society. In different epochs we can find different in essence, structure and institutional design of the definition of the state, the models of its creation and maintenance, or approaches to studying it as a definite phenomenon.

This can be a "Platonic state", oriented to a strict vertical distribution of power. Or the "polis" in the understanding of Aristotle, where this very "state" (or rather it should be designated as a political organization that precedes the state, that is, "proto-state", known in antiquity as a politico-state political and organizational system) is a certain union of citizens who have specific formalized power distribution rights, and their commonality and practice of creating a "polis" is a derivative of the natural desire to communicate. This follows from Aristotle's definition of man as a "political being", focused on constant communication and dialogue.

During the Middle Ages, the state's understanding boils down to the antithesis "church-state", or "Lord-King", or, if one turns to Marcilia Paduan [2], it is about opposing the power of spiritual (auctoritas) and the power of the physical (potestas). These two definitions will form the basis of other well-known thinkers of the time and will continue to develop further down to Niccolo Makkiaveli, who views the state as a complicated structured organization of society with a rigid vertical of power and a constant dynamic build-up of confrontation between the "possessors of this power", that is, representatives of the ruling family (dynasty) and rapidly developing middle class of that time (merchants, artisans, noble commanders).

Naturally, we cannot fail to mention the development of the state's understanding in the period of the Enlightenment and the New Times. Fundamental work in this sense is still "Leviathan, or Matter, Form and Authority of the Church and Civil State" by Thomas Hobbes [3]. The main thesis of his understanding of the state is the following one: in order to avoid the "war of all against all," the state is formed by means of a treaty. The basis of this agreement is the delegation of their rights and opportunities to a particular sovereign, who has the highest management parameters. Or, simply saying: there is an apple tree to which a man comes. He is strong, he has no competitors, and he appropriates this apple tree (the appearance of private property). But over time, another competitor appears who is stronger than the first one and kills him, taking away the apple tree (this is how the war of all against everyone for private property, or for the property which could be "his", "personal"). This person receives an apple tree, and decides to increase the territory around it.

Accordingly, his property increases. The emergence of many such people with their own property stimulates a war between them in strength, where equality has no place. In order to avoid the destruction of all, they decide to elect the supreme body, an arbitrator who will direct them to the right track. So there is a sovereign – the highest "body" of leadership, possessing both institutional and legal power, and physical power. The ultimate sovereign is the state itself, because its laws are undeniable, its rules are unified, and its possibilities are unlimited (again, Thomas Hobbes should be recalled).

Further it is interesting to trace the connection with the work of Jean Bodin [1], where he introduces such a concept as the sovereignty of the state, and the notion of the state of J.-J. Rousseau who implemented this concept to the sovereignty of people. Bodin insisted that there is a state existing within its specific borders (in its territory). Rousseau wrote about the state as a form of the existence of "people's sovereignty", because the people in this case present a stable, irreplaceable system of complex relationships. Whereas the government (bureaucratic apparatus) elected by them is stimulated by only temporary necessities for maintaining the strength of the state and its proper functioning as a specific social institution (to use the modern language).

One cannot help mentioning a new interpretation of the existence of the state, represented by the French philosopher M. Foucault, who writes about the "state of corporal coercion." His biopolitics put forward a revolutionary thesis that the modern state is moving away from legitimate physical violence, that is, "power over life," and comes to legitimized "power over the body." This is explained by the creation of a disciplinary state that forms a new image of the state itself – not just as an instrument in the hands of society, but as a "Leviathan of modernity", able to coerce "corporally".

Definitely, there are many more approaches to understanding the state, but we have stopped at the most fundamental, from which all subsequent follow. Hence, there are theories about the origin of the state, approaches to understanding it as a separate institution, or a political phenomenon. A separate pillar here are representatives of the anthropological and linguistic understanding of the state, that is, researchers who are interested in the dynamics of changing the understanding of the words "state" and its derivatives in different languages and their influence on the political systems of specific states, or the socio-political situation.

But, it seems to us, the antithesis that was justified by Marsil Piduansky would continue to be of interest to us, and it further laid the foundation for the work of any other philosopher, sociologist, political scientist. It is about opposing "spiritual power" and "physical power". That is, we deal with such categories as "auctoritas" and "potestas". The first definition is the power of authority, the second is the power of physical coercion, the power of force and violence. The antithesis "authority / strength" formed the basis of all subsequent studies.

If we look at the process of democratization, we will be forced to turn to these concepts: what "power" (the level of legitimate violence) the authorities have and how "authority" interacts within the political system. If we are talking about a political regime, then we understand how power is established (by violence or authority), how it is replaced or transformed (legitimately or illegitimately), etc.

That is, the "authority / force" antithesis is the key parameter of the definition of the state as such – classical or modern. The state is a political organization, accordingly, it has a certain power. It seems to be all classic. The state is a form of organization of society, therefore, it has some authority on the basis of which this form is united and reproduced further. The state has mechanisms of governance and coercion, where the latter implies violence and the use of physical force.

But, there arises such an interesting question as what to do with such concept as "order"? On the one hand, the state supports this very order, and at the same time it is still a state from a legal, institutional and socio-political point of view. But there are practices when the state is not able to maintain internal order (Civil War in Syria, the emergence of the Islamic State in Iraq), but it remains the same state. The question here is that the physical power was used, and continues to be used regardless of the level of order in the state. But with the power of authority, the situation is more interesting. For, the fall of authority or its deligitimation leads to the emergence of an "anti-order", or an alternative order (depending on how both parties understand the legitimacy of their "order", and how it is perceived by surrounding actors).

Accordingly, authority in this context is not so much a separate parameter of power in the state, but an indicator of determining the capacity of the state as such. If the state through its institutions has authority, it is able to maintain order and form its own trajectory of existence. If this authority is violated due to various circumstances, that is, its "soft" deligitimation occurs, then social movements (uprisings, revolutions) and military conflicts (religious, ethnic, economic basis) arise, the state enters a political crisis. And as we know, a crisis in one of the spheres immediately contributes to the emergence of crises in other spheres - "domino rule", or the emergence of bifurcation points - break-up of the system, an action that contributes to the destruction of the entire system and its further transformation / destruction.

For example, the authority of Syrian President Bashar Assad was undermined by the fact that he could not cope with the situation around farmers. As we know, in Syria, farmers were one of the massive and influential clusters, since Syria is an agrarian country more than an industrial one. The sale of most of the grain abroad, the policy of abolishing subsidies and helping the farmers from the government and the authoritarian instruments of government have created conditions for social tension. The farmers' protests were brutally suppressed by the administrative-power resource, which caused the failure of the entire system. Consequence: the beginning of the civil war, the intervention of ISIL on the territory of Syria, the intervention of global actors (Russia, the United States, Iran, Saudi Arabia). The authority of power was undermined by the inactivity of these power bodies, which led to the de-legitimization of authority. The fall in the authority of the regime also affected the fall of the authority of the state. Certainly, many people can start talking about other reasons, among them the religious interests of various groups in Syria, the interest of geopolitical actors in the current situation, and the continuing attempts to establish some "Arab Caliphate" (referring to the religious and political confrontation between Shiites and Sunnis). All these are very real and obvious things. However, they have become consequences (derivatives), and not the beginning, not the specific point of bifurcation.

Thus, the antithesis "power / authority" is still a key parameter for determining both the state itself and its legal capacity. The state can be understood from various sides: social, institutional, economic ones. We can treat it within the framework of law and legitimacy, based on various criteria. However, it is hardly possible to deny the fact that the modern state still has its roots, described by many researchers in conceptual models, approaches and interpretations.

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LEXICAL INFLUENCE OF AMERICAN ENGLISH ON BRITISH ENGLISH

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Abstract. The main focus of the present paper is analyzing reciprocal comprehension between American and British English native speakers. Although American and British English are generally mutually intelligible, there are enough differences to cause misunderstandings in everyday life language. In spite of several research findings question still arise like who 'owned' and set the 'correct rules' for the English language. Is it the different forces operating in the UK and the USA influencing the emerging concept of a Standard English? The present study will be delving into these complex issues. The main reason for choosing this subject is that more references to immigration in the US and its influence onto the development of language made me explore the main issues.

Keywords: American and British English, analyzing, subject, development, language.

Introduction. British and American English are the reference norms for English as spoken, written and taught all over the world. Although most dialects of English used in the former British Empire outside North America and Australia are to various extents, based on British English, most of the countries concerned have developed their own unique dialects, particularly with respect to pronunciation, idioms and vocabulary. Chief among other English dialects are Canadian English, Australian English, which rank third and fourth in the number of native speakers. The main focus of the present study is to find out the lexical variations of US and British English and how they constantly influence each other.

Object – matter for research is gradual changes to accommodate the written and spoken language especially when they purify words from corruptions, improve the regular analogies of a language and illustrate, etymology, are not only proper, but indispensable.

Although linguists admit that the change in the British English language comes, nowadays, from the American continent, there are some questions that constantly trouble the minds of those interested: how great this influence is, what areas of vocabulary it affects, whether this influence is perceived as a kind of corruption or it is a normal change, and what predictions could be made for the future of the English language in the given circumstances [Algeo 2010 : 3].

Much research has already been done on US and British English Spelling differences, differences in grammar, vocabulary, pronunciation, accents etc. by numerous authors starting from Noah Webster in the

18th century to authors of the present decade like D. Barton who in an article “Potentially confusing and embarrassing Differences between American and British English” commented:

“I realize that perhaps a lifetime of watching American Television and a half hour speech is not adequate preparation for appreciating and coping with the differences between American and British speech”.

So it is obvious to say that the subject – matter for research is find out the answers to all the above questions, given our interest in the two main varieties of the English language, British English and American English.

Discussion and Results. ‘Lexical Influence of American English on British English’ is of most importance and begins by revealing the factors that favored the influence of American English on ‘world English’:

- America’s population and wealth;
- America’s magnitude of higher education and of publishing industry;
- the appeal of America’s popular culture on language and habits;

The data gathered as a result of research prove a twofold influence of American English on British English: on one hand, on the everyday vocabulary, namely food, clothes, family and home, entertainment and free-time activities, conversational words and phrases, expressions and euphemisms. On the other hand, in the case of the functional varieties, the American influence is present in the fields of computing, journalism, broadcasting (cinema, television and theatre; wireless and music), advertising and sales, politics and economics, travelling and transport [Crystal 2003: 42].

‘Extent of Influence of American English on British English’ has been grouped under several headings. The first one (Influence of American English on British English – fact or fiction?!) definitely proves, with relevant examples, that there is a twofold influence of American English on British English: on the everyday vocabulary and on the vocabulary of functional varieties. The reasons for this situation are listed next. Among the most important ones are [Fisher 1989: 7]:

- the great appreciation of the status of American institutions and a readiness to adopt American practices;
- the adoption of American inventions designed to relieve people of some everyday inconvenience: the passenger elevator, the escalator, the telephone, the phonograph, the air-brake, the cash register, the electric light, the fountainpen, the linotype, the box camera, the adding machine, the revolving door, the safety pin, the typewriter; the speeding up of ocean voyages between England and America;
- America’s fastest growing economy.

The result was a political, educational, economic, or artistic international gathering during which American words or phrases passed into the traditional standard of British English.

The study was based on the 247 words and phrases whose date of entry into the British English vocabulary is definitely specified. Consequently, we found that British English began to welcome Americanisms as early as the 17th century – 1 term, followed by another one in the 18th century, 63 in the 19th century, 178 in the 20th and only 4 in our century. All these figures demonstrate that the influence of American English on British English is not very significant at the level of the entire Standard English vocabulary inventory, especially if the following fact is taken into consideration: out of the 600,000 definitions included in ‘The Oxford English Dictionary’, second edition, about 30 percent only are native English, 40 percent French, and 15 percent Latin. A simple addition shows that it remains a percentage of 15 percent for all other influences from other Germanic or Roman languages and American English. Finally, in the ‘Influence of American English on British English – Corruption or Normal Change?!’ section, we were interested in finding out if this influence of American English on British English threatens in any way the future of the English language in the United Kingdom. The distribution of American words and phrases according to everyday and functional varieties vocabularies shows that the greatest number (480 versus 313) belongs to the latter one. This is a statistics which shouldn’t worry anyone as chances that words and phrases specific to this domain to pass to and remain in the basic word stock are very little. Furthermore, vocabulary of functional varieties is the norm for certain categories of people, whose number is relatively small in comparison to the mass of common people having nothing or very little in common with them. [Fisher 2001: 38].

Extending the analysis on the specific domains of everyday vocabulary, we underline the fact that the greatest influence is in the first place in the ‘people, behavior and social position’ section, with 94 entries, and second in the ‘euphemisms, idioms and conversational words and phrases’ one, with 78 entries, followed third by the ‘sport’ and ‘consumer society’ ones, with 35 entries each. ‘Family and home’ and ‘clothes and

accessories' have 20 entries each. Finally, the least affected domain is 'entertainment', with only 8 entries. Further on, the concern diminishes even more if we think that the complete adoption of a foreignism can be proved by the derivatives it produces. Thus, the research reveals a number of only 12 Americanisms which gave British English such terms, most of them belonging to the sphere of computing, which is perfectly justified by the place computers and everything related to them occupy in people's lives nowadays. All these figures add to our conclusion that most of the American influence on British English is a matter of fashion which springs out of people's desire to admire something or somebody that seems better, more powerful, and even more attractive. And one must not forget that fashions come and go and rarely leave behind something that is not of good quality and thus is bound to be adopted by everybody. This conclusion is sustained by the study on the characteristics of the borrowings: out of the 793 Americanisms listed in the article, at least 40 can be classified as unnecessary. The greatest number (20), is in the field of everyday vocabulary, followed by travelling and transport (10), broadcasting (5), politics and economics (2), journalism (2), and advertising and sales (1 only). Another interesting fact is that out of the 793 words and phrases, 81 have long existed in British English, but have acquired new meanings under the American influence. 7 terms belong to everyday vocabulary, 6 to computing, 36 to journalism, 11 to broadcasting, 1 to advertising and sales, 16 to politics and economics, and 4 to travelling and transport. Then again out of the 793 terms, 17 are revivals of old words and phrases due to American influence. Most of them belong to the field of travelling and transport (7), followed by everyday vocabulary and journalistic terms (4 terms each), and finally political and economic terms (2 terms each). This leads to the conclusion that in this last case the American influence on British English cannot be regarded as a matter of fashion anymore, but as a matter of necessity [Mencken 1921: 38]. The problem of the lack of appropriate terms for different fields of activity was solved by extension of meaning or revival of terms already at hand in British English vocabulary. So far, we established that the influence of American English on British English is not a matter of corruption, but of normal change, whether it is or not dictated by fashion or necessity [McCarten 2007: 21].

Conclusion. In sum up, the American and British varieties have influenced each other over the years, especially now that we are in the era of the Internet and in the era of globalization. English became an influential language, not primarily because of the number of people who spoke it, rather because of the power of the British Empire, which controlled large parts of the world. Conversely, since today the British Empire no longer exists, the significance of the English language comes from global influences. Nowadays, the fact that English plays a major role in business, science, politics and economics ensures its continued presence in the world.

Furthermore, the phenomenon of "soft globalization" expresses the dominance of English (particularly US English) culture, through the standard use of consumer items such as blue jeans and Coca Cola.

English being spoken by so many, leads to unification of the people and allows worldwide communication.

In fact, British English has adopted many American uses into everyday language and, some British terms are used in America. This can be justified by the influence of TV programs, the Hollywood industry and the information and communication technologies. For this reason, it may be seen that Interlingua false friendship may not exist for long. It is likely that the meanings of these words will one day merge, turning them into equivalent terms as a result of the different processes of semantic and language change. In the first quarter of the 21st century, there is evidence that these words have different meanings in both varieties. The mutual influence of both varieties on each other, and particularly, the 'Americanization' of British English is not restricted to the lexical component of the language; in fact, the influence of American English also affects English syntax to lesser extent, as is the case of modal auxiliaries, and these interlingua false friends are not exclusive of different varieties of English.

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HUMAN RIGHTS MECHANISMS

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Abstract. In the article attention is paid to the definition of human rights, their position in the international law and to human rights mechanisms which embody the international system of the promotion and protection of human rights.

Key words: human rights, international mechanisms, regional mechanisms, conventional mechanisms, extra-conventional mechanisms, supervisory mechanisms.

Introduction. Human rights are commonly understood as being those rights which are inherent to the human being. The concept of human rights acknowledges that every single human being is entitled to enjoy his or her human rights without distinction as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

Human rights are legally guaranteed by human rights law, protecting individuals and groups against actions which interfere with fundamental freedoms and human dignity. They are expressed in treaties, customary international law, bodies of principles and other sources of law.

Object matter is the social relationships which arise in the field of human rights regulation.

Subject matter is the mechanisms which protect human rights.

Objective is to study types of human rights mechanisms.

Discussion and Results. The formal expression of inherent human rights is through international human rights law. A series of international human rights treaties and other instruments have emerged since 1945 conferring legal form on inherent human rights. The creation of the United Nations provided an ideal forum for the development and adoption of international human rights mechanisms. Other mechanisms have been adopted at a regional level reflecting the particular human rights concerns of the region [1].

International human rights mechanisms include:

- The Human Rights Council of the United Nations General Assembly;
- The United Nations Commission on Human Rights;
- The United Nations Economic and Social Council;
- The Human Rights Committee;
- The United Nations High Commissioner for Human Rights;
- The United Nations High Commissioner for Refugees, etc [2].

A number of conventional mechanisms and extra-conventional mechanisms are in place to monitor the implementation of international human rights standards and to deal with complaints of human rights violations.

Conventional Mechanisms include:

- Committee on Economic, Social and Cultural Rights (monitors the implementation of the International Covenant on Economic, Social and Cultural Rights);
- Human Rights Committee (monitors the implementation of the International Covenant on Civil and Political Rights);
- Committee on the Elimination of Racial Discrimination (monitors the implementation of the International Convention for the Elimination of all Forms Racial Discrimination);
- Committee against Torture (monitors the implementation of the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment);
- Committee on the Elimination of Discrimination against Women (monitors the implementation of the Convention on the Elimination of All Forms of Discrimination against Women);
- Committee on the Rights of the Child (monitors the implementation of the Convention on the Rights of the Child).

Extra-Conventional Mechanisms include:

- Special Rapporteurs, Special representatives,
- Special envoys and Independent experts, Working groups – thematic or country (Urgent Actions);
- Complaints procedure 1503.

Conventional mechanisms refer to committees of independent experts established to monitor the implementation of international human rights treaties by States parties. By ratifying a treaty, States parties

willingly submit their domestic legal system, administrative procedures and other national practices to periodic review by the committees. These committees are often referred to as treaty-monitoring bodies (or “treaty bodies”).

In contrast, extra-conventional mechanisms refer to those mechanisms established by mandates emanating, not from treaties, but from resolutions of relevant United Nations legislative organs, such as the Commission on Human Rights or the General Assembly. Extra-conventional mechanisms may also be established by expert bodies, such as the Sub-Commission on the Promotion and Protection of Human Rights (formerly the Sub-Commission on Prevention of Discrimination and Protection of Minorities). They normally take the form of an independent expert or a working group and are often referred to as “special procedures” [1].

Regional human rights systems strengthen the protection and enjoyment of human rights by taking into account regional considerations, such as shared regional customs, values, culture, and practices.

When domestic institutions fail to uphold the law, or when they themselves are the violators of the law, it may be possible or necessary to seek redress beyond national boundaries. Regional legal frameworks give violated rights-holders the possibility of bringing their case in front of a regional mechanism, providing that the country in question is part of this framework, and providing that all national remedies have either been exhausted or deemed inefficient.

In addition, regional human rights institutions are often competent to monitor the implementation and enjoyment of the right to education, usually through report submission.

Regional human rights mechanisms include:

- The European Court of Human Rights;
- The European Committee of Social Rights;
- The African Commission on Human and Peoples’ Rights;
- The African Committee of Experts on the Rights and Welfare of the Child;
- The African Court on Human and Peoples’ Rights;
- The African Committee of Experts on the Rights and Welfare of the Child;
- The Inter-American Commission on Human Rights, the Arab Charter on Human Rights [4].

It should be mentioned that there are different procedures, which have been instituted at the international and regional levels to monitor compliance with human rights treaties.

When talking about procedures, it is pertinently to distinguish two types of supervisory mechanisms:

a) Treaty-based mechanisms: supervisory mechanisms enshrined in legally binding human rights instruments or conventions. Within the UN framework these mechanisms are often called “treaty bodies”, e.g., the Human Rights Committee and the Committee on the Rights of the Child. The African Commission and future Court of Justice and Human Rights, the European Court of Human Rights and the Inter-American Court and Commission of Human Rights are also treaty bodies.

b) Non-treaty based mechanisms: supervisory mechanisms not based on legally binding human rights treaty obligations. Generally, this type of mechanism is based on the constitution or charter of an intergovernmental human rights forum, or on decisions taken by the assembly or a representative body of the forum in question. Under the UN framework, the non-treaty-based mechanisms are referred to as “charter-based” mechanisms, which include the Human Rights Council 1503 procedure, the Universal Peer Review and “special procedures”. The European Commission against Racism and Intolerance under the Council of Europe is also an example of a regional non-treaty based mechanism [3].

The various supervisory procedures established in human rights treaties can be divided into four main groups:

- Reporting procedures
- Inter-state complaint procedure
- Individual complaint procedure
- Inquiries and other procedures

Conclusions. In conclusion, it should be noticed that there is a big system of international human rights mechanisms in the world. And the aim of all of them is to achieve the promotion of universal respect for and observance of human rights and fundamental freedoms.

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PART II. NATURAL SCIENCES

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URSACHEN DER ARSACHEN DER ALZHEIMER-KRANKHEIT

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Abstract: Die Alzheimer-Krankheit ist eine der häufigsten von diejenigen Krankheiten, die wesentlich Lebensweise und Kommunikation beeinflussen können. Heilbar ist die Alzheimer-Krankheit noch nicht, aber durch die richtige Therapie lässt sich ihr Verlauf verzögern. Darum ist es heutzutage aktuell den Ursachen auf den Grund zu kommen, weil neue Heilverfahren in diesem Fall erfolgreich zu entwickelt werden können und Patienten die Chance bekommen vollwertig zu leben.

Schlagwörter: Alzheimer-Krankheit, Demenz, Ursachen, Ablagerungen.

Einleitung

Was ist AK?

Die Alzheimer-Krankheit ist die häufigste Form der Demenz: Von den derzeit rund 1,6 Millionen an Demenz erkrankten Menschen leiden rund 2/3 an der Alzheimer-Krankheit. Das Risiko, an der Alzheimer-Krankheit oder einer anderen Demenzform zu erkranken, nimmt mit dem Alter zu. Die meisten an Demenz Erkrankten sind über 65 Jahre alt, aber bei Menschen deutlich unter 65 spielen andere Faktoren eine Rolle. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Die Alzheimer-Demenz ist eine langsam fortschreitende Hirnerkrankung, die mit einem zunehmenden Verfall der geistigen Fähigkeiten einhergeht. In der Folge treten Störungen des Gedächtnisses und des Verhaltens sowie Schwierigkeiten bei der Verrichtung alltäglicher Dinge auf. Fallen anfangs nur eine leichte Vergesslichkeit und leichte Wesensveränderungen auf, steigern sich die Krankheitsanzeichen im Laufe einiger Jahre derart, dass nicht einmal mehr die eigene Familie erkannt wird und der Patient selbst den Angehörigen immer fremder wird. Der Betroffene büßt zudem durch den geistigen Abbau immer mehr Selbstständigkeit ein und wird früher oder später zum Pflegefall. [Juraj Kukulja]

Die Anfälligkeit für Infektionen steigt auch, was zu Infektionskrankheiten führt, die die häufigste Todesursache bei der Alzheimer-Krankheit sind. [DAIzG]

Alzheimer und andere Formen von Demenz stellen Betroffene, Angehörige und professionelle Helferinnen und Helfer vor wichtige juristische und ethische Fragen. Denn die Demenz schränkt die Fähigkeit der Erkrankten ein, eigenständig zu denken, zu handeln und zu entscheiden. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Diskussion und Ergebnisse

Was passiert mit einem Organismus?

An Alzheimer erkrankten Menschen, in deren Gehirn nach und nach Nervenzellen absterben. Auch die Verbindungen zwischen den Zellen gehen verloren. Der für Alzheimer typische Verlust von Nervenzellen beginnt im sogenannten Riechhirn. Dann greift das Zellensterben allmählich auf jene Lappen über, die das Gedächtnis kontrollieren, und erfasst schließlich die gesamte Gehirnoberfläche. Das Gehirn kann auf diese Weise bis zu einem Fünftel seiner Masse einbüßen. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Neben dem Riechhirn ist auch ein tiefer liegender Teil des Gehirns schon früh betroffen: der Meynert-Basalkern. Er gehört zum zentralen Nervensystem und produziert Acetylcholin, das zur Übertragung von Informationen zwischen den Nervenzellen nötig ist. Schüttet der Basalkern zu wenig davon aus, stört das die Informationsverarbeitung: Der Betroffene kann Ereignisse, die kurze Zeit zurückliegen, kaum noch speichern. Das Kurzzeitgedächtnis schwindet. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Man unterscheidet drei Stadien davon.

Im frühen Krankheitsstadium (leichtgradige Demenz) stehen Beeinträchtigungen des Kurzzeitgedächtnisses im Vordergrund. Die Kranken erleben oft bewusst, dass sie etwas vergessen. Aus diesem Grund müssen Betroffene in diesem Krankheitsstadium an den Entscheidungen bezüglich ihrer Behandlung und Betreuung beteiligt werden. [DAIzG]

Schon bei mittelschwerer Demenz nehmen die Einschränkungen von Gedächtnis, Denkvermögen und Orientierungsfähigkeit allmählich zu und erreichen einen Grad, der die selbstständige Lebensführung

nicht mehr zulässt. Die Betroffenen brauchen zunehmend Hilfe bei einfachen Aufgaben des täglichen Lebens. [DALzG]

Im fortgeschrittenen Stadium (schwere Demenz) besteht ein hochgradiger geistiger Abbau, die Sprache beschränkt sich nur noch auf wenige Wörter oder versiegt ganz. Die Demenzkranken sind bei allen Verrichtungen des täglichen Lebens auf Hilfe angewiesen. [DALzG]

Warum das passiert?

Es gibt viele verschiedene Forschungen und Theorien, die Ursachen der Alzheimer-Krankheit erklären.

Eiweißablagerungen im Gehirn. Im Gehirn von Alzheimer-Patientinnen und -Patienten lassen sich stets bestimmte Ablagerungen nachweisen. Diese Ablagerungen finden sich sowohl in den Nervenzellen als auch in den Zwischenräumen und bestehen aus krankhaftem Eiweiß, das im Gehirn nicht richtig abgebaut wird. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Die Ablagerungen können zwei Typen sein.

Eine sind faserförmig in den Zellen und heißen Neurofibrillenbündel. Die Ablagerungen in den Zwischenräumen hat ihr Entdecker, Dr. Alois Alzheimer Plaques genannt. Die Plaques wirken wie Gift: Sie stören den Stoffwechsel der Nervenzellen, sodass diese nicht mehr wie früher miteinander kommunizieren können. Deshalb nimmt die geistige Leistungsfähigkeit betroffener Menschen ab.

Warum sammeln sie sich an?

Das glymphatische System ist ein spezieller Mikrokreislauf im Gehirn und Rückenmark zur Ausschwemmung von überflüssigem und schädlichem Material, und wurde nachgewiesen, dass dieses System eine Schlüsselrolle bei der Entstehung der AK – und möglicherweise auch bei zukünftiger Vorbeugung und Behandlung – spielt. [Tarasoff-Conway, Carare und andere 2015: 457–470]

Ablagerungen von Beta-Amyloiden, so genannte Senile Plaques, im Zellzwischenraum werden durch das glymphatische System abtransportiert [Iliff, Chen, Plog, Zeppenfeld, Soltero und andere 2014: 16180–16193]. Bei Mäusen war der Abtransport der Beta-Amyloiden während des Schlafs doppelt so schnell wie während der Wachphasen. Dies wurde in Verbindung gebracht mit dem erhöhten Risiko von Personen mit Schlafstörungen, an Alzheimer zu erkranken. [Tarasoff-Conway, Carare und andere 2015: 457–470]

Auch die Zunahme des Erkrankungsrisikos im Alter wurde in Verbindung gebracht mit dem entsprechenden, altersbedingten Leistungsabfall des glymphatischen Systems [Tarasoff-Conway, Carare und andere 2015: 457–470]. Bestimmte pathogene, für Alzheimer charakteristische, Formen von Tau-Proteinen werden ebenfalls durch das glymphatische System aus dem Zellzwischenraum abtransportiert [Iliff, Chen, Plog, Zeppenfeld, Soltero und andere 2014: 16180–16193].

Woher kommen sie? Das Amyloid- β -Protein ($A\beta$) Protein spielt eine entscheidende Rolle in der Pathogenese der Alzheimer-Krankheit [X-L Bu, Y Xiang, W-S Jin, J Wang, L-L Shen, Z-L Huang und andere 2017].

Seit vielen Jahren wurde es angenommen, dass $A\beta$, das im Gehirn abgelagert wird, aus dem Gehirngewebe selbst stammt. Aber die letzte Forschung ist gezeigt, dass $A\beta$ jedoch sowohl im Gehirn als auch in den peripheren Geweben erzeugt wird. [X-L Bu, Y Xiang, W-S Jin, J Wang, L-L Shen, Z-L Huang und andere 2017]

In dieser Studie wird Verwendung eines Parabiosemodells zwischen APP^{swe} / PS1^{dE9}-transgenen AD-Mäusen und ihren Wildtyp-Wurfgeschwistern beobachtet, dass das menschliche $A\beta$, das von transgenen AK-Modellmäusen stammt, in den Kreislauf gelangt und sich in den Gehirnen von Wildtypmäusen ansammelt bildeten nach 12 Monaten Parabiose eine zerebrale Amyloidangiopathie und $A\beta$ -Plaques. AK-Typ-Pathologien, die mit der Neurodegeneration, Neuroinflammation und Mikrohämmorrhagie in Zusammenhang stehen, wurden in den Gehirnen der Parabiose-Wildtyp-Mäuse gefunden. [X-L Bu, Y Xiang, W-S Jin, J Wang, L-L Shen, Z-L Huang und andere 2017]

Erhöhtes Risiko bei Verwandten. Knapp ein Drittel aller Alzheimer-Patienten und Patientinnen ist eng mit jemandem verwandt, der ebenfalls erkrankt war oder ist. Alzheimer tritt also in einigen Familien gehäuft auf. Statistisch gesehen haben die Geschwister und Kinder von Alzheimer-Kranken ein bis zu vier Mal höheres Alzheimer-Risiko als andere Menschen. Aber muss es auch im Betracht nehmen, dass je später ein Mensch erkrankt, desto niedriger ist das Risiko der Verwandten. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Genetische Faktoren bei Alzheimer. Manche Familien sind mehr von Alzheimer betroffen als andere. Das legt nahe, dass es erbliche Ursachen gibt. Und tatsächlich haben Forscher Gene gefunden, die Alzheimer begünstigen. Das sogenannte Epsilon-4-Allel beispielsweise findet sich bei bis zu 40 Prozent der

Alzheimer-Kranken und nur bei 10 Prozent der gesunden Bevölkerung. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Darüber hinaus wurden kausale Mutationen in drei verschiedenen Genen gefunden (Präsenilin-1 und -2 und Amyloid-Precursor-Protein (APP, Amyloid-Vorläuferprotein)), die als Auslöser der seltenen früh auftretenden Unterform gelten. Die Veränderungen in allen drei Genen führen dazu, dass sich früher als bei der nichterblichen-sporadischen Form große Mengen von Beta-Amyloid zunächst im Assoziationscortex und im Hippocampus und später im gesamten Gehirn anhäufen. [Demenz vom Alzheimer-Typ (DAT)]

Familienalzheimer. Es gibt eine genetische Komponente in der Verursachung der Alzheimer-Krankheit. Etwa fünf bis zehn Prozent der Betroffenen zeigen eine familiäre Häufung (Familial Alzheimer Disease (FAD)), die auf Mutationen des Präsenilin-1-Gens (PSEN1) auf Chromosom 14, des Präsenilin-2-Gens (PSEN2) auf Chromosom 1 oder des APP-Gens auf Chromosom 21 zurückzuführen sind, die als Auslöser der seltenen früh auftretenden Unterform gelten. [Lopera, Ardilla 1997: 793–799]

Eine Punktmutation führt zu einem Aminosäureaustausch von Glutaminsäure zu Alanin im Genprodukt, was für ein gehäuftes Auftreten von FAD im kolumbianischen Departamento de Antioquia verantwortlich ist. [Lopera, Ardilla 1997: 793–799]

Prävention. Es gibt zahlreiche Faktoren, die Demenzerkrankungen begünstigen. Dazu zählen erhöhte Cholesterinwerte, Übergewicht und zu hoher Blutdruck. Auch Raucherinnen und Raucher sind mehr gefährdet als andere. Eine wesentliche Rolle bei der Vorbeugung spielen eine ausgewogene Ernährung und regelmäßige Bewegung. Genauso wichtig ist es aber, neben Ausbildung und Beruf Hobbys nachzugehen und den Kontakt zu anderen Menschen zu suchen. Denn das menschliche Gehirn braucht Reize und Anstöße, um leistungsfähig zu werden und zu bleiben. Zahlreiche wissenschaftliche Studien haben gezeigt, dass körperlich fitte und geistig rege Menschen seltener demenzkrank werden. [Bundesamt für Familie und zivilgesellschaftliche Aufgaben]

Heilung. Die Alzheimer-Krankheit kann derzeit nicht geheilt werden. Die positive Wirkung der derzeit zur Demenzbehandlung zugelassenen Medikamente auf bestehende Symptome ist nur relativ gering, sie können das Voranschreiten der Erkrankung nicht stoppen. [Cramer, Cirrito 2012: 1503–1506]

Schlussfolgerungen

Aus oben angeführten Tatsachen kann man zusammenfassen, dass die Alzheimer-Krankheit ziemlich häufig für ältere Personen ist, aber trotzdem bleibt sie unheilbar. Heutzutage werden die neuen Fakten entdeckt, die die Erscheinung der AK erklären und für Heilung benutzt werden können.

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УДК 594

ANTARCTIC LIMPET *NACELLA CONCINNA* IN THE COASTAL WATERS OF THE ARGENTINE ISLANDS ARCHIPELAGO

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Abstract. Antarctic limpet *Nacella concinna* (Gastropoda; Nacellidae) is the most widespread Antarctic species. According to literature, there are two morphotypes of this mollusk: littoral - with high sharp-edged dense shell (lives at a depth of up to 4 m), and sublittoral with flattened wide, lightweight shell (lives at a depth of 4-110 m). However, there is no information on the distribution of the *N. concinna* in the water area of Argentine Islands. The aim of the research is to clarify the distribution and species status of *N. concinna* in this region of the UAS "Academik Vernadsky".

Key words: *Nacella concinna*, Gastropoda, Antarctic limpet, West Antarctica

Antarctic limpet *Nacella concinna* (Gastropoda; Nacellidae) is one of the common, widespread, successful and numerous species of mollusks of local fauna. The size of the shell is up to 6 cm, but deep-water species are usually smaller. The shape of the shell is conical with 30 radial edges and a series of thin concentric lines that indicate annual growth rings. [Picken 1980: 10] The color of the shell has different shades - from pale brown to gray, and the inner surface is dark purple-brown (in deep-water specimens) and cream-brown (in shallow water samples). The mantle edges contain short tentacles.

The Antarctic limpet inhabits the Scotia Sea between Tierra del Fuego and the Antarctic Peninsula, where are located different islands such as the South Georgia Islands, the South Orkney Islands, the South Shetland Islands, the Anvers Island, the Petermann Island, Galindez Island and others. *N. concinna* lives in a depth range of up to 935 meters, but most specimens live in shallow water. The animal moves on rocks and soft substrates, feeds on algae, life expectancy - up to 60 years. The Antarctic limpet is a dioecious species. Spawning occurs during the spring algal bloom. Mature individuals often synchronize their spawning and form spawning groups of up to 35 individuals, which can be kept for about a week or even more. [Gonzales-Wevar 2011: 2]

There are two morphotypes of *N. concinna*: one lives on the littoral, and the other - in the shallow part of the sublittoral. The littoral morphotype has a higher pointed shape and its shell is heavy, dense. In addition, it has pronounced radial ribs, while the sublittoral specimens usually with smoother shell surface. Littoral specimens has an average of 20% less biomass (dry weight) compared with the sublittoral limpet of a similar volume of the shell.

The sublittoral morphotype has a light and flattened shell, as well as a lower and broader shell than the littoral morphotype. It lives at a depth of 4-110 m. [Beaumont 1991; Davenport 1988; Aranzamendi 2010]

Comparing the two morphotypes of *N. concinna*, morphological differences of the shells are observed. Endolithic alga infection in the shells of sublittoral morphotype significantly influences the density of the shells and the overall level of chlorophyll in the shells. The surface shell architecture of the sublittoral morphotype contains a series of furrows that are very similar to the radula of *N. concinna*. [Nolan 1991: 5]

The littoral morphotype of *N. concinna* is a migratory species: it lives in the shallow waters in the summer, and in the autumn it moves to the shallow part of the sublittoral, i.e. it migrates to depth with a significant decrease in temperature. In spring, the mollusk returns to the littoral. In winter, two morphotypes of limpet are in a mixed population. Migration of the littoral limpet to the sublittoral is associated with a decrease in temperature, an increase in wave activity, an increase in bird predation and the formation of ice on the littoral zone. [Clarke 2004; Brethes 1994; Walker 1972]

In connection with the foregoing, it can be noted that, the structure of the Antarctic limpet population and its distribution relative to depths and relief have not been sufficiently studied in the water area of the Akademik Vernadsky Station. Previous studies of the distribution and morphology of *N. concinna* in the vicinity of the Akademik Vernadsky Station have shown other pattern of morphotypes and its distribution on

the seabed. [Kushnir 2015; Utevsky 2015] These studies are of scientific interest and are of great importance for highlighting the completeness of scientific data for this region.

It is planned to study the structure of *N. concinna* population from various sites of underwater landscapes, taking into account the isolation, the structure of the underwater landscape, the size and shape of the shell, the genetic structure using modern GIS technologies. Make conclusions about the taxonomic status of the detected morphotypes.

To achieve this goal, the following **tasks** should be solved in the future:

1. To study the distribution of *N. concinna* at different depths and landscapes using modern GIS technologies (ArcGIS), exactly to construct cartographic and 3D-models of the *N. concinna* distribution, taking into account the landscape, currents, isolation and other geographic characteristics of the region, as well as the size and shell shape of mollusks and their features of feeding.

2. To study morphological features of mollusk populations from different islands and selected morphotypes; to identify systematic features; to construct models of growth from different islands and landscapes (correlation analysis, factor analysis, discriminant analysis).

3. To study the genetic features of the *N. concinna* morphotypes and their distribution on the islands and underwater landscapes of the Argentine Islands Archipelago by phylogeographic analysis.

4. To study the microflora of *N. concinna* soft tissues, and its connections with geographical distribution, distribution in depths and underwater landscapes.

Genetic, statistical, geoinformation and microbiological **methods** will be used to solve the tasks above.

Expected results. Cartographic models of *N. concinna* distribution with genetic and microbiological characteristics of two morphotypes in the area of the Akademik Vernadsky Station.

Scientific novelty. New data on the distribution of the Antarctic limpet, taking into account the landscape, currents, isolation and other geographical characteristics of the region.

Practical significance. Atlases of *N. concinna* distribution in the area of the Akademik Vernadsky Station.

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MODERN METHODS OF MALIGNANT BRAIN TUMOR TREATMENT

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Abstract: The article deals with clinical aspects of malignant brain tumors. The methods of malignant brain tumors detection are analyzed. The paper studies the kinds of malignant brain tumors. The criteria of determining different stages of the disease are analyzed. It is found in the paper that the knowledge of genetic and biological characteristics of malignant brain tumors result in improving treatment of the patient.

Key words: grades of tumor, therapy methods, palliative care.

Introduction. The problem of malignant brain tumors continues to be quite relevant and complex despite the success in the field of diagnosis and treatment of neoplasms in general. According to statistics, the incidence of brain tumors (neoplasia) is approximately 1.5%, more often they are registered among children. Among adults, the age of the patients is 20-50 years old, and men more often get ill. Children have neoplasms of the central nervous system, occupying second place in frequency, after leukemia (tumors of hematopoietic tissues). Gliomas and congenital variants of neoplasia are the most common varieties neoplasms. In addition to glioma, adults have vascular tumors (meningiomas, secondary, metastatic nodes).

Objective of the paper is to investigate the current approach to the treatment of malignant tumor of the brain patients. **Subject-matter** involves of malignant tumor of the brain causes, methods of treatment. **Object-matter** of the research is classifying malignant tumor of the brain types. **The tasks** are to clarify the cause of malignant tumor of the brain. **Materials** used are scientific articles from e-resources and medicine journals, investigating subject-matter. **Methods** of research enhanced imaging tests, biomarkers, immunotherapy, oncolytic virus therapy, blood-brain barrier disruption, new drugs and combinations of drugs, genetic research, palliative care, radiofrequency thermal ablation (RFA), gene therapy, photodynamic therapy, proton therapy.

Discussion. According to experts from 6 to 9 thousand new cases of malignant brain tumors are detected annually in Ukraine. The person, not receiving treatment, perishes within several months.

Cancer of the brain is recognized by the world's experts as one of the most aggressive forms of oncological diseases.

Brain cancer is a disease of the brain in which cancer cells (malignant cells) arise in the brain tissue. Cancer cells grow to form a mass of cancer tissue (tumor) that interferes with brain functions such as muscle control, sensation, memory, and other normal body functions. Tumors composed of cancer cells are called malignant tumors, and those composed of mainly noncancerous cells are called benign tumors. Cancer cells that develop from brain tissue are called primary brain tumors while tumors that spread from other body sites to the brain are termed metastatic or secondary brain tumors.

According to recent investigations, not all brain tumors are alike, even if they arise from the same type of brain tissue. Tumors are assigned a grade depending on how the cells in the tumor appear microscopically. The grade also provides insight as to the cell's growth rate. NCI lists the following grades from benign to most aggressive (grade IV):

- Grade I: The tissue is benign. The cells look nearly like normal brain cells, and they grow slowly.
- Grade II: The tissue is malignant. The cells look less like normal cells than do the cells in a grade I tumor.
- Grade III: The malignant tissue has cells that look very different from normal cells. The abnormal cells are actively growing and have a distinctly abnormal appearance (anaplastic).
- Grade IV: The malignant tissue has cells that look most abnormal and tend to grow quickly.

It should be mentioned about 80% of malignant primary brain tumors are known collectively as gliomas. However, astrocytomas account for about 60% of all malignant primary brain tumors.

The research proves that, especially if they are found early, although eliminating the cancer is the primary goal of treatment, preserving the function of the nearby nerves, organs, and tissues is also very important. When planning treatment, doctors consider how treatment might affect a person's quality of life, such as how a person feels, looks, talks, eats, and breathes.

The research makes best attempt to learn more about brain tumors, ways to prevent them, to treat them, and to provide the best care to people diagnosed with a brain tumor.

The topics discussed are especially relevant for the citizens of Ukraine. 2265 (1100 in women and 1165 in men), with an annual death rate of 1621 (733 in women and 888 in men). 54% of patients whose disease was diagnosed for the first time did not survive after the diagnosis was completed [*Malignant formation*].

Breakthrough has appeared in recent years in this field, and the life expectancy of people with brain tumors has increased at times.

Much prominence is given to new approaches to treating of brain cancer. The following areas of research may include new treatment options for patients through clinical therapies.

Let's examine some of them.

New techniques for imaging scans are being investigation (enhanced imaging tests), that would help better track the treatment and for possible tumor recurrence or growth.

Researchers are examining biomarkers to diagnose a brain tumor and estimate a patient's prognosis.

Immunotherapy, also called biological response modifier (BRM) therapy, is designed to boost the body's natural defenses to fight the cancer. It uses materials either made by the body or in a laboratory to improve, target, or restore immune system function. Different methods are being studied for brain tumors, such as the use of dendritic cells or the use of vaccines aimed against a specific molecule on the surface of the tumor cells. Several methods are currently being tested in clinical trials.

Oncolytic virus therapy uses a virus that infects and destroys tumor cells, sparing healthy brain cells. It is currently being researched as a treatment for brain tumors.

Blood-brain barrier disruption. This technique temporarily disrupts the brain's natural protective barrier in order to allow chemotherapy to more easily enter the brain from the bloodstream [Groothuis 2000].

Researchers are looking at using drugs currently used for other types of cancer as treatment for a brain tumor. In addition, combinations of drugs that target different pathways a tumor uses to grow and spread are being explored. Since tumors can develop resistance to chemotherapy, meaning the treatment stops working, another approach is to use a treatment that targets how tumor cells develop resistance.

Much attention should be paid to genetic research to learn more about mutations of specific genes and their influence on the growth of brain tumors. In particular, the Cancer Genome Atlas Research Network is ongoing effort by the National Institutes of Health to find out more about the link between genetics and glioblastoma. Recent results include the discovery of 3 specific genetic mutations not previously linked to glioblastoma: NF1, ERBB2, and PIK3R1. Other findings focused on the involvement of the MGMT gene and mutations of IDH gene. This information is useful for diagnosis and treatment of this type of brain tumor. Precise medicine approaches that target tumor-specific mutations are being explored. Although gene therapy is relatively new, it appears to show promise in treating head cancer.

Palliative care. Clinical trials are underway to find better ways of reducing symptoms and side effects of current brain tumor treatments to improve patients' comfort and quality of life.

Radiofrequency thermal ablation is a minimally invasive treatment option that applies heat to the tumor to destroy cancer cells. It is usually used to treat a localized tumor that cannot be removed by surgery [Stupp, Hegi, Gilbert 2007].

Photodynamic therapy. In photodynamic therapy, a light-sensitive substance is injected into the tumor that stays longer in cancer cells than in healthy cells. A laser is then directed at the tumor and destroys the cancer cells. The long-term effects of photodynamic therapy are still being studied [Stupp, Hegi, Gilbert 2007].

Proton therapy. Proton therapy can be added to a treatment plan to reduce the damage done to healthy tissue. This technique may help protect important structures in the head, such as the brainstem and the optic nerves that run to the eyes, when used for nasopharyngeal cancer, chordoma, or chondrosarcoma [Stupp, Hegi, Gilbert 2007].

Since the advent of new technology and capabilities for boost the body's natural defenses to fight the cancer, side effects of current brain tumor treatments to improve patients' comfort and quality of life, for reduce the damage done to healthy tissue recent molecular studies on brain tumors have begun to reveal the vast diversity of genetic and epigenetic alterations that exist between brain tumors. Thus, it was critical that molecular data be integrated into traditional histopathology approaches to reclassify brain tumor types more effectively.

Result. The research has revealed that the treatment of patients diagnosed with cancer is the most difficult goal. The decisive factor in the effective treatment of brain cancer should be using new methods of gene therapy, palliative care, photodynamic therapy, proton therapy. These methods reduce the damage done

to healthy tissue. Besides, the updated classifications will help to provide more accurate analysis and understanding of experimental studies in the lab, as well as better interpretation of population-based disease trends that may help identify causes and risk factors.

Conclusions. Considering the mentioned facts, we can assume that recent discoveries in medicine, coupled with advances in biotechnology, have led to enormous progress in the treatment of patients with malignant brain tumors. The development of more effective methods of therapies would give the opportunity to extend life to the patients who have a very poor prognosis.

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УДК 911+556.36

ARTIFICIAL HYDROGEOLOGICAL WINDOWS IN EASTERN UKRAINE

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Abstract. A new method to determine deposits of artificial hydrogeological “windows” in the roof and the base of aquifer has been described. The factor analysis of aquifer’s underground water chemical composition is proposed. Such “windows” are useful in determination of the aquifer pollution origin.

Key words. aquifer, water supply, deposits, pollution, artificial windows.

Introduction. Buchak-Kanev aquifer is widely developed within the north-eastern part of Ukraine and is its main source of water supply. It is intensively used in the city of Kharkiv, Poltava, Sumy and practically in all rural settlements. This aquifer is also used for water supply of industrial facilities and drilling in the extraction of oil and gas.

Within the northeast of Ukraine, Buchak-Kanev aquifer is reliably protected from pollution in natural conditions, because the regional waterproof of Kyiv sediments and a thick stratum of marl and chalk deposits inhibit the hydraulic connection of this aquifer with overlying and underlying aquifers and complexes.

As a result of prolonged and intensive operation of the horizon, the hydrostatic head has now been reduced by 10-20 m, chemical composition changes, and groundwater often becomes polluted.

The subject - matter of the research is Buchak-Kanev aquifer.

Analysis of previous studies. Many researchers (F.A. Rudenko, I.G. Sukhno, V.M. Shestopalov, K.N. Varava, G.N. Negoda, and others) studied this aquifer in natural and disturbed conditions [1, 2, 3, 4, 5]. According to their data, the water-bearing rocks of Buchak and Kanev suites are gray, greenish-gray fine, heterogeneous grains.

The supply of the aquifer occurs in places where the sediments are deposited on the surface, as well as in places where the waters of the underlying aquifers are discharged.

In recent years, a number of works dealing with general conditions of Bučak-Kanev aquifer pollution have been published by N.Ye. Zhuravel, A.V. Vasiliev and P.V. Klochko [6, 7, 8].

Purpose of the research

The aim of the work is to study such phenomenon as artificial hydrogeological windows of Buchak-Kanev aquifer. In our opinion, its pollution in the first place could occur and occurs through artificial hydrogeological windows in the roof and base of this aquifer.

Under artificial hydrogeological windows are the shafts of old water intake wells, old and emergency gas and oil wells and emergency wells used to maintain reservoir pressure and burial of associated commercial waters [10].

Methods and materials. To determine the location of artificial hydrogeological windows, we suggest using a factor analysis of chemical composition of groundwater in Buchak-Kanev aquifer.

In 1962, as a result of the accident at well No. 35 at a depth of 2315 m, a powerful outburst of oil and gas-water mixture occurred. After some time, the well 65 began to flow in. At the site of the well, a crater with a saline reservoir in the central part was formed. For almost two months the brines of the carbon were supplied to the aquifers and complexes of the upper hydrogeological floor.

In 1997, in four wells operating in Buchak-Kanev aquifer at Kachanovske oil field, the MPC was exceeded for individual hydrochemical components.

Using the principal components method (R-modification of the factor analysis), it was determined that there are five factors in the region of the location of the Kachanovske oil field, the weight of which is more than 10%, and they contain chemical elements with bond strength greater than 0.2.

The first three factors contain the main elements characteristic of groundwater of the lower hydrogeological floor, in particular the brines of the carbon.

To determine the distribution of these factors on the territory of the district, the Q-modifications of the factor analysis determined the loads of each factor for all wells. Distribution of these factors value made it possible to establish intersection of the first three factors in the vicinity region of crater of emergency wells No. 35 and 65.

This indicates the contamination of groundwater in Buchak-Kanev aquifer by brine carbon.

Discussion and results. Under the same scheme, the results of chemical analyzes of groundwater in Buchak-Kanev aquifer in the location of Glinsky, Andriyashovsky, Perekopov and Anastasivsky oil and gas-condensate fields were also processed. The initial data table contained the same elements for 16 wells operating in Buchak-Kanev aquifer.

The effect of four factors has been determined, their weight being more than 10%, containing chemical elements whose binding force is greater than 0.2.

Based on the results of the obtained factors distribution on the area of the research, it was possible to establish that the same factors cross the territory of the Glinske field in the vicinity of emergency wells crater at Kachanovske field.

Consequently, by analogy with Kachanovske field, at Glinsky deposit, there is, at least, one artificial hydrogeological window. This could be an emergency or an old liquidated oil well that was used to maintain reservoir pressure through which Buchak-Kaniv aquifer was contaminated with mineralized waters.

Calculations have shown that mineralized waters can cause local salinization of the aquifer, and volley discharge into the aquifer of the same amount of water-oil mixture can lead to oil contamination of groundwater over a much larger area. The front of oil pollution can advance 1.0-1.5 km from the emergency well.

Peculiarities of water migration with increased density in fresh water were studied by N.E. Zhuravel, A.N. Vasiliev, P.V. Klochko, and others. In their opinion, contamination of aquifers in oil fields is associated with inter-fluid flows along the annular space behind the column and violation of the operating and injection columns tightness in case of accidents. The negative effects in both cases are similar. The nature of accidents in the wells is determined by the technical state of the production columns, which in turn depends on the duration of the well operation, the efficiency of the anodic and inhibitor protection, timeliness of detection and elimination of the overflow or non-tightness of the column.

The time of non-tightness detection of production columns, even if all the technological requirements are met, can range from several hours to one month. On average, a reservoir is depressurized in 2 wells during a year, the theoretical leakage of reservoir fluids due to one such case is estimated at 5-10 m³.

With a prolonged outflow of the water-oil mixture from the emergency production well contamination of the underground waters of Buchak-Kaniv aquifer may be possible in a much larger area.

Conclusions. The results of factor analysis cannot be considered final due to the consideration of a limited number of data on the chemical composition of groundwater in Buchak-Kanev aquifer. To confirm these results, you need to enter additional data. When confirming the results, using the same methodology, it is necessary to carry out research on the entire territory of DDV, especially within the old oil and oil and gas condensate fields. This will reveal unknown artificial hydrogeological windows and take measures to protect Buchak-Kanev aquifer from pollution.

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УДК 504

THE ECOSYSTEM OF THE GREAT BARRIER REEF
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Abstract: in connection with the unreasonable activities of people with persons on land, important for the entire living ecosystem are disappearing. The basis of the article is a description and factual evidence of a negative change in the environment, on the example of the Great Barrier Reef. The article also mentions a number of conditions for the formation of buildings of coral polyps, the description of some endemics of the Great Barrier Reef and the possibilities of this ecosystem.

Key words: global warming, environmental pollution, ecosystem, people and nature.

The Great Barrier Reef is the largest ecosystem in the world. This natural object can be seen from the space. The structure of the reef is formed of billions of tiny organisms known to science as coral polyps. Reef-forming corals can develop only in warm, shallow, transparent sea water. Most of its geological history, Australia was too cold for corals to exist in its coastal waters. However, about 65 million years ago, at the end of the Cretaceous, this continent, having split off from Antarctica, began to move to the north. When the surface of Antarctica was formed in ruins, the sea level on Earth dropped by about 100 meters. The movement of Australia in the tropics, depending on sea level, which led to the emergence of the north-eastern coast of the conditions necessary for the formation of coral reefs.

The Great Barrier Reef supports the life of a huge variety of living organisms and thanks to this, in 1981, UNESCO was selected as a World Heritage Site.

About 1,500 species of marine fish live on the Great Barrier Reef. The number of only massively occurring species of true reef fish is about 500. The largest fish on earth, the whale shark, a lot of species of parrot fish, kuzovka, butterfly fish, moray eels and many others, live here.

Here there are more than 400 species of corals. Most of them belong to the hard corals - mushroom corals, coral brainstem and so-called "deer horns". Coloring of these corals can be from red to dark yellow. There are soft corals, in which the limestone skeleton is absent, instead of it in their tissues there are small, solid crystalline structures called sclerites. Gorgonarians (Gorgonacea), which apart from sclerites, also have a secondary skeleton of a solid and flexible substance - the gorgonin. Most of the gorgonians of the Great Barrier Reef are distinguished by a bright color, which is explained by the presence of pigments in their tissues. The most common colors are yellow, various shades of red, from orange to brown, sometimes white, lilac-purple

In the waters around the reef, there are several species of whales, as well as many dolphins. The waters around the reef are a breeding zone for whale-humpback whales, which can often be seen here from June to August. The islands of the South Reef are a breeding place for sea turtles. In the reef waters, six of the seven species are found, and all of them are endangered.

There is also a huge number of crustaceans, mollusks, octopuses and squid. Even a small reef gives shelter to about a hundred different types of shrimp and crabs. Meeting here and deadly dangerous for human blue-eyed octopuses (*Hapalochlaena*), whose dimensions do not exceed 15 cm.

In addition to all possible inhabitants of the sea, the Great Barrier Reef gives shelter to more than 240 species of birds. Continental islands are nesting sites for huge bird colonies, where petrels, phaetons, frigates and various terns fly together. On the reef there are also the white-headed eagle and the osprey.

The ecosystem of the coral reef is very vulnerable, due to the fact that special conditions are necessary for coral growth. The water temperature should not be below 17.5 ° C (ideal temperature 22-27° C).

The main enemies of corals of the barrier reef is the starfish "The Thorn Crown" (*Acanthaster planci*). In the early 1980s, these predators caused severe devastation on the Great Barrier Reef. Tropical hurricanes cause tremendous damage to the delicate balance of coral reefs.

All these are natural enemies of the reefs. But the main damage is done by people. Recently, talk about global warming has become more frequent, many people do not believe in it, because they can't feel such a small but stable increase in temperature. But who is not the biggest in the world, as a process of discoloration. This process is one of the most common and poorly studied problems of coral reefs. When water temperature rises at least one degree higher than usual, algae that live in polyps die. Damaged corals are evicted zooxanthellae (symbiotic algae), which give them a bright color. As a result, whitish forms on the colonies. These sites, however, are not completely devoid of algae. In some cases, partial restoration or appearance of new species of zooxanthellas is possible. It is established, however, that the discolored colonies do not grow and are more easily destroyed by wave activity. Large-scale discoloration occurred due to El Niño 1997-1998, which caused a prolonged warming of the surface layers of the ocean to 1.5 ° C.

One of the main sources of income in northern Australia is tourism, which brings in more than \$ 3 billion annually. This brings big profits, but also great damage, so the whole water area and islands are now divided into six zones of accessibility. The zone of the most stringent control is protected for scientific research. The most accessible is the common use area, trawling, shipping and other moderate resources such as tourism, coral sale, etc. are allowed here.

Conclusion. According to a study published in October 2012 by the National Academy of Sciences, the Great Barrier Reef has lost more than half of the coral polyps forming its structure since 1985. This fact makes us think that this ecosystem is on the brink, after going through these ways to resume the Great Barrier Reef it will be impossible. Therefore, now the activists are trying to prove the correctness of the reality of the ecological crisis, in order to allocate funds for the renewal of reefs.

It is also worth mentioning that this problem is not a problem for one country, since global warming has occurred due to emissions of harmful substances, all states of the world.

To solve this problem is not only the allocation of funds, but also a ban on certain industrial activities that are irreparably harmful to the environment. For violation of this prohibition, perpetrators should be held criminally liable.

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УДК 622+669

PROSPECTS FOR GOLD MINING IN UKRAINE

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Abstract. This article reveals the prospects for the development of gold mining in the territory of Ukraine. This issue is very urgent for today, because Ukraine has a difficult economic situation - attracting investments becomes the basis of the economy and provides increased employment of the population, thanks to new jobs in extractive industries

Key words: gold, mining, polymetallic, ton, quartz

Introduction

In connection with the recent news about foreign investments in the development of gold in Zakarpathia, I was interested in what prospects our country has in the field of mining this beautiful, rare, historical metal.

American company Avellana Gold has developed a mining project gold and gold-polymetallic ore in Zakarpathia, which plans to invest about 100 million dollars.

This is reported by Geocadastre.

The company plans to develop a new infrastructure and development strategy for the Mujiyevskoye field using modern equipment.

The old infrastructure of the Mujiyevskoye field limited the mine's potential - the production volume reached 120 thousand tons per year. Today, investors plan to organize high-performance production for a long-term perspective with an annual production of 500 thousand tons.

Discussion and Results. On the territory of Ukraine there are dozens of more or less explored gold deposits, allowing to start industrial extraction of this noble metal. There are gold deposits, and considerable ones, and they were discovered long ago. Most of the previously discovered gold deposits in Ukraine, especially in the pre-revolutionary period, are now abandoned and have not been developed for a long time.

In those early days, the technique of gold mining in the Russian Empire was primitive and more than 50% of gold remained in dumps or was simply not found. If today we go through the old Ukrainian mine even with an ordinary metal detector, then on the first day we can collect a decent golden "harvest." The situation has changed dramatically since Ukraine gained independence. The young state set geologists a task and in a short time it was established that Ukraine has quite a powerful gold ore potential. According to preliminary estimates, the country's mineral resources have predicted resources in the first thousand tons of gold and in time are able to occupy one of the leading places in Europe for its reserves and production. Zakarpattia region. Within the Beregovsky ore field, the exploitation of the Muzhiyevsky gold-polymetallic deposit was explored and started. It refers to the volcanic-hydrothermal type. Ore bodies are steeply dipping quartz veins with an admixture of chalcedony, kaolinite, hydromica. The gold content varies from 4.5 to 15 g / tonne, and gold reserves are estimated at 25-30 tons. Within the Beregovsky ore field, in addition to Muzhiyevsky, Beregovo and Kuklyanskoye gold-polymetallic deposits with a similar geological structure are also known. Within the Rakhiv ore district, the Saulak gold ore deposit has been explored and partially exploited. Quartz and quartz-carbonate veins and vein zones are gold-bearing here. Ore mineralization is represented by free high-grade gold, the average content of which in ore bodies is 5-10 g / ton, and silver - up to 30 g / ton.

Lugansk region. In the Bobrikov deposit, the gold content in the ore bodies is extremely uneven. Disseminated ores contain little gold, and higher concentrations are characteristic of veins and veins. In general, the gold content in ores is 2-9 g / ton (in individual samples 40-106 g / ton), silver up to 320 g / ton.

The Dnepropetrovsk region The Sursky gold ore region, including the Sergeevskoye and Balka Zolotaya deposits, is located in the southern part of the same archaean greenstone structure of the Ukrainian Shield. The age of the gold-bearing rocks is estimated at 3.0-3.2 billion years. The average gold content in the ores at the Sergeevskoye deposit is 7-8 g / ton with the ratio Au: Ag = 1: 2.

In the Balka Gold deposit, the average metal content in ores is 6.2 g / tonne. At the Balka Shiroka deposit of the Chertomlyk ore region, the average gold content in ore deposits is in the range of 4-7 g / tonne. The deposit is considered as an analogue of the Mount Magnat deposit (Western Australia), where more than 40 tons of gold is mined.

Zaporozhye region. The Surozh deposit is located in the Western Azov Sea, 30 km north of Berdyansk. The gold content here is very uneven and ranges from 4 to 66 g / ton. The sample of native gold is high - 926-983. Kirovograd region. In the Klinty deposit gold has a lot of impurities. With the gold-bismuth association, there are associated hurricane gold contents reaching 200 g / ton with a bismuth content of 35 g / ton. The Yuryevskoye field is located 17 km south of the city of Kirovograd. The gold content in the ore is uneven - from tenths to 34.5 g / ton, and in individual samples to 153.8 g / ton. The May gold deposit was estimated and considered as the most promising gold-bearing object of the Ukrainian Shield. With an on-board gold content of 0.5 g / ton in zones, ore bodies with a thickness of 1 to 18 m are distinguished, containing a precious metal from 1 to 70 g / tonne. Gold-bearing placers of Ukraine. Placers represent one of the most important geological and industrial types of gold deposits. They accounted for slightly more than 4% of reserves, but more than 10% of global gold production. The gold content varies widely and in combination with mining conditions determines the way of working. When mining gold, the dredge has an industrial content in the range of 0.15-0.25 g / m³, with a hydraulic production of 0.2-0.3 g / m³ and above, with an open separate mining of 0.5-1.0 and higher, and with underground - 2-6 g / m³ and above. In Ukraine, mainly medium (0.5-1 tons) and small (less than 0.5 tons) reserves are known, although there are prospects of identifying large (1-5 tons) deposits mainly in the Carpathians, Donbass and coastal zones of the Black and Azov Seas.

Alluvial concentrations of gold are found in the sediments of the Riphean-Vendian of Middle Transdnistria and in the modern alluvium of the Dniester River, in the basal conglomerates of the Dobruja Triassic, in paleolines covered with terrigenous deposits of Lower Cretaceous and Middle Eocene on the Ukrainian Shield. Native gold is found in the alluvium of the rivers Irsha, Teterev, Ros, Sinyuha, Saksagan, Ingulets, Dnepr and others on the Ukrainian Shield. In the Donbas, gold alluvium was found in the valleys of the rivers Nagolnaya, Krynka, Mius, Krepenkaya and deluvial deposits of some gullies. The most promising in industrial terms is placer gold in modern sediments that cover the rocks of the Carboniferous deposit at the gold mine of Bobrikovo. In the Northern Black Sea area, gold occurrences are confined to coastal-marine and limestone deposits of the Quaternary age. Ukraine has a Ukrainian crystal shield, and crystal shields are

the most promising breed complexes. We were lucky that most of the country is occupied by a shield, which lies at a depth of 0 to 100 meters.

Conclusions

Thus, it can be concluded that gold mining in the territory of Ukraine is a very promising, money-making activity that requires specialists of the industry such as us, investments, and reasonable management, which will enable us to replenish the treasury with foreign currency and thereby improve the country's standard of living, whole.

УДК 622

THE IMPACT OF MINING ON THE ENVIROMENT

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Abstract: Over a long period of time, the mining industry has made a significant contribution to the daily lives of people. To date, it continues to gain momentum. That is why the issue of environmental protection is sharply raised. The article presents the consequences of mining, the situation of the Donetsk Coal Basin is considered, and ways to solve the problem are suggested.

Key words: mining, problems, ecology, rock.

One of the problems of modern times is the negative impact of the mining industry on the environment. At present, the question of preserving, or rather, saving the Earth from a catastrophe, is more urgent than ever. An analysis of recent studies has shown that the extraction of minerals has increased tenfold, compared with previous years. This is due to the trend of increasing the needs of the population, the availability of mineral deposits, as well as the maintenance and development of socio-economic ties.

As you know, all modern production is based on the use of mineral resources, therefore it is impossible to refuse their extraction. Instead, measures must be taken to minimize environmental damage. Creation of the most safe working conditions and restoration of the territory after their completion should be an important task of the mining industry [1].

Mining industry is a set of industries engaged in exploration and production of minerals, as well as their primary processing and obtaining semi-finished products. The following groups of mining industries are:

- 1) Extraction of mineral energy raw materials
- 2) Extraction and processing of ores of black and alloying metals
- 3) Extraction and processing of non-ferrous metal ores for non-ferrous metallurgy
- 4) Mining chemicals industry
- 5) Extraction of non-metallic industrial raw materials and raw materials for the production of building materials
- 6) Extraction of precious and ornamental stones
- 7) Hydromineral industry [2].

All of the above mining industries are intensively developing, with a strong negative impact on the environment.

The active use of land for the extraction of minerals entails the destruction of the surface layer of the earth, the emergence of mine workings and dumps of overburden, the violation of the hydrological regime of rivers, pollution of soils, surface and groundwater, destruction of the integrity of the ecological system and natural landscapes [3].

The range of minerals extraction directly depends on the method of extraction, namely an underground and open one. Regardless of mining methods, mining causes major changes in the environment, such as breaking the surface over the treated areas of the deposits and the formation of rock embankments in the mining area.

Significant violations of the surface of the earth occur when natural resources are extracted from the depths of the earth in an open way, as large areas of fertile soils are allocated for the development of minerals, which become unsuitable for agricultural activities after completion of work.

Mining of minerals by underground means also has a negative effect on natural landscapes. With the displacement and deformation of rocks on the earth's surface, funnels, troughs, and depressions are formed, which eventually fill with groundwater and precipitation.

Negative impact from underground mining operations is manifested in the contamination of the earth's surface. As a result, more than half of all the rock extracted from the quarries, goes to the sludge

dumps, occupying large areas. Dumps are sources of pollutants. This leads to a decrease in the productivity of nearby lands, increased dust content of the atmosphere with gases and dust, and a violation of the water regime of the area.

An example of the region of Ukraine, where the negative impact of the mining industry is negative, is the Donetsk Coal Basin. It is one of the largest mining regions in Europe and the world. However, the increasing man-made impact adversely affects the soil, water and air environment, as well as the health and life expectancy of a person. To a large extent, the ecological state of the Donetsk basin is affected by large amounts of waste from the mining industry, namely, more than 2 mill. Tons. Under the influence of atmospheric agents and biochemical processes, the material is oxidized, which can lead to spontaneous combustion. Also high concentrations of mercury, arsenic, lead, zinc, in the city soils, adversely affect the state of the atmosphere. A study of groundwater in the Donbass demonstrates that the content of chemical elements and compounds in them exceeds the maximum permissible concentrations [4].

All of the above shows that the current flow of pollutants into water, soil and air can lead to unpleasant, irreversible phenomena. Accordingly, a plan is needed to prevent catastrophic changes.

I believe that the mining industry is quite developed these days. Therefore, the most relevant is the following:

1) To conserve natural resources from depletion and pollution, strive for rational use of soils before and after mining.

2) To protect the earth's surface from the adverse impact of the mining industry, use mining and special protective measures to eliminate the consequences of mining development by reclamation of disturbed lands [5].

3) To improve the efficiency of environmental protection activities and improve the ecological condition of areas located near mining enterprises, it is necessary to use technology in which waste products are brought to marketable products or raw materials for use for production needs or other areas [5].

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THE DEVELOPMENT OF NON-CONVENTIONAL RENEWBLE ENERGY IN CHILE

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Abstract. This article provides a background of the power generation status in Chile, along with an analysis of the country's electricity market and its regulations, focusing on non-conventional renewable energy. The research focuses on Chile's leading role in renewable energy production and reasons of this leadership.

Key words: Chile, energy recourses, energy production, non-conventional renewable energy, investments.

Introduction. Chile has considerable geothermal, solar, wind and other energy resources while fossil fuel resources are limited. In fact, Chile is a hotbed for non-conventional renewable energy sources (NCRE). It possesses a huge potential for continued growth of the non-conventional renewable energy sector, and Chile is well aware of this. With the purpose of attracting renewable energy investments, several new regulatory incentives have been introduced. Additionally, electricity generation from renewable sources is

environmentally beneficial, as it decreases greenhouse gas emissions, produced as a result of combustion of fossil fuels.

Nowadays, the problem of energy is one of the most important in the world and therefore scientists around the world are engaged in this topic.

The objective of the article is to evidence the importance of developing non-conventional renewable energy recourses in Chile, because the country represents a complex energy situation, given the growth in electricity demand.

There are several **tasks**, which this article deals with:

- 1) identifying main and the most important NCRE in Chile;
- 2) providing recommendations for development of the renewable energy sector in Chile;
- 3) finding out main tendencies of the NCRE future.

The object-matter of the research is non-conventional renewable energy in Chile. **The subject-matter** is ways to develop non-conventional renewable energy production in Chile.

Materials and methods are part of research elements: articles that support the publication of research output, including data, software materials and methods – in brief, citable articles complementary to find research articles.

Discussion and Results. Renewable energy in Chile is classified as Conventional and Non-Conventional Renewable Energy, and includes biomass, hydropower, geothermal, wind and solar among other energy sources. When referring to Renewable Energy in Chile, it will be predominantly the Non-Conventional kind.

According to Chilean law [№ 20.257 2008], the Non-Conventional Energy sources are:

- 1) biomass, biogas and waste;
- 2) hydropower, with installed capacity below 20 MW;
- 3) geothermal energy;
- 4) solar energy;
- 5) wind power;
- 6) sea power, such like wave and tidal energy;
- 7) others approved by the authority, that help diversify electricity generation sources and have a low environmental impact.

Law № 20.257 issued in 2008 and Law № 20.698 issued in 2013 by the Ministry of Energy have been the main framework for the promotion of Non-Conventional Renewable Energy in Chile. The laws facilitated the competitiveness of intermittent renewable energy sources. The Ministry of Energy complemented both laws with support mechanisms and investment promotion [Renewable Energy 2017]. The first law determined the renewable energy target for Chile and defined the concept of “Non-Conventional Renewable Energy”. The target (10% by 2025) was set to start by 2010 and would only be applied to contracts signed or renewed after August 31, 2007. The second law also known as Law 20/25 increased the target to 20% by 2025 year and modified the tender mechanism for regulated clients. Originally, the bill aimed at reaching 20% by 2020, but due to the opposition from several sectors (among them the generating companies) the period was extended till 2025. The obligation to generate from NCRE would increase stepwise annually beginning with 2016 (Table 1) [Law № 20.257 2008, Law № 20.698 2013].

The most important conventional renewable energy source in Chile is large scale hydroelectric energy. The development of non-conventional renewable energies to generate electric energy has grown considerably during the past years. This has encouraged many investors from companies in Chile to take advantage of the steady growth taking place in this sector. Companies may use any means of NCRE, which are a primary energy source, such as biomass, small hydro, geothermal, solar, wind, marine and other generation means that use renewable technologies for electricity generation, help to diversify the power supply sources of the different electrical systems in Chile and cause a low environmental impact. Intermittent NCRE generation will increase rapidly in the future since a high proportion of the approved NCRE projects are based on solar and wind photovoltaic and wind technologies. Integration of these intermittent sources may represent a challenge for the management of the electricity generation system [Rodriguez-Monroy, Marmol-Acitores 2017: 941].

Additionally, Chile has several development tools, aimed at supporting the development of NCRE projects, among which 35 potential development instruments stand out, including to loans, grants and funds, delivered by government and international agencies, as well as tax benefits [Gamma Ingenieros SA 2010]. Moreover, renewable energy projects can be part of the Clean Development Mechanism, associated with the

Kyoto Protocol, in case they are related to investments that reduce green-house gas emissions in developing countries (countries not included in Annex 1 of the Kyoto Protocol). Currently, there are several bills pending to be approved by the Chilean Congress [Camara de Diputados de Chile; Central Energia]:

1. In amendment to Law №19.300 requiring projects for exploration and exploitation of geothermal energy to be subject to the system of environmental impact assessment.
2. A procedure to compensate energy withdrawals with energy produced by non-conventional renewable energy sources.
3. An amendment to Law №19.657 on geothermal energy concessions.
4. An increase in the percentage of electricity generation through NCRE.
5. Promotion of the development of NCRE.
6. Establishment of the payment of a special municipal tax when a new generating power plant is installed.
7. Obligation for concession-holding companies to install and connect net metering systems that facilitate domestic or residential generation with NCRE by electricity consumers.
8. Creation of a national fund for the research and development of biofuels.
9. Introduction of a scheme of wind energy rights.

Conclusions. In recent years Chile has experienced a significant increase in the development of power generation projects based on non-conventional renewable energy sources.

1. Non-conventional renewable energy sources in Chile include:

- 1) solar energy;
- 2) geothermal energy;
- 3) biomass energy;
- 4) wind energy;
- 5) marine energy;
- 6) biogas energy;
- 7) small-scale hydroelectric energy (up to 20 MW).

2. The study also recommends several other actions that if taken will benefit the renewable sector in Chile:

- 1) In order to achieve sustainable growth, Chile should look for foreign companies to invest in local projects. Investments need to be incorporated to increase energy efficiency on part of energy companies.
- 2) Ways to increase energy infrastructure on all levels in Chile need to be researched.
- 3) The potential of human capital on local levels needs to be evaluated and developed. Besides, the impact that renewable energy could have on employment and job development has to be studied.
- 4) Feasibility studies should be done to map out the resources available at the national scale.

3. The Government has recognized the large opportunity for investment in the renewable sector as well as the opportunity to clean the energy matrix and to develop projects that have less opposition from communities. Therefore, through the Ministry of Energy, it is promoting a variety of initiatives that increase the competition in the energy sector and support the integration of renewables. In addition, through the committee, the current government developed the energy scheme where the goal is to generate 70% of renewable energy in the matrix in Chile by 2050. It is important to state that this also includes a large segment of hydropower. This aims to guide the future development of the energy sector and the development of laws that are able to support this roadmap.

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COMPARISON OF REPRODUCTIVE CHARACTERISTICS OF WOMEN FROM CHERNIVTSI AND SIMFEROPOL

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Abstract. Reproductive characteristics were calculated for the residents of Chernivtsi and the residents of Simferopol of post-productive age according to the data of the obstetric-gynecologic anamnesis. The average number of pregnancies and their outcomes for the representatives of these cities were count for two generations. Statistical differences between populations were found by the percentage of women who had medical abortions, miscarriages and stillbirths. Significant difference was found for the percentage of artificially interrupted pregnancies and the realized zygotes.

Key words: reproductive characteristics, population, generation, Chernivtsi, Crimea.

Introduction. In the modern world due to improvement of the quality of medicine, as well as the socio-cultural aspects of everyday life, number of offspring decreases because survival of individuals have been increased. [Kurbatova, Pobedonostseva 2012; Atramentova, Meshherjakova, Filipcova 2013]. Nevertheless, some nationalities retain a more ancient way, where the importance is assigned to the number of descendants [Mustafaeva, Kozak 2014, Antsupova, Kozak, Kuritsina 2017].

The reproductive behavior of women changes in different communities of people because of various factors, such as religion, education, material status, etc. [Altuhov 2004: 340]. Thus, the Crimean Tatars belongs to the Muslim religion, whose influence leads to a change in their reproductive behavior and corresponds to the extended type of reproduction, due to the large number of children in families. In Slavs, on the contrary, in modern society, there are global trends in reducing fertility, respectively, a small number of descendants in families [Atramentova, Fedchun, Povolockij 1993:522].

Object: comparison of reproductive behavior of Crimean Tatars living in the territory of Simferopol AR Crimea, and Chernivtsi who are mostly Slavs, Ukraine.

Object-matter: Reproductive characteristics of women of post-reproductive age.

Subject-matter: Anonymous questioning of women in post-productive age (from 45 to 90 years) was conducted. Totally 262 Crimean Tatar women from Simferopol were surveyed, from which 44 were attributed to the first generation and 218 to the second. 216 questionnaires were collected from Chernivtsi, 49 of which were attributed to the first generation, 167 for the second. The first generation includes older women, the second generation has younger ones. The division into generations approximately correspond to the length of the human generation. The time interval for one generation was 20 years.

Tasks: The following general statistics were calculated: arithmetic mean (\bar{x}), standard deviation (s), median (Me), mode (Mo). A comparison of the arithmetic mean for normally distributing variables was carried out using Student's t-test. The percentages were compared after the ϕ -transformation using the criterion F. The conclusion regarding statistical null hypotheses was assumed at the significance level of 0.05 [Atramentova, Utevskaia 2008; Gosudarstvennyj komitet statistiki Ukrainy].

Materials and methods: Data were collected in 2013 in the women's clinic of the Crimean Republican Institution "Medical Center for Serving the Deported Peoples", Simferopol. And also, in 2016 in the gynecological department of the City Clinical Maternity Hospital No. 2, Chernivtsi. The questionnaire included questions about the year of the birth of a woman, her nationality, as well as the nationality of her parents. Ethnicity, recorded by self-identification, was checked by the pedigree. The number of pregnancies and their outcomes was taken into account: medical and spontaneous abortions, ectopic pregnancies, number of stillbirths and live births.

Discussion and Results: Women of the first generation from given cities have almost the same average number of pregnancies – 4.7 for Chernivtsi and 4.2 for Simferopol; births (2.0 and 2.9, respectively) and live births (2.0 Chernivtsy and 2.8 Simferopol, Table 1.). But the women of Chernivtsi resorted to medical abortions three times more often than the Crimean Tatars (0.8 and 2.4 abortions respectively). On the contrary spontaneous abortions occurred 2.5 times more often among Crimea residents (0.5 miscarriages per woman on average) compared with Chernivtsi residents (0.2 miscarriages, $p>0.05$). Ectopic pregnancies

were indicated only by one woman from these samples, which for Chernivtsi was 0.08, and for Simferopol 0.02. Stillbirths were indicated by two Crimean Tatar women, whereas Chernovtsy women with this problem, apparently, did not get into the sample.

Table 1. The average number of pregnancies and their outcomes per woman of the first generation

Indicator	Generations				<i>p</i>
	<i>f</i> ₁ Chernivtsi		<i>f</i> ₁ Simferopol		
	$\bar{x} \pm s_{\bar{x}}$		$\bar{x} \pm s_{\bar{x}}$		
Pregnancy	4,7±0,37	2,6	4,2±0,4	2,6	>0,05
Medical abortions	2,4±0,30	2,1	0,8±0,1	1,3	>0,05
Spontaneous abortions	0,2±0,08	0,5	0,5±0,08	0,9	>0,05
Ectopic Pregnancy	0,08±0,08	0,6	0,02±0,003	0,1	>0,05
Live birth	2,0±0,29	2,1	2,9±0,2	1,3	>0,05
Stillbirths	0,00	0	0,07±0,01	0,3	>0,05
Live births	2,0±0,29	2,1	2,8±0,4	1,4	>0,05

Table 2. The average number of pregnancies and their outcomes per woman of the second generation

Indicator	Generations				<i>p</i>
	<i>f</i> ₂ Chernivtsi		<i>f</i> ₂ Simferopol		
	$\bar{x} \pm s_{\bar{x}}$		$\bar{x} \pm s_{\bar{x}}$		
Pregnancy	3,7±0,15	1,9	3,8±0,3	2,1	>0,05
Medical abortions	1,5±0,11	1,4	0,9±0,06	1,4	>0,05
Spontaneous abortions	0,3±0,06	0,8	0,3±0,02	0,6	>0,05
Ectopic Pregnancy	0,01±0,008	0,1	0,01±0,001	0,1	>0,05
Live birth	1,9±0,07	0,9	2,6±0,07	1,0	>0,05
Stillbirths	0,03±0,02	0,3	0,09±0,01	0,3	>0,05
Live births	1,8±0,07	0,9	2,5±0,2	1,1	>0,05

Notes: *f*₂ - second generation, \bar{x} - arithmetic mean, *s* _{\bar{x}} - statistical error of the arithmetic mean, *s* - standard deviation, *p* - level of significance of the difference between groups

For the second generation of women, the data for the average indicators of different outcomes of pregnancies, as well as for women of the first generation, do not have statistically significant differences (Table 2), however, it should be noted some features between different populations the majority of whose inhabitants belong to different ethnic groups. Residents of Chernivtsi from the second generation, as well as the first, make medical abortions more often than Crimean Tatars. In the second generation of Chernivtsi, this indicator is 1.7 times higher (1.5 abortions per a woman) than among women of Simferopol (0.9 abortion). On average, there are 2.6 births for one Crimean Tatar of the second generation. It is 1.4 times more than for the Chernivtsi woman (1.9 births). The live birth rates are approximately at the same level as the births in both cities (2.5 and 1.8, respectively). Stillbirths were noted by 17 Crimean Tatars of the second generation, while only 3 of Chernivtsi woman indicated have it. They were 0.09 and 0.03 respectively. Pregnancies of both groups are on the same level and are 3.7 for Chernivtsi and 3.8 for Tatars. Spontaneous abortions and ectopic pregnancies in these samples do not differ. The average number of miscarriages for both cities was 0.3, and the ectopic pregnancy was 0.01.

Table 3. Proportion of women of different generations with different outcomes of pregnancies

Indicator	Generations					
	<i>f</i> ₁ Ch.		<i>p</i>	<i>f</i> ₂ Ch.		<i>p</i>
		₁ S.			₂ S.	
Number of women (n):	49	44		167	218	
not having pregnancies,%	4,1	4,5	>0,05	3,6	5,5	>0,05
not giving birth,%	4,1	4,5	>0,05	3,6	5,5	>0,05
who had medical abortions,%	83,7	34,1	<0,05	69,5	45,4	<0,05
who had spontaneous abortions,%	14,3	31,8	<0,05	23,4	33,5	<0,05
having ectopic pregnancies,%	2,0	0,3	>0,05	1,2	0,9	>0,05

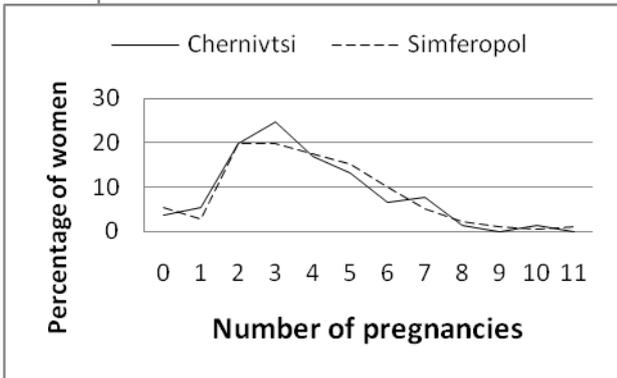
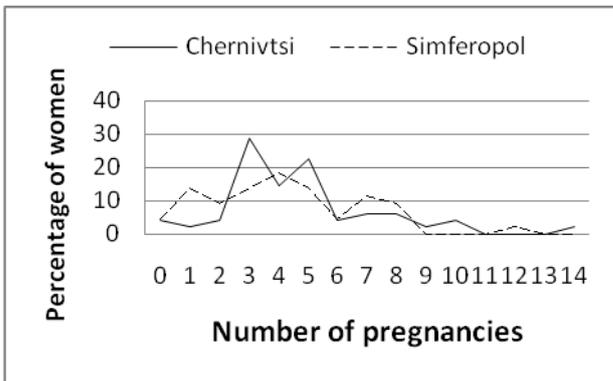
who had stillbirths,%	0,0	4,5	<0,05	1,8	9,2	<0,05
<i>Artificially interrupted pregnancies,%</i>	50,9	18,4	<0,05	39,5	24,3	<0,05
<i>Realized zygotes,%</i>	43,0	68,6	<0,05	49,8	66,8	<0,05

Notes: *p* - the level of significance of the difference between generations, *Ch.* - Chernivtsi, *S.*- Simferopol

The proportion of women who did not have pregnancies and did not give birth was not significantly different in the first generation and averaged 4.3% (Table 3). Among second generation, the residents of Chernivtsi invested more in the gene pool of the population than the inhabitants of Simferopol. The percentage of women who did not give birth was 1.5 times higher for Crimean Tatars (5.5%) than for Chernivtsi women (3.6%). The percentage of women in the first and second generation for medical abortion has no statistically difference. Chernivtsi woman of the first generation do abortions 2.5 times more often (83.7%) than Simferopol Crimean Tatars (34.1%, $p<0.05$).

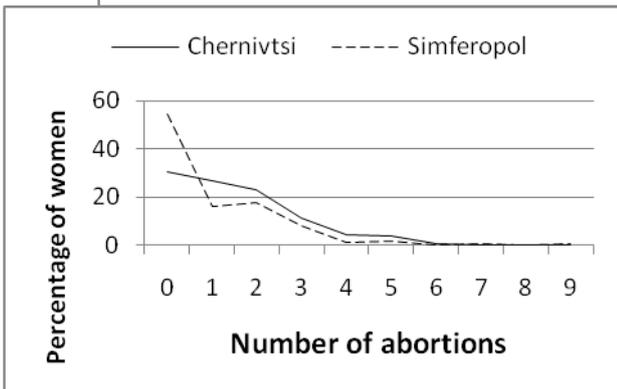
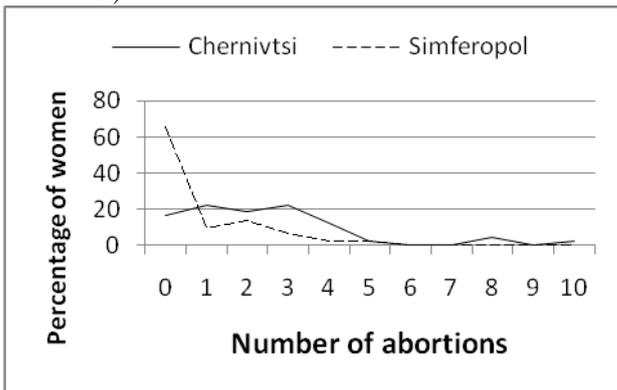
In the second generation this figure declined in the Chernivtsi, while in the Tatars it increased, but nevertheless, Chernivtsi women make abortions more often in 1.5 times (69.5% and 45.4%, $p<0.05$). The share of spontaneous abortions is 2.2 times higher among female residents of Simferopol of the first generation (31.8%) than in Chernivtsi (14.3%, $p<0.05$). For the second generation, the difference is almost one and a half times, for Crimean Tatars 33.5% and 23.4% for Chernivtsi women. A big genetic burden in Crimean Tatar families can be connected with the spread of consanguineous marriages among Muslims, which is reflected in embryonic losses. The percentage of ectopic pregnancies does not have obvious differences and in average for the first generation is 2.2%, and for the second 1.1%. Stillbirths, as well as miscarriages, are also more common among representatives of the Muslim faith. In the first generation 4.5% of Crimean Tatars indicated stillbirths, while none of the women from Chernivtsi who were in the sample had stillbirths. In the second generation of the inhabitants of Simferopol, this indicator increased to 9.2%, which is 5 times higher than that of residents of the city of Chernivtsi - 1.8% ($p<0.05$). But, the share of artificially interrupted pregnancies is 2.8 times higher for Chernivtsi women (50.9%) than for Crimean Tatars (18.4%, $p<0.05$). In the second generation of women from Chernivtsi, this indicator decreased (39.5%), but still remains more than 1.5 times higher than in women from Simferopol (24.3%, $p<0.05$). Based on the above data became visible the share of realized zygotes, which is higher among representatives of the Muslim religion. In the first generation of Crimean Tatars this indicator is 1.6 times higher than that of Ukrainians (68.6% and 43%, respectively). In the second generation, the trend remains about the same level and is 66.8% for residents of Simferopol and 49.8% for residents of Chernivtsi.

The graphs show the percentage of women with different numbers of pregnancies, medical abortions and live births (Fig. 1a-f). Modal pregnancy classes for first-generation women were 3.0 for Chernivtsi and 4.0 for female residents of Simferopol (Fig.1a). In the second generation, the difference was reduced due to a decrease in pregnancy mode in Crimean Tatars (2.5), while the modal class of the



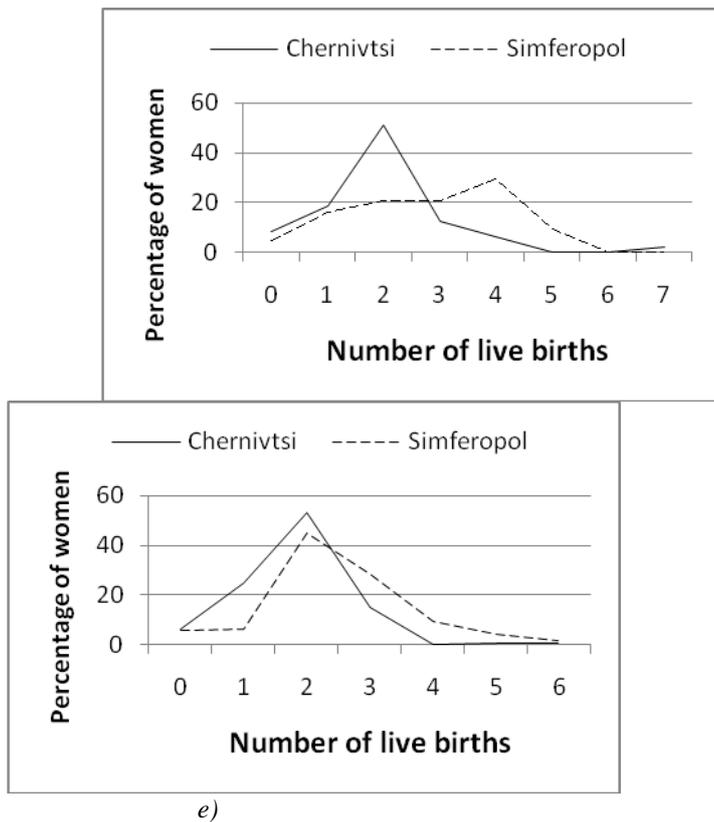
a)

b)



c)

d)



e) f)
 Fig.1. Distribution of the number of pregnancies and their outcomes in two generations
 (a, c, e - first generation, b, d, f - second generation)

Chernivtsi residents remained 3.0 (Fig. 1b). In the first generation of Chernivtsi women, the bimodality of the distribution of the number of medical abortions was noted, peaks accounted for 1 and 3 abortions, respectively, while in Crimean Tatars the modal abortion class was 0 (Fig. 1c). In the second generation both samples have the same modal class = 0 (Fig. 1d). By birth and live births the mode of Chernivtsi women in both generations is 2.0, whereas in the Crimean Tatars in the first generation the indicator was 4.0, and in the second generation 2.0 (Fig. 1e, f). The remaining modal classes for the two samples of the first and second generations are equal to 0.

Conclusions. Comparison of the reproductive characteristics of Chernivtsi residents and Crimean Tatars from Simferopol from two adjacent generations showed on the whole their dynamics is in line with the global trends, manifested in a decrease in the birth rate due to its artificial regulation. Comparison of the reproductive characteristics of the representatives living in Chernivtsi with the data obtained for the Crimean Tatars from Simferopol a number of statistically significant differences were revealed. Most of them can be explained by cultural traditions and religious prohibitions in the sphere of posterity in representatives of different religious groups and nationalities. The main difference is that the narrowed type of reproduction is typical for Chernivtsy, and extended for the Crimean Tatars. These differences can affect the ethnic composition of Ukraine.

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УДК 579.61

THE ANTIBIOTICS CRISIS

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Abstract. This article considers the causes and mechanisms of the emergence of multidrug-resistant bacteria. The most dangerous antibiotic-resistant bacteria are highlighted and their features are analyzed. New methods of fighting with multidrug resistant bacteria have been identified and the need for rational use of antibiotics has been substantiated.

Key words: superbugs, horizontal gene transfer (HGT), antibiotics, multiple antibiotic resistance.

Introduction. In recent years there has been a lot of news about the impending antibiotics crisis, brought to a head by renewed awareness that we are running out of drugs to treat evolving superbugs, and with the startling revelation following the NDM-1 discovery, that microorganisms are also capable of sharing bits of themselves with each other to thwart even our most powerful last-line antibiotics.

Is this the beginning of the end of antibiotics, as some scientists are predicting, are we about to return to a pre-penicillin world where a common bacterial infection could be a death sentence? Or are we just at the cusp of a new wave of inventions that will spur a new generation of drugs that will keep us ahead of the evolutionary race against harmful microorganisms? What are the possible solutions of the problem we faced?

Object-matter. Antibiotic-resistant bacteria.

Subject-matter. Resistance to antibiotics.

Objective. 1) To study the most dangerous multidrug-resistant microorganisms and the reasons for their occurrence; 2) to demonstrate the link between the misuse of antibiotics and the occurrence of multidrug-resistant bacteria.

Tasks. 1) To study the existing literature data on multidrug-resistant bacteria;

2) to study methods of fighting with multidrug-resistant bacteria.

Materials. Scientific articles, educational literature, electronic resources.

Methods. Theoretical analysis of literary sources, scientific articles, electronic resources.

Discussion and Results.

Antibiotics and Microorganisms

Antibiotics are drugs that kill microorganisms like bacteria, fungi and parasites. Bacteria are very small creatures of usually only one cell, comprising internal cell structures but no distinct nucleus, surrounded by a cell wall. They can make their own proteins and reproduce themselves as long as they have a source of food.

Some bacteria cause no harm while they live in one part of the body, but then become potentially deadly once they enter the bloodstream. A good example is *Escherichia coli* (*E. coli*), which lives in the human gut and helps break down food, but if it enters the bloodstream, it can cause severe cramping, diarrhea, and even death from peritonitis if not treated promptly.

Antibiotics have made a big difference to mankind's fight against infectious microorganisms and have vastly improved the conditions and chances of success in many fields of medicine all over the world.

They work because they block a life-sustaining function in the unwelcome microorganism. Some stop the microorganism from being able to make or maintain a cell wall, while others target a particular protein that is vital for survival or replication.

How Antibiotic Resistance Arises

Microorganisms are always evolving. By chance, every now and again, a generation gives rise to offspring with slightly different genes to their forebears, and the ones whose variations confer a survival advantage, e.g. to make better use of a resource or withstand an environmental stress, get to produce more offspring. And the efforts of mankind – the production of antibiotics that are designed to kill off bacteria – is

just another environmental stress, or "selective pressure" that ensures bacteria with the survival advantage get to produce proportionally more offspring next time around.

In fact, several mechanisms have evolved in bacteria to make them antibiotic resistant. Some chemically modify the antibiotic rendering it inactive, some physically expel it from the bacterial cell, and others change the target site so the antibiotic can't find it or latch onto it.

This evolutionary process is further boosted by the fact that bacteria also "swap" bits of genetic material, thus increasing the opportunity for bits that confer survival advantage to spread "horizontally" among species and not just "vertically" down generations of the same species. This is known as "horizontal gene transfer", or HGT. An example of HGT is the transfer of a piece of genetic material that codes for the enzyme NDM-1 (New-Delhi metallo beta-lactamase), an enzyme that destroys antibiotics, even (and this is why NDM-1 is cause for alarm) the super-strong carbapenems, which are generally reserved for use in emergencies and the treatment of infections caused by multiple-drug-resistant bacteria. NDM-1 is most often seen in *Klebsiella pneumoniae* and *E. coli*.

Multiple Drug Resistance (MDR)

As the bacteria have evolved and acquired resistance to antibiotics, we have tried to stay one step ahead by developing new drugs, and adopting a protocol of first, second and last-line treatment. Last-line treatment drugs are reserved for patients whose bacterial infection is resistant to first and second-line treatments.

More recent research suggests that the problem of MDR may be more than just genetic. In the study published online in January 2011 in the Journal of Medical Microbiology [Catharine Paddock PhD (2011)], researchers proposed that a non-genetic mechanism called "persistence" makes bacteria temporarily hyper-resistant to all antibiotics at once. They found "persister" bacterial cells of *Pseudomonas aeruginosa*, an opportunistic human pathogen and a significant cause of hospital-acquired infections, were able to survive normally lethal levels of antibiotics without being genetically resistant to the drug.

The most dangerous antibiotic-resistant superbugs

The World Health Organization issued a warning about a group of deadly bacteria and released its first-ever list of "priority pathogens," a list of antibiotic-resistant bacteria that pose the greatest threat to human health. The list is divided into three categories: of critical-, high- and medium-priority. Three pathogens made it into the critical-priority group. Multidrug-resistant bacteria, sometimes called "superbugs," are a critical priority because infections with these germs can be deadly, according to the WHO. All of the top three pathogens on the list are resistant to a group of antibiotics called carbapenems. These antibiotics are sometimes referred to as "last resort" medications, because if they don't work, very few options are left.

Here are the top three germs the WHO is worried about:

1. Carbapenem-resistant *Acinetobacter baumannii*

This bacterium can cause pneumonia, serious blood infections and other conditions, according to the Centers for Disease Control and Prevention. *A. baumannii* occurs primarily in hospitalized patients. It spreads through either person-to-person contact, or contact with a contaminated surface. Although the pathogen doesn't pose a big threat to healthy people, it's very dangerous for patients with compromised immune systems or chronic diseases. Outbreaks of *A. baumannii* typically take place in hospital settings such as intensive care units (ICUs) or long-term health care facilities with sick patients, such as nursing homes.

2. Carbapenem-resistant *Pseudomonas aeruginosa*

P. aeruginosa infections most often occur in the hospital. For patients with *P. aeruginosa* infections, pneumonia or infections following surgery can become extremely dangerous, and even life-threatening. But these bacteria can also live in hot tubs and swimming pools, and have been linked to serious ear infections and skin rashes. Patients can become infected with the bacteria from contact with a breathing machine or a catheter, or through a surgical wound. The infection is most dangerous to those with weakened immune systems.

3. Carbapenem-resistant *Enterobacteriaceae*

Infections with carbapenem-resistant *Enterobacteriaceae* (CRE) most often occur in hospitals or long-term health care settings. Similar to *A. baumannii*, CRE usually does not pose a risk to healthy people; rather, it is most dangerous to people with compromised immune systems. CRE can spread through person-to-person contact or through medical devices such as ventilators.

Other concerning germs

In the other two categories on the priority-pathogens list, the WHO included germs that are resistant to certain antibiotics and those that cause diseases including gonorrhea and *Salmonella* food poisoning.

Six pathogens were included in the high-priority category, and three pathogens were listed in the medium-priority category. The six high-priority pathogens are *Enterococcus faecium*, vancomycin-resistant; *Staphylococcus aureus*, methicillin-resistant, vancomycin-intermediate and resistant; *Helicobacter pylori*, clarithromycin-resistant; *Campylobacter spp.*, fluoroquinolone-resistant; *Salmonellae*, fluoroquinolone-resistant; and *Neisseria gonorrhoeae*, cephalosporin-resistant, fluoroquinolone-resistant. The three medium-priority pathogens are *Streptococcus pneumoniae*, penicillin-non-susceptible; *Haemophilus influenzae*, ampicillin-resistant; and *Shigella spp.*, fluoroquinolone-resistant. [Helen Branswell (2017)].

The WHO list was developed in collaboration with the Division of Infectious Diseases at the University of Tübingen in Germany. To determine which bacteria to include, researchers looked at a few factors, including how deadly the infections caused by the bacteria are, how resistant the bacteria are to existing antibiotics, how easily the bacteria spread, the number of treatment options available, and how preventable infections caused by the bacteria are. [Helen Branswell (2017)].

Solution to the problem

1. Make the use of antibiotics prudent.

The European Centre for Disease Prevention and Control (ECDC), suggests:

- monitoring of hospital antibiotic resistance and antibiotic use;
- timing and duration of antibiotics for surgery to lower surgical site infections and reduce emergence of resistant bacteria. In some cases, shorter rather than longer treatments can be given without affecting patient outcomes and lowers the frequency of antibiotic resistance;
- taking samples before therapy, monitoring culture results, and streamlining use of antibiotics based on these results can lead to reductions in unnecessary use of antibiotics.

The ECDC urges doctors to:

- note that antibiotic exposure is linked to the emergence of antibiotic resistance;
- take responsibility for promoting appropriate use of antibiotics in order to keep antibiotics effective;
- prescribe antibiotics only when necessary;
- base antibiotic prescriptions on a symptomatic diagnosis and not on patient pressure;
- use their status as an authoritative source of information to advise patients on the risks of inappropriate antibiotic use.

Of course, these suggestions will not stop getting microorganisms resistant. But at least that will slow this process a lot.

2. New directions in the fight against harmful microorganisms.

Cold plasma therapy. A team of Russian and German scientists found that a ten-minute treatment with low temperature plasma (high energy ionized gas) killed drug-resistant bacteria causing wound infections in rats and increased the rate of wound healing by damaging microbial DNA and surface structures.

Fungus-farming ants. Researchers at the University of East Anglia in the UK found that ants, who tend farms of fungi that they grow to feed their larvae and queen, use antibiotics to inhibit the growth of unwanted microorganisms. The antibiotics are made by *actinomycete* bacteria that live on the ants in a mutual symbiosis. The researchers said they not only found a new antibiotic, but they also learned important clues that can teach us how to slow drug-resistant bacteria.

Natural enzymes in body fluids. A US team from Georgia Institute of Technology and University of Maryland has developed a pioneering method of identifying naturally occurring "lytic enzymes" found in body fluids like tears and saliva that are capable of attacking harmful bacteria, including antibiotic-resistant ones like methicillin-resistant *Staphylococcus aureus* (MRSA), while leaving friendly bacteria alone.

Also, the current crisis in antibiotic therapy may mean that we turn our attention to other, long forgotten ways of overcoming microorganisms, such as Phage Therapy. Phages are natural viruses that specifically infect and kill target bacteria, in a similar way to the lytic enzymes.

The Eliava Institute of Bacteriophage, Microbiology, and Virology (EIBMV) in Tbilisi, Georgia receives patients from all over the world for treatment with phage therapy. They have successfully treated patients with chronic conditions like sinusitis, urinary tract infections, prostatitis, methicillin-resistant Staph infections, and non-healing wounds, according to an article that appeared in Genetic Engineering and Biotechnology News in October 2008. EIBMV have a large phage collection and have recently partnered with a California-based company to bring their expertise to a wider international market.

Conclusions. Antibiotic-resistant bacteria are one of the most acute problems of today. But, as well as microorganisms, humanity does not stand still. And as we can see it is not difficult to slow down arising

of new "superbugs". We just have to be more responsible both as patients and doctors, and make the use of antibiotics prudent. Also, there are enough new successful investigations to make us sure that people will never get back to a pre-penicillin world.

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ENVIRONMENTAL ASSESSMENT OF WATER QUALITY IN POND №1 IN LYUBOTYN, KHARKIV REGION

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Abstract. The publication presents the results of water samples analysis from pond №1 in Lyubotyn, which is the first in a cascade of six ponds. The author analyzed the causes of the chronic toxicity of water that was detected during ecotoxicological studies. Indicators of ammonia, nitrites, zinc and copper content in the water exceeded the norms. The author has detected a poor water ability to self-purge, and also has indicated the likely sources of water pollution. There are the need for further study of cascade ponds and the implementation of clean-up and prevention of pollution.

Keywords: water quality, biotesting, artificial pond, chronic toxicity, surface water.

Introduction. Water resources have always been very valuable to mankind, they are the basis of life on Earth. Therefore, their quality directly affects the quality of our lives. After industrialization processes, the quality of water resources has greatly deteriorated, which has led to significant changes in aquatic ecosystems: pollution, stagnation, eutrophication and reduction of biodiversity. It is very important to pay enough attention to this problem now. Deterioration of even a small river's water quality can lead to adverse changes in a large river or lake into which it flows. All components of the environment are closely related by the processes of energy, substance and information exchange. So, the changes of some components provoke changes in others.

Water resources can be used by the society to meet many needs, such as drinking water, recreation, water for use in the production process, and others. However, during determination of water quality and possibility of its improvement, the environmental functions of the water object should also be taken into account.

On the territory of Lyubotyn town, Kharkiv region, in the park zone there are artificial ponds of a cascade type, consisting of 6 water objects. These water objects perform an important recreational function for Lyubotyn, also local people catch fish there.

The objective of the study is to environmentally assess the artificial pond №1 in Lyubotyn town.

Tasks of the study: sampling water from the pond, conducting physical -chemical and ecotoxicological analyses, evaluating the results, identifying possible causes of pond contamination and making conclusions.

The object-matter is the artificial pond №1 in Lyubotyn town, Kharkiv region.

The subject-matter is pollution problem of the artificial pond №1 in Lyubotyn town.

The article contains data of the analysis of water samples from pond №1, which were selected 03.11.2017. Physico-chemical analysis was conducted in the educational-research laboratory of analytical ecological researches. Ecotoxicological analysis was carried out in the laboratory of ecotoxicological researches using the method of biotesting to determine chronic water toxicity on crustaceans *Ceriodaphnia affinis* Lilljeborg. After analyses, their results were evaluated, links with contaminants and identified chronic toxicity of water samples were determined.

Discussion and Results. Pond №1 is the first in this cascade, and therefore some water from it flows into the next pond. Due to this combination of reservoirs we should understand that the water quality of the following reservoirs of the cascade depends on the quality of the water in the previous ones. It is important to take into account the fact that the pond is lower in relief from the railway station and road. Although it is located in the park zone, it detains a certain amount of pollutants by vegetative cover, but there is a possibility of pollutants getting into this water object.

To assess water pond №1 conditions there were conducted physico-chemical and ecotoxicological analyses of water samples. Physico-chemical analysis was used as the basis for determining the causes of water toxicity for hydrobionts, as well as for comparison with water-use standards. Ecotoxicological analysis was carried out using the method of biotesting to determine the chronic water toxicity on crustaceans *Ceriodaphnia affinis* Lilljeborg, which makes it possible to determine whether conditions are favorable for life of hydrobionts and fish breeding is possible in this pond.

During the biotesting, the chronic water toxicity was determined while diluting water samples in 1, 2 and 4 times. In all cases, water revealed chronic toxicity by the indicator of test objects' birth rate. Due to the fact that research did not show the multiplicity of dilution, in which chronic toxicity of water does not manifest itself, it was impossible to determine the level of chronic toxicity, the degree of contamination and the class of water quality.

On 01.01.2017, according to the Order of the Prime Minister of Ukraine, the action of sanitary norms and rules, which included norms for water of water objects of household-drinking and cultural water consumption was canceled, so the comparison of the results of the physico-chemical analysis was made with norms for water of water objects of fishery water-use, which are presented in Table 1.

Table 1 – Comparison of indicators of physical and chemical analysis with norms

№ by order	Indicators	Results of laboratory tests	Norms for water of water objects of fishery water-use
1.	Hydrogen index, pH	6,27	-
2.	Chlorides, g/m ³	88,4	300
3.	Ammonia, g/m ³	0,63	0,05
4.	Nitrites, g/m ³	0,26	0,08
5.	Dissolved oxygen, mg O ₂ /dm ³	3,0	-
6.	Fe (iron), g/m ³	0,101	-
7.	Zn (zinc), g/m ³	0,072	0,01
8.	Cu (copper), g/m ³	0,04	0,001

Indicators of ammonia, nitrites, zinc and copper exceed the norms for water of water objects of fishery water-use in 12,6, 3,25, 7,2 and 40 times, respectively. Such results may be related to the receipt of pollutants with surface runoff from the railway station and road. Such significant excess of MPC may be a condition for the emergence of chronic toxicity of water. In these circumstances, we can conclude that this reservoir can not be recommended for breeding and fishing.

Data of physical-chemical analysis have showed that pH is 6.27, so the water of the reservoir can be classified as weakly acid.

Nitrogenous substances (ammonia, nitrites and nitrates) are formed in water as a result of chemical processes and decomposition of plant residues, as well as due to the expansion of protein compounds that enter almost always with sewage water, the final product of decomposition of protein compounds is ammonia. Ammonia presence in the water of plant or mineral origin is dangerous from a sanitary point of view. Significant excess of MPC of ammonia combined with a high content of nitrites suggest that pollution happened a long time ago. The decay of organic residues may be due to insufficient content of dissolved oxygen in water. Such results indicate water acidification in pond №1, the processes of organic residues decay and, therefore, all this indicates violation of the reservoir self-cleaning processes.

Conclusions. Thus, the current state of pond №1 makes it impossible to recommend this water object for use in fisheries. Also, indicators of dissolved oxygen, ammonia and nitrites have shown that the pond has a poor ability of self-cleaning. Excess MPC of metals, found in a water sample, may be due to the receipt of pollutants with surface runoff from the railway station and the road and can cause chronic water toxicity. In the case of measures to clean and protect against further pollution of this reservoir, it is possible to improve its condition in order to ensure the possibility of water-use. Since this reservoir was polluted, then

it would be advisable to conduct a research of all ponds of cascade, as flowing water from the first pond could cause contamination of the next one.

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THE DETERMINATION PROBLEM OF *EXECHESOPS FOLIATUS* FRIESER, 1995 (COLEOPTERA, ANTHRIBIDAE) IN THE FOREST-STEPPE ZONE OF THE LEFT-BANK UKRAINE

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Scientific supervisor: Terekhova V.V.

Abstract: *Exechesops leucopis* Jordan, 1928 was considered to be a part of Anthribidae specimens in Ukraine. The samples of *Exechesops* genus have been collected in Kharkiv region and determined as *Exechesops foliatus* Frieser, 1995. The examination of previously published records of the genus has shown that only *E.foliatus* is present in Coleoptera fauna in Ukraine.

Key words: beetles, Anthribidae, *Exechesops foliatus*, *Exechesops leucopis*

Introduction. The Anthribidae family consists of more than 3000 species but the major part of them is tropical ones. According to the publications [Löbl, Smetana 2011: 90-109; UkrBIN] the findings of 21 species have been registered in Ukraine, including *Exechesops leucopis* Jordan, 1928.

The *Exechesops* genus includes 54 species. There are 14 species in the Palearctic region [Löbl, Smetana 2011: 90-109], but the only 2 species of *Exechesops* genus are thought to have been found in Ukraine, namely *E.foliatus* and *E.leucopis*. *Exechesops foliatus* Frieser, 1995 is close enough to *Exechesops leucopis*, they look alike and have the overlapping area of spread. *E.foliatus* has been registered in Korea, China, Far East and *E.leucopis* has been found in Korea, China, Vietnam Far East and Japan [Park, Hong, Han 2012: 50-52].

Exechesops leucopis was described in 1928 by Jordan in north Vietnam. *Exechesops foliatus* was described in 1995 by Frieser and in 1996 by Egorov as *E.elenae*.

E.foliatus host plants are reported to be *Acer tataricum* and *Acer ginnala*, while *E.leucopis* is associated with *Styrax japonica* and *Styrax obassia*. The Anthribidae species in general are xylophagous. The *Exechesops* specimens also use seeds of their host plants for reproduction.

Exechesops foliatus is considered to have been brought to Europe with decorative plants from China. At the same time it has not been registered in artificial plantations such as parks or gardens [Yunakov, Terekhova 2012: 419-422].

Exechesops foliatus was registered in Ukraine for the first time in 2000 in Donetsk region. According to the UkrBIN database [UkrBIN], some findings also was registered in Poltava region in 2008, in Kharkiv region in 2002, 2008, 2012, 2013, 2014, also in Donetsk region in 2012, and in Lugansk region in 2006. In all these cases the samples are signed as *E.leucopis*.

Diagnostic features for *E.foliatus* are following: eyes only placed on upper edge of frons in male; 3rd antennomeres clavate and flattened in male; basal carinula unclear and not connected to angle of carina in both sexes [Park, Hong, Han 2012: 50-52].

Diagnostic features for *E.leucopis* are following: eyes placed on long stalk in male; 3rd antennomeres not clavate and much longer than other segments; basal carinula clear and connected to angle of carine in both sexes [Park, Hong, Han 2012: 50-52].

Thereby, it is harder to distinguish females than males visually.

In the research, devoted to behavior features of *E.leucopis* [Yoshitake, Kawashina 2004: 78-79], it is emphasized that the size of stalk is proportional to the size of body. Thereby, the bigger is a specimen, the

brighter and more conspicuous is the feature. An *Exechesops foliatus* or *Exechesops leucopis* specimen is considered as a big one if it has a body of 6-8 mm long.

Examining the photos of the big specimens of previous years' findings that are presented in [Yunakov, Terekhova 2012: 419-422; Zabaluev 2012: 378; UkrBIN] we can observe no typical features of *E.leucopis* in them (Fig. 2).

The **aim** of our research is to point out the species affiliation of *Exechesops* genus specimens in Ukraine. The **tasks** are to analyze diagnostic morphological features of the collected insects and to identify the presence of the *Exechesops* species. The **object-matter** of the research is the beetles from the genus *Exechesops* in the forest-steppe zone of the Left-bank Ukraine and the **subject-matter** is the morphological features of the imago and the species affiliation of beetles.

Materials and methods. The sampling was made near Gaidary village in Kharkiv region in July and August 2017. Three points of the host plant *Acer tataricum* growth were chosen: upland oak forest (49,625332N, 36,308258E), edge of upland oak forest (49,626629N, 36,315518E) and edge of upland oak forest on the border with dry meadow (49,626621N, 36,315034E).

The beetles were collected by means of the beating technique. Collecting pan is placed under branches with seeds and then branches are roughly shaken to dislodge insects on the pan.

The beetles were collected in the morning between 9 a.m. and 11 a.m. and in the afternoon about 4 p.m.

The beetles were kept in the 96% ethanol to save DNA for the further molecular analysis.

The determining was made by the morphological method. All specimens were examined thoroughly under a binocular microscope. The most attention was drawn to male specimens as their features are much clearer for observation.

All collected specimens are housed in the KUMN – Museum of Nature, Kharkiv National University (Kharkiv, Ukraine).

Results. The host plants, on which the sampling was made, had a lot of seeds damaged by the beetles. There were some dry parts on plants, and sampling on these parts was as successful as on the branches with seeds. The high level of seed damage was noticed.

Exechesops foliatus Frieser, 1995

COLLECTED MATERIAL. Ukraine: Kharkiv Prov.: 5♀ (KUMN) Gaidary vill. env., 49,626621N, 36,315034E, 18.VII.2017; 2♂ (KUMN) Gaidary vill. env., 49,626621N, 36,315034E, 19.VII.2017; 10♂♂, 9♀♀ (KUMN) Gaidary vill. env., 49,626629N, 36,315518E, 23.VII.2017; 4♀♀ (KUMN) Gaidary vill. env., 49,626629N, 36,315518E, 05.VIII.2017; 2♂♂, 7♀♀ (KUMN) Gaidary vill. env., 49,625332N, 36,308258E, 06.VIII.2017.

With the help of morphological method the species affiliation of collected beetles has been determined. Diagnostic features of both *E.foliatus* and *E.leucopis* have been observed under a binocular microscope. Samples are from a big size class, males do not have stalk on their heads and their 3rd antennomeres are clavate and flattened. Basal carinula is not connected with the angles of carina in both sexes.

Other diagnostic features also have confirmed that collected beetles are *E.foliatus*.



Fig. 1. The collected specimens of *E.foliatus*



Fig. 2. *Exechesops specimens*
studied previously
[Yunakov, Terekhova 2012: 419-422]



Fig. 3. Other findings in
Ukraine [UkrBIN]

If we compare the photos of specimens from publications about *E.leucopis* in Ukraine (Fig. 2) and in the data base UkrBIN (Fig. 3) with specimens collected this season (Fig. 1), the following conclusion can be made: only *E.foliatus* has been found in Ukraine and in the previous publications we deal with a fallacious determination.

Conclusion. The *Exechesops* specimens sampling has been made. The collected samples are determined as *Exechesops foliatus*. It is obvious that we deal with the mistakes in determination of this species in previous findings in Ukraine.

Our further research is connected with making the complete and actual list of Anthribidae species in Ukraine and the keys for their determining.

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PARKINSON'S DISEASE TREATMENT METHODS

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Abstract: The paper studies medical, surgical and other ways of Parkinson's disease treatment. The principals and methods of Parkinson's disease detection are analyzed. Basis principals of PD diagnosis are identified. The paper determines different methods of treatment on different stages of Parkinson's disease. It is found in the paper genes, toxins influence on development of PD and also existing different methods to support the organism.

Key words: anticholinergic drugs, diagnosis, dopamine, treatment.

Introduction: Most people don't know much about Parkinson's, and what they do know may be a poor guide to the early stages of the disease. Some symptoms which people experience before a definite

diagnosis are very vague and non-specific. For instance several people described quite long periods when they noticed that they were increasingly exhausted, or noticed that they had become physically or mentally slower, or felt somewhat depressed.

Objective of the paper is to investigate the symptoms and treatment of Parkinson's disease. **Subject-matter** involves Parkinson's disease treatment. **Object-matter** of the research is classifying the methods of Parkinson's disease treatment. **The tasks** are to find out the possibility, ways of treatment and what purposes can be reached during treatment. **Materials** used are scientific articles from e-resources, investigating subject-matter. **Methods of research:** levodopa, Computed Tomography, magnetic resonance imaging.

Discussion. While it is known that the symptoms of Parkinson's disease occur when many nerve cells in the substantia nigra area of the brain die. It is still unclear what causes these cells to die. A review of the latest research evidence from the Parkinson's suggests that a combination of genes and the environment may trigger the disease. Genetic research has identified genes which are linked to Parkinson's and it is possible that in some cases of young-onset Parkinson's, one or more of these genes may be abnormal. Other research has revealed environmental causes, for example, toxins which have caused the dopamine producing cells to die [Garcia Esparcia, 2013].

The research suggests that the make-up of people's genes might make them more likely to get Parkinson's disease but only if they are exposed to other factors.

The research proves that medication treatment of Parkinson's disease is more effective with Levodopa. It is a substance which can diminish some of the movement difficulties experienced by people who have Parkinson's disease. Discovered in the 1960's, levodopa is an amino acid which is converted in the brain to dopamine. Dopamine is one of several neuro-transmitters used by nerve cells in the brain and elsewhere in the body to send signals to each other.

According to experts, people with Parkinson's disease don't produce enough dopamine. When it became possible to manufacture levodopa, remarkable improvements were observed among people with Parkinson's disease. But it was also soon realised that the use of levodopa rather than dopamine over many years carried risks of severe and disabling side effects. Since the 1960s many advances have modified the effects of levodopa but it continues to be the main drug in the treatment of Parkinson's disease [Garcia Esparcia, 2013].

Other drugs, called dopamine receptor agonists, imitate the effects of dopamine, and may also be used, either alone or together with levodopa. Levodopa is now combined with another drug, a dopa-decarboxylase inhibitor. This helps to reduce some of the unwanted side effects such as nausea, vomiting and blood pressure changes. Two dopa-decarboxylase inhibitor drugs are in common use: benserazide and carbidopa, combined with levodopa form co-beneldopa and co-careldopa [Duffy J. , 2014-2017].

The investigation shows that levodopa is sometimes used to diagnose Parkinson's disease when the cause of symptoms is uncertain. A patient is given levodopa and, if a noticeable improvement occurs, this confirms the diagnosis [Ganong William F., 2005].

Several people whose symptoms were not seriously problematic when they were diagnosed could delay taking on medication for months, even years. The use of dopamine over many years can cause problems.

Managing dopamine levels is very complicated. Some people find that when they take levodopa close to meals, especially meals containing protein, the desired levels are not reached, because its ability to get into the blood is blocked.

Concerning the main alternatives to levodopa in treating Parkinson's disease we should mention the dopamine receptor agonists (dopamine agonists). These drugs act directly on the dopamine receptors in the brain, taking the place of the dopamine which the brain cells can no longer produce. They may be used alone or together with levodopa. When used alone, the overall improvement in motor performance is usually less than when combined with levopoda [Singh, 2011].

The research makes attempt to prove that dopamine agonists have the advantage of causing long term motor complications. When they are used together with levodopa, less levodopa is needed that also diminishes the risk of developing side effects, particularly dyskinesia. A range of dopamine agonists are available and most come as tablets or capsules of various strengths, although some come as patches or injections. People may need to experiment with their doctor to find what works best for them. The dopamine agonists are not without their own side effects, both in the short and long term, so their use must be carefully monitored [Ganong William F., 2005].

Many neurologists prefer to use it as the first treatment in the early stages, particularly for people with young-onset Parkinson's disease in whom prolonged use of levodopa might result in dyskinesia later.

The research reveals the fact that dopamine agonists should be injected gradually, starting with very tiny doses and building up to an effective dose over weeks or even months. The patients did not notice the sudden and amazing effects observed on first taking levodopa. The PD symptoms did not improve immediately and often side effects such as nausea and excessive daytime sleepiness were distressing. It should be mentioned that the main reason for keeping the dose of medication as low as possible is that the higher the dose, the greater the side effects.

One group of dopamine agonists (cabergoline and pergolide) are derived from ergot and have been associated with fibrotic (scarring) reactions affecting the lungs and the heart. These drugs are still occasionally used but require careful monitoring [Duffy J., 2014-2017].

Considering other medications for Parkinson's disease we can state that they are used occasionally alone but usually together with levodopa or a dopamine agonist.

The MAO-B inhibitors (Monoamine-oxidase-B inhibitors such as rasagiline and selegiline) delay the breakdown of dopamine helping to reduce the 'end-of-dose' deterioration for people who are taking a levodopa preparation. Selegiline can also be used on its own in the early stages of treatment when the body is still itself making reasonable amounts of dopamine. It is not recommended for use to the patients who have postural hypotension (a tendency to develop low blood pressure when they stand up) as it can make this worse.

Another group of drugs is called COMT inhibitors (catechol-O-methyltransferase such as tolcapone and entacapone). They prevent the breakdown of levodopa, so allowing more to reach the brain. Before levodopa was discovered only anticholinergic drugs could be used to treat Parkinson's disease. They were particularly effective in treating tremor and are still occasionally used in the early years of the disease if tremor is the only symptom.

When we refer to 'surgery' in Parkinson's disease it usually refers to Deep Brain Stimulation (DBS).

According to experts, Deep Brain Stimulation involves placing a wire with electrodes at its tip into one of three target sites in the brain (the thalamus, the globus pallidus or the subthalamic nucleus). A few days after they are connected to an implantable pulse generator (IPG). This small unit is inserted under the skin on the chest wall. When the IPG is turned on the electric pulses stimulate the target area and produce a change in the Parkinsonian symptoms [Singh, 2011].

Before Deep Brain Stimulation was introduced in the 1980's the only operation available for Parkinson's disease involved selectively damaging certain cells in the thalamus and the globus pallidus called 'lesioning'. While this sometimes relieved symptoms the damage was irreversible and the operation was risky. With DBS the insertion of the electrodes can be checked to confirm that they have been sited correctly and there are further opportunities for 'fine tuning' through the IPG. The technical advances which made this operation possible have been the development of CT and MRI scanning which allow a surgeon to locate the target site with great accuracy. While it is not essential, it is usual for the electrodes to be inserted with the patient awake so that they can provide evidence that the target has been reached.

The research makes attempt to prove that for several of the people who had not had the operation, the possibility of being awake while their brain was being manipulated was enough reason for them to dismiss the very idea of undergoing it [Duffy J., 2014-2017].

Some people have difficulties with their speech following the operation, a symptom which some did not have before DBS.

One important change which has affected all the people who had DBS was being able to cut down on the amount of medication they have had to take to control their symptoms. In doing this they have mostly succeeded in avoiding the dyskinesia which had troubled them before the operation.

It has been found that some patients had already explored alternative therapies before their diagnosis in an attempt to alleviate symptoms which had not yet been explained. Someone practised on herbal medicines, tried walking, mentioned about swimming. People attended a gym, and had tried exercise, used massage, chiropractic, osteopathy, reflexology.

The research proves that therapies like yoga, Tai Chi and massage helped them to relax and to feel as if they were doing something positive to help themselves. Relaxation meant relief from pain, spasm and feelings of stress. Many people, whose emotional state affected their symptoms, noted that relaxation helped calm their tremor, helped them to sleep and made them feel generally better.

Results. Considering the above-mentioned facts, we can assume that the choice of methods of Parkinson's disease treatment depends on the stage of its development. There exist different methods to support the organism, but there are none of them which can help to get rid of the disease completely. Scientists have been investigating new methods for delivering dopamine to critical areas in the brain. Parkinson's disease research is being focused on many aspects: the functions and anatomy of the motor system regulating

movement through command centers in the brain; the cause of Parkinson's disease such as toxins that may trigger the disorder; genetic defective factors; new protective drugs that can delay, prevent, or reverse the disease.

Conclusions. It has been found that the disease under adequate treatment is not fatal and the average life expectancy of people suffering this disease usually does not differ from the average. However, secondary complications such as pneumonia, injuries in the fall, suffocation, etc., can lead to the death. It also should be noted that the violation or neglecting treatment inevitably leads to severe disability and premature death. We can draw a conclusion, that Parkinson's disease and needs further investigation to predict how fast it will progress.

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DIFFERENTIATED APPROACH TO THE TREATMENT OF ANDROGENETIC ALOPECIA TAKING INTO ACCOUNT INFLUENCE OF AN INFLAMMATORY COMPONENT AND IMMUNE DISORDERS

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Abstract. The paper focuses on the main methods of research on androgenetic alopecia (AGA), the androgen-dependent and hereditary disease of scalp hair, which has different patterns, age of onset, frequency for males and females. Nowadays, androgenetic alopecia is the most frequent cause of male and female hair loss which causes psychological distress and negative influence on the quality of life.

Various treatment schemes and methods do not always lead to a successful result as it depends on whether therapy is directed to the etiologic and pathogenic factors of the disease. Taking all of this into account, it is required to conduct research about new possible links in AGA etiology, to specify the role of immunological disorders in AGA and according to this, search for new possible ways of treatment.

Key words: androgenetic alopecia, growth factors, immunology, platelet-rich plasma, treatment, trichology.

Introduction. Hair loss nowadays is a condition that might have a significant influence on quality of life, leading to low self-esteem, emotional distress and even social isolation for both men and women. Among all non-scarring alopecia, androgenetic alopecia is the most common one [Zlatogorskiy et al. 2013, Trueb 2010, Ralph 2010].

Androgenetic alopecia (AGA) is a multifactorial disorder of scalp hair with a genetic predisposition and an important role of endocrine factors that leads to progressive miniaturization of the hair follicle. AGA has a worldwide occurrence, can start at any age and affects patients of both sexes. About 50% of male patients over 30 suffer from the male pattern of hair loss, and about 38% of females – from the female pattern. Nevertheless, about 4% of males may have the female pattern of AGA, while 13% of premenopausal women and 37% of postmenopausal women may have the male pattern of hair loss [Trueb 2005, Ralph 2010].

In recent years, considerable success has been achieved in understanding key-points of pathobiology and molecular mechanisms of AGA, but still many questions remain unanswered which requires further research in this field. More and more recent studies report an important role of “inflammation-stress-fibrosis” phenomenon in AGA pathogenesis, and none of those have previously been considered in treatment guidelines. One of the most promising methods of AGA treatment is use of Platelet-rich plasma, as it is a natural source of growth factors whose role in hair follicle regrowth has been mentioned in many studies.

Consequently, further research of immunologic disorders will widen our understanding of a mechanism of a disease development, help to improve the diagnosis and explore novel therapeutic approaches.

Object-matter of the research is patients with androgenetic alopecia. Its subject-matter is a complex of clinical, biochemical and immunologic parameters of AGA patients in follow-up control.

The objective of the research is to consider laboratory, immune and clinical results in order to detect the role of inflammatory, destructive and immune disorders in case of AGA, and according to the results to improve treatment. The objective presupposes achievement of the following tasks:

- 1) to analyse molecular elements controlling the physiological hair follicle degeneration, determined by the immune system, via apoptosis-mediated organ death;
- 2) to study oxidative stress influence in AGA pathogenesis;
- 3) to study inflammatory component and fibrosis formation as important elements of AGA pathogenesis;
- 4) to detect the mechanism of action of platelet-rich plasma (PRP) on the differentiation and proliferation of a hair follicle cells;
- 5) to review the use of PRP as a new method of AGA treatment.

The research makes use of the following methods: clinical, biochemical, immunologic (immunohistochemistry and immunomorphology) and instrumental methods (trichoscopy, phototrichogram).

Discussion and Results. Clinical features. In men patients with AGA changes of normal scalp hair typically occurs in the male pattern, affecting frontal and temporal areas and the vertex. For grading the progression of this process during clinical trials Norwood Hamilton scale (Fig. 1) is used, which ranges from stages I to VII. This classification is the generally accepted standard when describing the male pattern of hair loss.

Women with AGA may have three clinical variants: (1) diffuse thinning of the crown with intact frontal hairline; (2) the so called “the Christmas tree” model, characterized by the diffuse thinning of the central part of the scalp and relatively intact frontal hairline; and (3) thinning with bitemporal regression of a frontal hairline resembling the male pattern, although not progressing beyond Hamilton stage IV. Female pattern of hair loss is most frequently classified according to the Ludwig scale (Fig.2), which ranges from grade I to grade III.

Although patients with androgenetic alopecia may experience periods of hair loss and worsening course, the progression of hair thinning is usually gradual and increases with age.

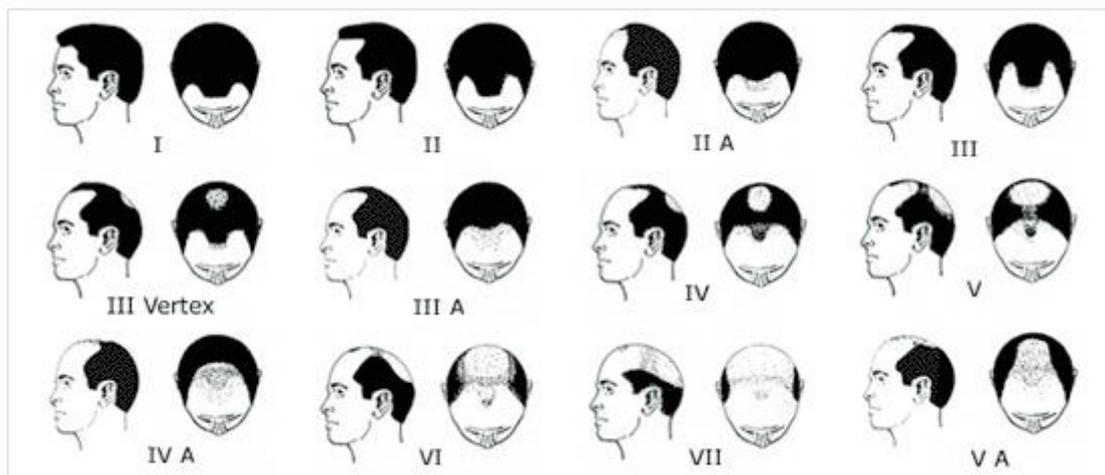


Fig. 1. Norwood Hamilton scale

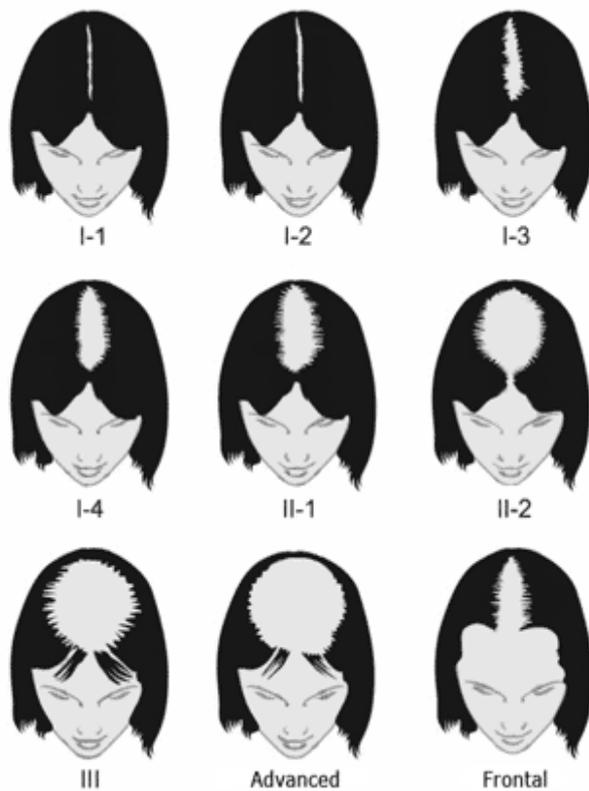


Fig. 2. Ludwig scale

Genetic influences and a current model for androgen action in the hair follicle. Androgenetic alopecia has generally been accepted as an autosomal dominant trait with variable penetrance. Recent research has been done to find out more about location-specific hair follicle gene expression, as the exact role of different parts of the hair follicle in AGA etiology remains unclear [Ralph 2010].

While genetic predisposition in androgenetic alopecia remains poorly understood, considerable success in understanding of main elements of androgen metabolism has been achieved. Androgen-dependent processes are appearing mostly as a result of a dihydrotestosterone (DHT) and an androgen receptor (AR) binding. DHT-dependent cell functions are defined by the presence of mild androgens, their transformation into more potent androgens with the help of 5α -reductase, low enzyme level of androgen-deactivating enzymes and presence of functionally active androgen receptors in high amount. Increased expression of androgen receptors and a high level of DHT were discovered in the scalp area prone to the disease. The leading role in testosterone-DHT transformation is performed by dermal papilla, and after androgens bind their receptors, the gene expression of the dermal papilla cells is altered so that they change their production of regulatory factors such as soluble growth factors or extracellular matrix proteins, which probably influence the growth of other hair follicle components [Zlatogorskiy et al. 2013, Trueb 2005, Trueb 2000].

Pathobiological aspects of AGA. Normally, hair follicle undergoes repeated phases (anagen, when the hair is growing, catagen – a period of a brief regression, and a telogen phase of rest). This is known as a hair follicle growth cycle. In case of AGA, genetically disposed hair follicles in affected areas undergo an androgen-dependent gradual transformation of terminal pigmented hair into almost invisible depigmented vellus hair. The duration of next growth phases in a hair follicle growth cycle reduces, and this leads to decreasing of an anagen-hair number and a progressive follicular miniaturization [Morris et al. 1999, Wilson et al. 1994]. As a result, we have an increased loss of hair which is in the telogen phase (telogen effluvium), and, at the same time, affected hair follicle produces thinner and shorter new hair. Moreover, the biorhythm of the hair follicle growth cycle is changed – the time between hair loss and a new anagen regrowth increases, which leads to decreased scalp hair density.

Although androgenetic alopecia is classified as a non-inflammatory type of baldness, early histological changes show nonspecific focal perivascular basophilic degeneration in the lower third part of connective tissue membrane with further mild perifollicular lymphocytic infiltrate on the sebaceous duct level. With further progression giant polynuclear cells may appear [Jaworsky et al. 1992, Mahe et al. 2000].

Perifollicular inflammation and fibrosis. Many independent studies have shown that micro-inflammation is responsible for AGA. Massive infiltration of activated T and B lymphocytes are also found

around the upper hair follicle [Mahe et al. 2000]. This is connected with an overgrowth of a follicular dermal membrane that consists of collagen bundles (perifollicular fibrosis) in areas with progressive hair loss. Analysis of horizontal section studies of a scalp biopsies has indicated a moderate perifollicular fibrosis consisting of loose concentric layers of collagen which must be differentiated from scarring alopecia [Sperling et al. 1995, Whiting 1993]. It was suggested to use the term “micro-inflammation”, as the process is distinguished by a slow and painless course, unlike an inflammatory and destructive condition in the classical scarring alopecias [Mahe et al. 2000].

Growth factors multidirectional influence on a hair follicle. Growth factors and cytokines play an important role in development of a hair follicle. According to a contemporary understanding, hair regeneration is a two-stage process, connected with two groups of stem cells, concentrated in bulge zone and in dermal papilla [Greco et al. 2009, Lavker et al. 2003]. Cells of a germ layer are more differentiated comparing to bulge zone cells, which supposedly are precursors of a germ layer. Situated specifically close to papilla, germ cells are the first ones who get the mesenchyme signal. Then during an anagen's second phase bulge zone cells join the process of hair growth – they start an active proliferation and division in a downward direction forming an outer root sheath [Cotsarelis et al. 1990, Philpott et al. 1992]. It is obvious that such gradual recurrent mechanism of differentiation needs strict coordination. Growth factors, produced by both epidermis and mesenchyme cells, play this regulative role.

Growth factors are polypeptides with a molecular weight 5-50 kDa, which are in the group of trophic regulative substances. Similar to hormones, these factors have a wide spectrum of biological action on many cells – stimulate or decrease mitogenesis, chemotaxis, differentiation. But unlike hormones, growth factors are produced by nonspecialized cells that are located in all tissues, and have an endocrine, paracrine and autocrine effect. Nowadays it is established that such factors, as EGF, TGF- β , IGF-1, HGF, KGF, VEGF take part in a hair follicle growth cycle [Philpott et al. 1996, Alexandrescu et al. 2009, Danilenko et al. 1995, Guo et al. 1996, Morris et al. 1999]. The main immunogenic reactivity has been shown by dermal papilla cells. Also it has been found that growth factor influence on the hair follicle depends on the character of its realization. For example, such growth factors as EGF, TGF- α , TGF- β , FGF-1, FGF-2 decreased hair growth, this group of factors is characterized by autocrine effect. At the same time, subcutaneous injections of paracrine growth factors as FGF-7, IGF-1, HGF had a stimulatory effect on hair growth and modulated hair follicle cycle in vivo [Inui et al. 2011, Tsuji et al. 2003, Xu et al. 2001, Zhao et al. 2011].

Current therapeutic strategies. The main aim of AGA treatment is to increase hair coverage of the scalp and to slow down progression of hair thinning. Evidence-based methods of treatment include topical minoxidil (2 and 5%) and oral finasteride (competitive inhibitor of type 2 5 α -reductase). The second-line of treatment includes hormonal treatment (cyproterone acetate, spironolactone) with low evidence levels, and a broad spectrum of miscellaneous treatments claiming to be efficient too with insufficient or lacking evidence [Blume-Peytavi et al. 2011, Blumeyer et al. 2011, Hajheydari et al. 2009, Li et al. 2001]. Traditionally, in complex therapy of patients with scalp diseases various nutrition supplements are used, containing aminoacids, pantothenic acid, biotin and a combination of L-cystine, yeast and pantothenic acid (CYP-complex) [Trueb et al. 2005]. Surgical methods are expensive, painful and long-lasting, their possibilities are limited.

The most promising method for AGA treatment is the use of platelet-rich plasma (PRP).

Platelet rich plasma (PRP) is basically an increased concentration of autologous platelets in a small amount of plasma after centrifugation. Platelets play a fundamental role in hemostasis and are a natural source of growth factors. In 2006, Uebel et al. reported a study in which patients subjected to hair transplant surgery had their follicular units embedded in PRP before transplantation, this approach resulted in improved hair growth and an increase in follicular density. In 2009, Greco et al. performed a study to determine if PRP had any effect on non-transplanted miniaturized hair, the result of this small study revealed an average increase of hair shaft diameter after 6 months. Those results give a ground to count a PRP method as a new possible therapeutic approach in AGA treatment and give a reason for further research.

Conclusions. The research considers widening the current concept of mechanism of AGA development, detection of the role of immunologic disorders in the pathogenesis of the disease. Current therapeutic methods do not take into account the "inflammation-stress-fibrosis" phenomenon which has been recently discovered by many independent researches. Moreover, an important goal is to improve the records on the spectrum and role of growth factors in hair follicle growth cycle regulation. Nowadays it is established that such factors, as EGF, TGF- β , IGF-1, HGF, KGF, VEGF take part in a hair follicle growth cycle, but this still requires further studies. Previously published articles reported that high concentration of growth factors in PRP can help to achieve new hair growth, thickening of hair shafts, etc. As a result, analysis of PRP method application as a new possible AGA treatment method is required.

Further studies in the pathophysiology of AGA help to improve the diagnosis and explore novel therapeutic approaches.

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BIOLOGICAL AND CLINICAL ASPECTS OF TYPE 2 DIABETES MELLITUS TREATMENT

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Abstract: The clinical aspects of treatment of type 2 diabetes mellitus are considered in the paper. The principles and methods of type 2 diabetes are analyzed. The main principles of the treatment of diabetes mellitus are defined. The article shows that knowledge of the biological and genetic characteristics of type 2 diabetes leads to improvement in the quality of treatment and reduction in the risk of complications in patients..

Key words: Biological characteristics, diagnostics, metformin, treatment.

Introduction: According to statistical data recently the incidence of type 2 diabetes has increased steadily throughout the world. Type 2 diabetes is a heterogeneous and multifactorial disease. The disease develops in the bowels of the metabolic syndrome is accompanied by hyperglycemia and leads to the defeat, dysfunction or insufficiency of systems and organs, mainly the cardiovascular, nervous, eyes and kidneys. **Objective** of the paper is to determine the effectiveness of treatment for patients with type 2 diabetes mellitus. **Subject-matter** involves the basic principles of treatment of type 2 diabetes. **Object-matter** of the research is the case histories of patients with type 2 diabetes mellitus. **The tasks** are to clarify the causes of diabetes and to assess drug therapy among patients with type 2 diabetes according to recommendations of the "Unified health insurance primary and secondary (Specialty) medical care" Type 2 diabetes. **Materials** used are scientific articles of medical journals that study the subject. **Methods** of research are retrospective analysis of case histories of patients with type 2 diabetes mellitus.

Discussion. According to international statistics of the World Health Organization, the National Health Systems, professional associations and the International Diabetes Federation (IDF Diabetes Atlas) type 2 diabetes is one of the most widespread endocrine diseases all around the world (552 million patients in 2016) and in European countries (52.8 million patients, the average prevalence is 8.5%). It is proved that constantly progressive increase in number of people with type 2 diabetes gives reason to call this disease «Noninfectious epidemic of the 21st century». It should be noted that knowledge of the risk factors for developing type 2 diabetes has improved significantly due to well-designed promising research in many population groups. The prevalence of diabetes varies markedly in geographical regions, ethnic groups and age. In most cases the prevalence among men is higher than that of women under 60 years of age. For every known case of type 2 diabetes there is approximately one person with a previously undiagnosed case, which can be detected only when testing the glycemic status. Many of these people with asymptomatic hyperglycaemia can be detected only with an oral glucose tolerance test. The prevalence of impaired glucose tolerance in the population is roughly similar to the prevalence of diabetes. The risk factors for developing type 2 diabetes are relatively well known. The role is played both genetic and non-genetic. The rapid increase in the prevalence of type 2 diabetes over the past few decades throughout the world emphasizes the importance of changing lifestyle risk factors, of which the most important are obesity, sedentary lifestyle and malnutrition. This gives an idea of the prevention and treatment of type 2 diabetes. In the research much attention is paid to drug treatment and a selection of drugs common in our country.

The research shows that a modern therapeutic strategy of treatment of diabetes has been directed at the most effective prevention of progression of the disease and its complications and achievement of the maximum disease control. For this purpose in EU countries decision on creation of an integrated registry of patients with diabetes was taken in March 2012. This registry includes data collection, monitoring, complications and costs of treating patients with diabetes. The project was named EUBIROD (European Best

Information through Regional Outcomes in Diabetes). The Ministry of Health of Ukraine has planned to begin creating an integrated Ukrainian registry of patients with diabetes already in the 2015. Ratification of «Unified Clinical Protocol of primary and secondary (specialized) medical care «Type 2 diabetes» has become one of the most significant steps in the unification of medical care for patients with type 2 diabetes in Ukraine [Ahmed, 2002, 5-8].

We can assume that Type 2 DM is characterized by insulin insensitivity as a result of insulin resistance, declining insulin production, and eventual pancreatic beta-cell failure. This leads to a decrease in glucose transport into the liver, muscle cells, and fat cells. There is an increase in the breakdown of fat with hyperglycemia. The involvement of impaired alpha-cell function has recently been recognized in the pathophysiology of type 2 DM. A decreased β -cell mass through genetic and / or β -cell cytotoxic factors is an important predisposing factor for glucose intolerance. As the blood glucose level rises to an insignificant degree above the normal level, acquired defects in the glucose homeostasis system violation of the first phase of the insulin response to food, leading to a rise in the blood glucose level in the pre-diabetes. This increase in glycemia, possibly in combination with hyperlipidemia, causes an additional impairment in the function of β -cells and, to a lesser extent, resistance, as a result of which the blood glucose level continues to rise to full diabetes [Jack L. Leahy, 2008, 17-33].

The research shows as a result of this dysfunction, glucagon and hepatic glucose levels that rise during fasting are not suppressed with a meal. Given inadequate levels of insulin and increased insulin resistance, hyperglycemia results, the incretins are important gut mediators of insulin release, and in the case of GLP-1, of glucagon suppression. Although GIP activity is impaired in those with type 2 DM, GLP-1 insulinotropic effects are preserved, and thus GLP-1 represents a potentially beneficial therapeutic option. However, like GIP; GLP-1 is rapidly inactivated by DPP-IV in vivo. We can define pharmacological Agents: derivatives, biguanides, thiazolidinediones, meglitinides, inhibitors α – glucosidase, glucagon-like peptide-1 (GLP-1) agonist – incretin mimetics, DPP-4 inhibitors. Biguanide derivatives belong to the main classes of antidiabetic drugs, among which metformin is the most common drug used for the treatment of type 2 diabetes.

It has been proved that metformin effectively contributes to lowering blood glucose levels, increasing sensitivity to insulin, reduces the risk of cardiovascular disease, hypoglycemic coma, and is the only hypoglycemic drug to improve macrovascular outcomes and reduces mortality in patients with T2DM. A new group of OHGD has been registered in Ukraine not long ago (in late 2013). They are called oral sodium glucose cotransporter type 2 (SGLT2) inhibitors. The drug from the group of sulfonylurea derivatives Glimepiride was administered most often – in 45%. Glimepiride was administered as monotherapy (in 10%) or in combination with Metformin (in 33%) and only 2% in the form of fixed combination (Tripride – Glimepiride, Pioglitazone, Metformin). Gliclazide is second in frequency of prescribing (20%). Gliclazide was administered as monotherapy (in 3%) or in combination with a Saxagliptin, Vildagliptin, Sitagliptin (in 2%), in combination with Metformin (in 15%). Glibenclamide was administered as a fixed combination with Metformin (Glibomet, Glukovance, Glibofor) in 5%. DPP-4 inhibitors was administered in 13%, in which connection drugs of this group were administered as monotherapy in 4% (Saxagliptin, Vildagliptin, Sitagliptin) or in form of fixed combination with Metformin (Janumet, Galvus Met, Kombiglyze). Dapagliflozin (SGLT2 inhibitors) as second-line monotherapy was administered in 1.2%. Insulin therapy was administered in 15.8% due to severe type 2 diabetes as a combination with Glimepiride, Metformin and in a fixed combination (Glibomet, Kombiglyze) [Lucychsky, 2015, 18-30].

Results. As a result of a retrospective analysis of 90 stories of the disease of patients with type 2 diabetes, it was found.

– Patients with DMD type 2 of moderate severity (75%) received oral hypoglycemic (PGHP) therapy, and patients with DMD type 2 of severe type (25%) received treatment with insulin and PGHP drugs introduced in the Unified Clinical Protocol;

– The most commonly prescribed drugs are from the group of sulfonylureas derivatives (70% of all appointments).

As a result of this study, everyone was treated, in accordance with the clinical manifestations of type 2 diabetes.

Conclusions. Type 2 DM is a metabolic disease that can be prevented through lifestyle modification, diet control, and control of overweight and obesity. Education of the populace is still key to the control of this emerging epidemic. The treatment regimens comply with the recommendations of the Unified Clinical Protocol. But in accordance with the recommendations, a drug that must be present in various diabetes

therapies (therapy, doubled and tripled therapy) is Metformin (in the absence of contraindications for its use). In the case of two or more drugs, preference should be given in favor of fixed combinations, which are presented in the pharmaceutical market of Ukraine in sufficient quantity, which allows choosing the most suitable combination with calculation of the features of the course of diabetes and compliance with the patient that therapy.

It can be concluded that according to international recommendations Metformin and/or DPP-4 inhibitors are first-line drugs in the initial therapy. A combination of several drugs in one dosage form significantly simplifies the use of the drug regime and leads to increase of compliance of the patient to therapy, allows to support long-term glycemic control, preventing the progression of diabetes and development of complications.

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INTAKE OF INDIVIDUAL SATURATED FATTY ACIDS AND RISK OF CORONARY HEART DISEASE

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Abstract. The article deals with the review of two long term US cohort group studies (1986-2012) which investigated the association between the intake of individual saturated fatty acids (SFA) and the risk of coronary heart disease (CHD) basing on the various effects of SFAs on blood lipids. It includes the analysis of the data obtained and dietary recommendations including the healthy macronutrients for SFA replacement to prevent CHD.

Key words: saturated fatty acids (SFA), coronary heart disease (CHD), nutrient profile, macronutrients.

Introduction. Prevailing dietary US guidelines recommend to keep the intake of saturated fatty acids (SFA) below 10% of total energy for the prevention of cardiovascular diseases, a leading cause of death worldwide [Mozaffarian D, Benjamin EJ, Go AS 2015: 131: e29-322]; [Astrup A, Dyerberg J, Elwood P 2011: 93:684-8]. However, the findings from the recent systematic reviews and meta-analyses remain inconsistent on the association between SFA intake and coronary heart disease, largely owing to SFA being compared to different macronutrients in published studies [de Souza RJ, Mente A, Maroleanu A 2015: 351:h3978]; [Siri-Tarino PW, Sun Q, Hu FB, Krauss RM 2010: 91:535-46]; [Jakobsen MU, O'Reilly EJ, Heitmann BL 2009: 89:1425-32]; [Mozaffarian D, Micha R, Wallace S 2010: 7: e1000252]. When SFAs were replaced with polyunsaturated fats, a lower risk of coronary heart disease was observed in large-scale prospective and intervention studies. But in practice, calories from SFAs are mainly replaced with low quality carbohydrates which exert clear adverse effects on cardio-metabolic disorders such as obesity and diabetes. Therefore, increased SFA intake does not appear to be associated with the risk of coronary heart diseases in many studies because the comparison nutrient was typically refined carbohydrates.

Object-matter. Association between long term intake of individual saturated fatty acids (SFAs) and the risk of coronary heart disease.

Subject-matter. Possible negative relationship between long term intake of individual saturated fatty acids (SFAs) and the risk of coronary heart disease.

Objective. To identify the link between long term intake of individual saturated fatty acids (SFAs) and the risk of coronary heart disease.

Tasks. To analyze the obtained data and draw a conclusion about the link between long term intake of individual saturated fatty acids (SFAs) and the risk of coronary heart disease.

Methods. Population study. The Nurses' Health Study included 121 700 female nurses aged 30-55 years in 1976 [Hu FB, Manson JE, Stampfer MJ 2001: 345:790-7], and the Health Professionals Follow-up

Study included 51 529 male health professionals aged 40-75 years in 1986 [van Dam RM, Willett WC, Rimm EB, Stampfer MJ, Hu FB 2002: 25:417-24]. Information on medical history, lifestyle, potential risk factors, and disease diagnosis was collected at baseline through a self-administered questionnaire which was updated every two years by use of similar questionnaires in both cohorts. The study protocol was approved by the institutional review boards of Brigham and Women's Hospital and the Harvard T H Chan School of Public Health. Return of self-administered questionnaires was considered as an informed consent.

The current analysis was conducted among 81 757 women and 51 529 men who completed a food frequency questionnaire at study baseline (in 1984 for the Nurses' Health Study and 1986 for the Health Professionals Follow-up Study). Participants were excluded if any of the following occurred:

- they reported their physician of diagnosed cancer, diabetes, or cardiovascular disease at study baseline (n=7749, Nurses' Health Study; n=7596, Health Professionals Follow-up Study);
- their total energy intake was deemed implausible (<600 or >3500 kcal/day, Nurses' Health Study; <800 or >4200 kcal/day, Health Professionals Follow-up Study; 1 kcal=4.18 kJ) or had missing individual SFA data (n=98; n=147);
- they answered the baseline questionnaire only or had missing age at baseline (n=763, Nurses' Health Study; n=1152, Health Professionals Follow-up Study).

The final variant included the data of 73 147 women and 42 635 men having completed all the information needed.

Ascertainment of the diet.

In 1980, Nurses' Health Study participants completed a 61-item food frequency questionnaire on their usual intake of foods and beverages in the previous year. In 1984, 1986, and every four years thereafter until 2010, they were sent an expanded food frequency questionnaire to assess and update dietary information. The same questionnaire was sent to Health Professionals Follow-up Study participants every four years, from 1986 to 2010. The study baseline year was 1984 for the Nurses' Health Study, for more comprehensive estimates of individual SFA intake starting from this follow-up cycle. Overall, women completed and returned 6.9 (86.3%) of the eight food frequency questionnaires received up to 2010, whereas men completed and returned 5.5 (78.6%) of seven questionnaires received.

Participants were asked how often, on average, they had consumed specific foods in the past year, with nine responses ranging from "never" to "at least six times per day" based on a specified standard portion size. They were also asked about the types of fat, oil, and margarine used during cooking and at the table. Intakes of even-chain SFAs with carbon chain lengths between four and 18, total polyunsaturated fats, total monounsaturated fats, and total trans fats were calculated by multiplying the frequency of consumption of each food item by its fatty acid composition, and then summing up the values from all foods.

SFA composition of foods was based on the US Department of Agriculture and Harvard University food composition database, which is updated over time to reflect the nutrient profile of new food items and changes in their processing [Farvid MS, Cho E, Chen WY, Eliassen AH, Willett WC 2014: 348: g3437]. As detailed previously, whole grain carbohydrates were estimated on the basis of whole grain ingredients from the list of grain based foods. These foods include oatmeal, oat bran, or whole bran bread; brown rice; popcorn; whole wheat bread; whole wheat crackers; rye bread; oat based cold cereals; raw oat or wheat bran; and bran muffins [Li Y, Hruby A, Bernstein AM 2015: 66:1538-48].

Researchers tested proportional hazard assumption by including interaction terms between individual SFAs and follow-up duration in the model, and results did not suggest that the assumption was violated ($P>0.05$). Substitution analyses were stratified by age (<65 years, ≥ 65 years), body mass index (<25, ≥ 25), physical activity (<18, ≥ 18 metabolic equivalent of task/week), and smoking status (current smoking or not). They performed three sensitivity analyses to examine the robustness of the findings. Firstly, researchers controlled for baseline body mass index instead of updated body mass index, because obesity is a potential mediator between SFAs and risk of coronary heart disease. Secondly, they made adjustments for hypertension, hypercholesterolemia, and diabetes diagnosed during follow-up. Finally, they excluded probable fatal cases. Statistical analyses were performed by using SAS 9.4 (SAS Institute). All P values were two sided, with statistical significance defined as $P<0.05$.

Patient involvement. No participants were involved in raising research questions or the outcome measures, nor were they involved in developing plans for recruitment, design, or implementation of the study. No participants were asked to advise on interpretation or writing up of the manuscript.

Results. At baseline, participants with higher SFA intake were younger, were more likely to be white and non-smokers, had lower alcohol consumption, engaged in less physical activity, and had lower prevalence of hypercholesterolemia and hypertension than those with lower SFA intake. These participants

were also less likely to take multivitamin supplements; had a higher body mass index; and had higher intakes of total energy, polyunsaturated fat, monounsaturated fat, trans fat, and proteins, and lower intakes of carbohydrates and plant proteins.

Substitution analysis was stratified by age, body mass index, physical activity, and smoking status, and all P values for interaction were greater than 0.05. Associations between SFA intake and risk of coronary heart disease were similar when baseline body mass index was adjusted as a covariate, but were slightly attenuated when incident hypertension, hypercholesterolemia, and diabetes diagnosed during follow-up were further adjusted. Exclusion of probable fatal cases of coronary heart disease (n=790) did not materially change the main findings.

Discussion. In two large prospective cohorts of US men and women, dietary intakes of major individual SFAs – including lauric acid (12:0), myristic acid (14:0), palmitic acid (16:0), and stearic acid (18:0) – were positively associated with risk of coronary heart disease during 24-28 years of follow-up. Replacement of 1% daily energy intake from the combined group of 12:0-18:0 by equivalent energy from polyunsaturated fats, whole grain carbohydrates, or plant proteins was associated with a 6-8% reduced risk of coronary heart disease. The same replacement of 16:0 was associated with 10-12% reduction in risk.

Conclusion. It was found that dietary replacement of 12:0-18:0 with healthier macronutrients – such as polyunsaturated fat and whole grain carbohydrates – was associated with a lower risk of coronary heart disease. Particularly, the replacement of 16:0 with these beneficial macronutrients was associated with the lowest risk. Owing to high correlations among individual SFAs in diet, these findings support the current dietary recommendations that focus on replacement of total saturated fat as an effective approach to prevent cardiovascular disease. The public health and clinical significance of modulating the content of individual SFAs in specific foods should be further evaluated.

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MITOCHONDRIAL DYSFUNCTION ASSOCIATED WITH CHRONIC FATIGUE SYNDROME

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Abstract. This paper aims to discover the ways of improving the health of patients suffering from chronic fatigue syndrome, which comes up because of mitochondrial dysfunction, by interventions based on the function of mitochondria in producing adenosine triphosphate and recycling adenosine diphosphate to replenish the ATP supply in the cell. It is found in the paper that the genetic pathology is the key issue of mitochondrial diseases. In this paper was analyzed the complex of medicines used to correct mitochondrial dysfunction.

Key words: chronic fatigue syndrome, genetic pathology, mitochondria, mitochondrial disease, myalgic encephalomyelitis.

Introduction. According to the annual statistics, mitochondrial diseases are not common, not widely known and are under discussions and investigations. This is the reason why this pathology can impede the timely diagnostic and correct treatment. There are many chronic illnesses not currently classified as mitochondrial diseases. Examples of such illnesses include bipolar disorder, multiple sclerosis, Parkinson's disease, schizophrenia, depression, autism, and chronic fatigue syndrome, which will be *discussed directly* below.

Objective of the paper is to investigate the reasons of chronic fatigue syndrome emergence and the ways to reduce its influence on the patient's life.

Subject-matter includes chronic fatigue syndrome diagnosis, causes, and potential treatment methods.

Object-matter of the research is mitochondria and effects of their pathology.

The task is to prove the connection between mitochondrial dysfunction and appearance of chronic fatigue syndrome.

Materials used are scientific journals, articles from e-resources and the materials of the last scientific findings. **Methods** of research are genetic screening and blood chemistry («ATP profile» test).

Discussion. It can be started that mitochondria are special organelles that present in all nucleated eukaryotic cells and in almost every cell of the human body. They are responsible for the production of cellular energy in the form of ATP (Adenosine triphosphate).

According to experts, mitochondrial dysfunction can arise because of defects in either mitochondrial DNA or nuclear mitochondrial genes and can appear both in childhood and adulthood without any specific symptoms or with symptoms affecting an organ or tissue, or the organ systems. The numerous researches have revealed the fact that there is no absolute cure for the mitochondrial disease for the majority of patients with this disease, so the right diagnosis is therefore crucial for the further diagnostics and the clinical observation of affected patients. Moreover, research has established a link between mitochondrial dysfunction and numerous degenerative disorders. Most autoimmune disorders also appear to have a mitochondrial basis to them. In addition to this information, experts have suggested any illness that has symptoms of fatigue or a reduced energy component to it could be related to mitochondria.

We can assume that mitochondrial dysfunction has been hypothesized to occur chronic fatigue syndrome (CFS) - a disease characterized by fatigue, cognitive difficulties, pain, malaise, and exercise intolerance. CFS can also be referred to as myalgic encephalomyelitis (ME) or systemic exertion intolerance disease (SEID).

The underlying cause of the disease known as myalgic encephalomyelitis (ME) or chronic fatigue syndrome (CFS) is unknown, but there are at least two presumable hypothesis, which can explain this disease. One of the proposed theories is the task of this paper.

A widespread hypothesis (A) is that the metabolism of people with CFS is normal, but the fatigue and other symptoms are due to psychological factors. It is acknowledged that physical fatigue is lack of energy, but mental fatigue is considered to be a subjective sensation characterized by lack of motivation and of mental alertness, even though the brain is a major consumer of resting cellular energy. However, if the metabolism is functioning properly, the fatigue and related symptoms must be due to energy being wasted by the mental and physical processes of stress, exhaustion, tension and depression. Patients should be able to be helped, possibly cured by psychological intervention, e.g. cognitive behavioral therapy.

According to an alternative hypothesis (B), which is being in this paper, there is a metabolic dysfunction which results in the lack of energy being produced. The main source of energy comes from the complete oxidation of glucose to carbon dioxide and water. In the cytosol of each cell glucose is broken down in a series of chemical reactions called glycolysis into two molecules of pyruvate which enter the energy-producing organelles - the mitochondria. Consequently, if the mitochondria are broken, the energy wouldn't be produced enough, which can lead to general fatigue and can produce other symptoms of CFS.

It has been found that the two hypotheses are not mutually exclusive. Some patients may satisfy both, but there is considerable evidence that mitochondrial dysfunction is discovered in cells of some CFS patients. For example, muscle biopsies studied by electron microscopy have shown abnormal mitochondrial degeneration [Byrne E, Trounce I, Dennett X. (1998)]. This can be attributed to the fact that one consequence of mitochondrial dysfunction is increased production of free radicals which cause oxidative damage. Such oxidative damage and increased activity of antioxidant enzymes have been detected in those muscle specimens.

We could also observe a decrease of intracellular pH after moderate exercise and a lower rate of ATP synthesis during recovery was measured [Lane RJM, Barrett MC, Taylor DJ, Kemp GJ, Lodi R. (2010)]. These observations show the difficulties in recycling of ADP to ATP in the mitochondria.

It is worth noting, that hypothesis B is attractive to scientists because mitochondrial dysfunction in various organs offers possible explanations for many of the other symptoms of CFS and ME.

There is quite significant evidence that the symptoms are caused by dysfunctions on the cellular level. Abnormalities have been seen in immune cells [Kennedy G, Spence V, Underwood C, Belch JJF (2004)], brain cells, the thyroid, skeletal muscle cells, and mitochondria. One of genetic research identified seven clinical phenotypes.

According to this we can identify three distinct clusters of clinical abnormalities that determine CFS [Bell D. S. (2007), p. 21-26]: (a) vascular abnormalities (vascular system), (b) pain and high sensitivities to temperature, light, noise and smells (central nervous system sensitization), and, finally, (c) fatigue and total exhaustion (impaired energy production). Hypothesis B is that the lack of energy in the third cluster originates in the mitochondria of separate cells, but mitochondrial dysfunction can also produce vascular abnormalities and central nervous system sensitization because ATP produced in each cell by its mitochondria is the major source of energy for all body functions, including vascular system, central nervous system, muscles and immune system.

Concerning diagnosing methods, the “ATP profile” test is used by scientists [The «ATP profile» test [Electronic resource]. This test reveals 5 independent numerical factors from 3 series of measurements on blood samples of neutrophils.

First of the measure is the rate at which ATP is recycled in cells. Because production of ATP is highly dependent on magnesium status so the first part of the test studies this aspect.

The second part of the test measures the efficiency with which ATP is made from ADP. If this is abnormal, this could be a result of magnesium deficiency, low levels of Co-enzyme Q10 (Ubiquinone) or low levels of vitamin B3.

The third part is that the protein which transports ATP and ADP across mitochondrial membranes is impaired and this is also the reason of dysfunction.

As it had been investigated, this blood test combines several tests which together assess mitochondrial function and identify where the problem areas with energy production are. It is exceptionally useful for chronic fatigue syndrome sufferers as it gives clear indications for a further treatment.

Results. Much prominence is given to the methods of treatment and improvement the health of patients suffering from chronic fatigue syndrome (CFS) in the paper. The main medical measures are aimed to optimize the processes of biological oxidation and tissue respiration and correcting the deficit of individual metabolites developing because of mitochondrial dysfunctions.

The research emphasizes the importance of the complex of medicines used to correct the effects of mitochondrial disorders includes mainly 4 groups of drugs:

- First group is the medicines, applicable to activate the transfer of electrons in the respiratory chain, namely: Coenzyme Q10 (Ubiquinone), Kudesan and Siccine acid.
- Second group is the drugs used to the cofactor therapy, namely: Nicotinamide (NAA), Riboflavin (B2 vitamin), *Thiamine (B1 vitamin) and* Thiocctic acid.
- Third group includes the medicine which corrects the broken metabolism of fatty acids. This is *Levocarnitine or L-karnitine*.
- Fourth group includes medicines aimed at preventing oxygen-radical damage of mitochondrial membranes. These are ascorbic acid (C vitamin) and Tocopherol (E vitamin).

The research has revealed that above-mentioned medicines improve the health status of CFS patients, because most patients feel themselves much better with these interventions.

Conclusions. Considering the above-mentioned facts, we can assume that the connection between mitochondrial dysfunction and appearance of chronic fatigue syndrome actually exists. Furthermore, we found the ways to reduce chronic fatigue syndrome influence on the patient’s life with the help of special medicines and drugs. Speaking about the future outlook, the developing an effective treatment for mitochondrial disease and for CFS particularly, will depend on the integration of clinical understanding of disease progression, molecular genetic mechanisms, and pathological features in mitochondrial disease.

In can be concluded that further molecular genetics and histopathology studies will find more effective treatment which could improve the lives of patients with mitochondrial dysfunction.

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MODELING RESEARCH OF FEMUR BONE RECONSTRUCTIONS WITH BONE GRAFT SUBSTITUTES AT DIFFERENT LOADS.

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Summary: The aim of this article is to provide a reader with some information about results of studies and experiments of existing works on computing modeling of femur bone with bone graft substitutes and calculation of the most optimal implantation option.

Key words: femur bone, implant, geometrical model, computing modeling

In connection with the change of the demographic structure for the population, treatment of diseases peculiar to elderly and senile people becomes especially important. Among them, an important place is occupied by fractures of the femoral neck, occurring in 4.7-15.8% of all injuries of the musculoskeletal system. Such fractures are one of the consequences of bone loss and the development of osteoporosis in the aging process. Most often, this damage occurs in older women. In the structure of patients with femoral neck fractures, women (64.4%) of the elderly and senile age prevailed. [1]

Typical complications are the formation of false joints, the development of aseptic necrosis of the femur's head, posttraumatic coxarthrosis and in the early postoperative period - purulent-necrotic and intravascular thrombotic complications. [2]

To solve this problem, the surgical technique was proposed to prevent fracture of the femoral neck [3] by reinforcing it with implants in order to increase the strength of the "bone tissue-implant" system.

However, the introduction of implants into clinical practice requires a preliminary experimental and theoretical study of the effect of implants on the strength of the biomechanical design "bone tissue-implant" with external loads simulating the real situation, leading to fractures in the neck of the femur. The first attempts to study the effect of reinforcement on the strength of the bone tissue of the femoral neck were performed [5], and attempts to simulate the strain-strain state for particular types of load and the geometric position of the implant were performed [6].

Also biomechanical deterioration of the hip after reinforcement with its bone graft substitutes can be manifested due to the static load and time and is expressed by such phenomena as bone damage, creep and fatigue. These phenomena can be investigated experimentally. [4]

It is necessary to study and understand the behavior and functioning of bones in order to make adequate diagnostics for planning and performing surgical operations, as well as prediction of the postoperative condition.

Geometric modeling

The effectiveness of using implants to reduce the probability of bone fracture is confirmed by positive results in work [7], where the modeling of stress-strain bone state was performed.

However, it is worth considering that to simulate a more realistic bone, it is worth using a more complex bone structure. In particular, it is necessary to consider a two-layer model consisting of two layers: the outer (cortical bone) and the inner (spongy bone).

Since a more accurate geometry is needed to construct a two-layer model of the femoral neck, another approach to its construction is proposed in [8] than in [7].

The key features of the approach from [8]:

- use of the algorithm for automatic simplification of bone geometry;

- a significant reduction in the time of building the geometry of the bone;
- the ability to adjust the accuracy of the geometry.

In works [7], [8] for computer modeling of a bone the project The Titanium Bone Project is used. But for its more accurate implementation it is necessary to use the Quadric Edge Collapse Decimation algorithm, simplifying the bone model without breaking the topology. One of the filters of the MeshLab software product, which provides a set of different filters for working with 3D models, implements the necessary algorithm. As a result, we obtain a simplified geometric model. In Python, a script was developed that allows you to convert data from the VRML format (in which the previous work was saved) to the APDL (ANSYS Parametric Design Language) code to build a finite elemental partition that was used to calculate the stress-strain state of the bone.

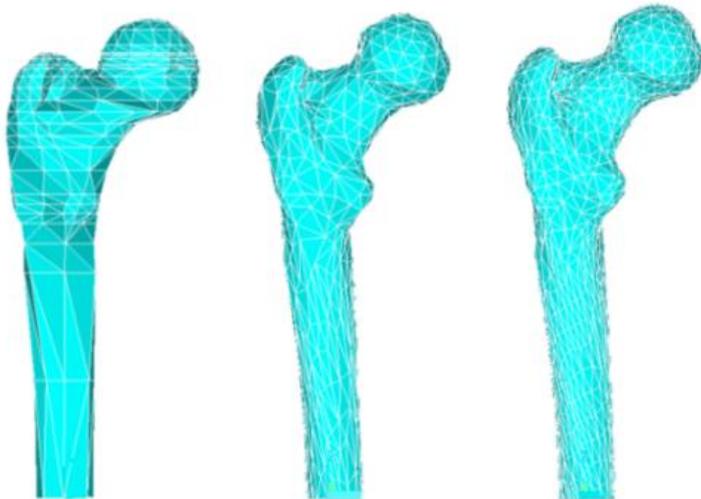
The result of performing ANSYS-commands for constructing the geometry of the femur of various complexity can be seen in Fig. 1. In the future, to solve the problems of constructing and analyzing the behavior of the bone, we used the three-dimensional model in Fig. 1, b, since the model in Fig. 1, c is too detailed and its use in creep problems for large time intervals is impractical due to the long calculation time.

Fig. 1. The geometry of the femur after applying the QECD filter for the first time (a, 379 points used), the second time (b, 508 points used) and the third time (c, 957 points used)

Also, such auxiliary software tools were developed to implement the "implantation" of implants into the neck of the human femur and the generation of a finite element mesh:

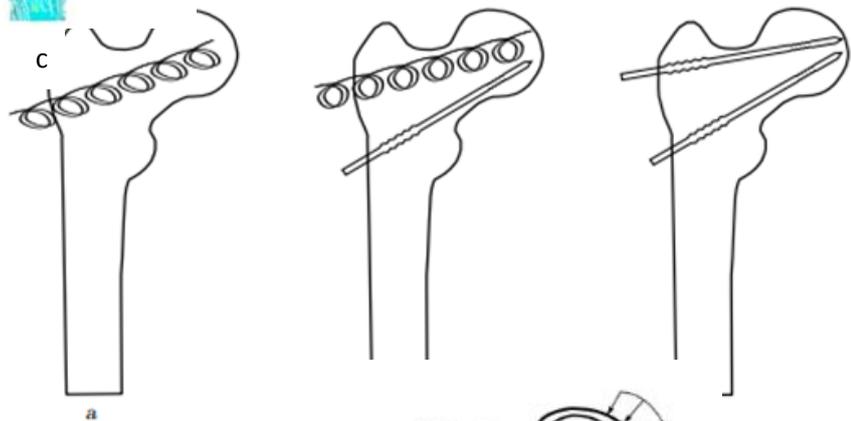
- Generation of APDL-commands for constructing the geometry of implants according to given characteristics (length, diameter, thread pitch, etc.);
- positioning the implant inside the neck of the thigh;
- generation of APDL commands for combining the geometry of the bone and the implant;
- specification of material characteristics and type of finite elements for bone and implant.

Some used implant positioning schemes are shown in Fig. 2.



a b c

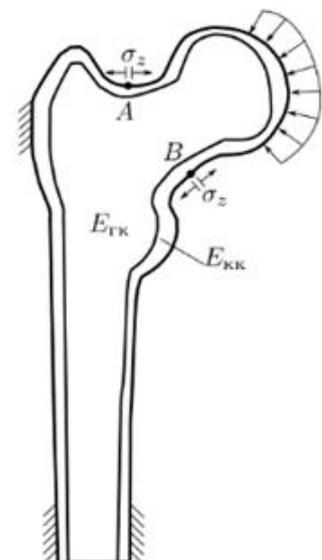
Fig.2. Schemes of femoral reinforcement systems using "screw-corkscrew" implants (a) "spoke + screw-corkscrew" (b) and "spoke + spoke" (c)



Results of studies and experiments of existing works

To analyze the stress state in the near-surface most stressed regions, the points (A and B in Figure 3) are local coordinate systems, with the Oz axis having a tangent direction in the selected section, and the maximum (in modulus) which later were subject to careful analysis in solving boundary-value problems with a different design of implants.

Table 1 shows the results of calculations (from [8]) of the σ_z component (modulo) at points A and B for different types of implants. The $\Delta\sigma_z$ column shows how many percent of the voltage in the implant design decreased compared to designs without implants.



It must also be taken into account that, according to [9], the normal tensile stresses (point B in Figure 3) are more dangerous 2 times than the compression stretch.

Fig. 3. Diagram of a two-layer model of the femur; load and fixation of bone when a person falls.

The maximum value (modulo) of the value of σ_z in the compression regions (Point A) and stretching (point B)

Implant	Point A		Point B	
	σ_z, Pa	$\Delta\sigma_z, \%$	σ_z, Pa	$\Delta\sigma_z, \%$
Non-reinforced bone	$1,64 * 10^8$	—	$6,57 * 10^7$	—
corkscrew	$1,66 * 10^8$	-1,2	$6,32 * 10^7$	4,0
Spoke + corkscrew	$1,69 * 10^8$	-3,2	$5,96 * 10^7$	10,2
Spoke + Spoke	$1,47 * 10^8$	11,6	$5,86 * 10^7$	12,1

Thanks to research data, you can choose the optimal model of implantation - "bone - spoke - spoke". Based on the results of calculations, this design reduces the greatest stresses in the bone by about 12%.

Also, these results supplement the performed analysis of the work [7], which shows that for a "spoke-spoke" implant with a duration of loading for 1 year under natural loads corresponding to human walking, the intensity in the most stressed region of the femoral neck due to creep is reduced by 49 % in relation to the stress at the initial moment of application of the load.

It should be noted that the time component (prolonged steady-state load) in no way worsens the positive effect of reducing stress concentration due to reinforcement of the femoral neck, which is a positive point from the point of view of medical practice.

Conclusion. In this article, some generalized results of rational geometric modeling of the human femur, various implants and their absorption are presented. Also, an optimal design model for implantation was proposed.

Thus, by investigating the behavior of reinforced (and not reinforced) femoral implants, it is possible to predict its behavior both under long-term static loads (walking) and under extreme loads (human fall).

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INFLUENCE OF HEMICLONAL POPULATION SYSTEM'S TYPE ON SPERMATOZOIDS' SIZE IN *PELOPHYLAX ESCULENTUS* COMPLEX

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Abstract: Water frogs of *Pelophylax esculentus* complex (Anura, Ranidae) form difficult hemiclonal population systems (HPS). We suggested that HPSs' structure might influence on water frogs' reproductive

function, especially spermatogenesis. To test this suggestion water frogs' urinal sperm size distributions have been compared in this study.

Key words: *Pelophylax esculentus* complex, spermatogenesis, urinal sperm

Introduction. Water frogs are widespread amphibians in Europe [Plötner, 2005]. In Eastern Europe including Ukraine water frogs are represented by *Pelophylax esculentus* complex which consist of two parental species *Pelophylax ridibundus* (Pallas, 1771) and *Pelophylax lessonae* (Camerano, 1882) with their hybrid, *Pelophylax esculentus* (Linnaeus, 1758). Since hemiclinal reproduction was observed [Berger, 1964; Tunner, 1974] water frogs became a subject of several ecologic and genetic research. Hemiclinal reproduction means that hybrid water frogs *P. esculentus* form gametes with non-recombinant parental species' genomes (*P. lessonae* L-genome or *P. ridibundus* R-genome. One of the features of *Pelophylax esculentus* complex is presence of stable part of triploid individuals in some populations [Biriuk et al., 2016: 195]. HPS gets its name taking to account its structure: for example, R-E- consists of *P. ridibundus* and diploid *P. esculentus*; R-Epf-HPS includes *P. ridibundus* and female (f) triploid (p) *P. esculentus* [Shabanov et al., 2017].

Several anomalies concerned with gametes are observed in water frogs' such as diploid oocytes [Dedukh et al., 2013, 2017], aneuploidy and polyploid cells in testicles [Biriuk et al., 2016]. Also approximately significant difference ($p=0,053$) of normal testicle cells' part between R-E- and R-E-Ep-HPSs were observed [Pustovalova et al., 2017:].

Object-matter of our research is water frogs' spermatozoids. Our **subject-matter** is factors which determine spermatozoids size. So we have set an **objective** to examine HPS types influence on spermatozoids' size. Sampling size distributions building and their statistical analysis were our **tasks**.

Materials of our research were samples of water frogs' sperm. We tested 34 water frogs collected from June to September 2017 from four different HPS' type (table 1.): R-E-HPS (Udy River, Kharkiv city), R-E-Ep-HPS (Koryakiv Yar, nearby Haidary village, Kharkiv region), R-Epf-HPS (Kreminna, Luhansk region) and L-E-R-HPS (Pisochne lake, Volyn region) [Mezhzherin 2010; Shabanov et al., 2017]. Individuals' ploidity was defined by means of erythrocytes' length [Bondareva A.A. et al., 2012].

Methods. To get sperm sample we used hormonal stimulation (surfagon injection) [Bobrova et al., 2014]. Derived sperm was fixed in Carnoy's solution and centrifuged. Sediment with cells was placed into the glacial acetic acid and centrifuged iteratively. Spermatozoid suspension was put dropwise on the warm slide ($t=60^{\circ}\text{C}$). Spermatozoids' specimens were microscopied and photographed with USB-camera. Spermatozoids' heads from the photos were measured in PDF-XChange Viewer. Then we have built spermatozoids' size distribution an analyzed them using factorial ANOVA and Tuke's test in STATISTICA 12.

Individuals of <i>Pelophylax</i> <i>esculentus</i> complex	Udy River, Kharkiv city (R-E-HPS)	Koryakiv Yar, nearby Haidary village, Kharkiv region (R-E-Ep-HPS)	Kreminna, Luhansk region (R-Epf-HPS)	Pisochne lake, Volyn region (L-E-R-HPS)	Total
<i>P. ridibundus</i>	1	5	5	2	13
<i>P. lessonae</i>	-	-	-	4	4
<i>P. esculentus</i> (2n)	3	8	-	5	16
<i>P. esculentus</i> (3n)	-	3	-	-	3
Total	4	16	5	11	36

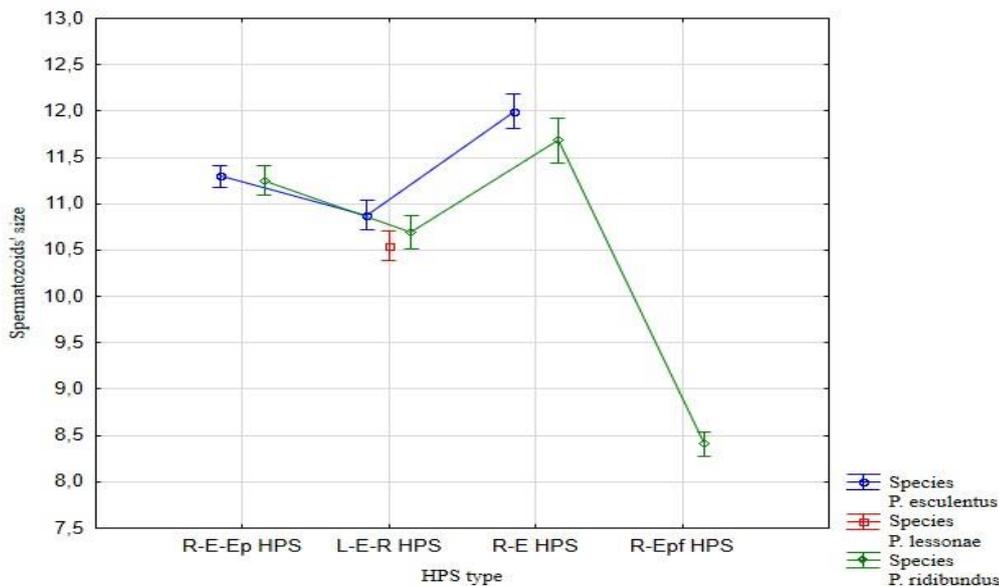
Table 1. Sample's structure

Discussion and Results

For factorial ANOVA we used spermatozooids' size as dependent variable and species and HPS type as categorical factors. Thus, analysis shows considerable spermatozooids size difference between males from R-E-, R-E-Ep-, R-Epf- and L-E-R-HPSs. As we can see from Fig. 1 the most outstanding HPS is R-Epf-HPS (Kreminna, Luhansk region). It is worth noting about cell resemblance in different species from the same hemiclinal population system.

Figure 1. Factorial ANOVA graph. Vertical bars denote 0,95 confidence interval

Post hoc Tukey's test represents significant difference between groups as a p-value. According to that we may define resemblance or dissimilitude of every compare group (as it is shown of Table. 2).



Species	HPS type	<i>P. ridibundus</i> R-E HPS	<i>P. ridibu</i> ndus	<i>P. ridibu</i> ndus	<i>P. ridibu</i> ndus	<i>P. esculen</i> ntus	<i>P. esculen</i> ntus	<i>P. esculen</i> ntus	<i>P. lesson</i> ae
<i>P. ridibundus</i>	R-E-HPS		0.068422	0.000032	0.000032	0.458076	0.088348	0.000034	0.000032
<i>P. ridibundus</i>	R-E-Ep-HPS	0.068482		0.000171	0.000032	0.000032	0.999819	0.035487	0.000032
<i>P. ridibundus</i>	L-E-R-HPS	0.000032	0.000171		0.000032	0.000032	0.000033	0.807664	0.923092
<i>P. ridibundus</i>	R-Epf-HPS	0.000032	0.000032	0.000032		0.000032	0.000032	0.000032	0.000032
<i>P. esculentus</i>	R-E-HPS	0.458076	0.000032	0.000032	0.000032		0.000032	0.000032	0.000032
<i>P. esculentus</i>	R-E-Ep-HPS	0.088348	0.999819	0.000033	0.000032	0.000032		0.001366	0.000032
<i>P. esculentus</i>	L-E-R-HPS	0.000034	0.035487	0.807664	0.000032	0.000032	0.001366		0.075871
<i>P. lessonae</i>	L-E-R-HPS	0.000032	0.000032	0.923092	0.000032	0.000032	0.000032	0.075871	

Table 2. Tukey's test. Significant means of p-value marked out with boldface font.

R-E-HPS. Hemiclinal population systems of *P. ridibundus* and diploid hybrids *P. esculentus* are widespread in Eastern Ukraine [Shabanov et al., 2017]. Males from this

HPS have maximal average spermatozooids' size among the examined samples. According to Tukey's test R-E-HPS males' cells differs from R-E-Ep and L-E-R. It is worth noticing that average spermatozooids' size of *P. ridibundus* from R-E and R-E-Ep-HPS doesn't significantly differs ($p \sim 0,07$). However, hybrids from these HPS show highly significant difference ($p \ll 0,001$). We suggest that it can be concerned with presence of triploid hybrids.

R-E-Ep-HPS. As R-E-HPS, R-E-Ep individuals average spermatozooids' size significantly differs from such in R-Epf- and L-E-R-HPSs. Another R-E-Ep-HPS' feature is high ($p \sim 0,99$) resemblance of hybrid and parental species' cells.

L-E-R-HPS. Most geographically distinct, L-E-R-HPS' average size of males' gametes differs from Eastern Ukraine samples. Also, hybrids' spermatozooids from this HPS are less similar to parental species.

R-Epf-HPS. Hemiclonal population system of *P. ridibundus* and triploid female *P. esculentus* are not studied enough. In particular, reproduction of this system is still unclear [Shabanov et al., 2017]. R-Epf-HPS is the most distinct group among other HPS'. Average size of males' gametes in R-Epf-HPS is extremely small. We suggest that further study of this HPS is required.

Conclusions. We have examined spermatozooids from individuals of four hemiclonal population systems types using factorial ANOVA and Tukey's test. Spermatozooids' distribution analysis represents the difference between the samples of R-E-, R-E-Ep-, R-Epf- and L-E-R-HPSs. It testifies in favor of HPS' type as a factor which influence on male germ cells' size. The most distinct sample which represents R-Epf-HPS may be of interest to further research.

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ESTIMATION OF RISK OF DEVELOPMENT OF TYPE 2 DIABETES MELLITUS IN STUDENTS

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Abstract. The article deals with diabetes mellitus (DM), its definition, main types, symptoms, diagnosis and treatment. It also describes the research into the risk of type 2 DM development in the 1st year students of the Medical faculty at Kharkiv Karazin National University.

Key words. Diabetes mellitus (DM), hyperglycaemia, type 1 DM, type 2 DM.

Introduction. Diabetes mellitus (DM), commonly referred to as diabetes, is a group of [metabolic disorders](#) in which there are surges in [high blood sugar](#) levels over a prolonged period [Fadeev, PA. 2009: 12]. DM is one of the most serious health threats of the global scale in the 21st century. Every year, more and more people in the world suffer from diabetes. According to the International Diabetes Federation, in 2015 the number of diabetes cases in the world reached a record figure of 415 million, and by 2040 it is projected to be 642 million. The prevalence of diabetes in the population, on average, is 1-8.6% while among children and adolescents it makes up about 0.1-0.3%. According to IDF (International Diabetes Federation), the world has up to 208 million people with undiagnosed diabetes, accounting for 50% of diagnosed cases. In 2015, diabetes has caused 5 million deaths [Nam Han Cho, David Whiting 2015: 12-15]. Over the past several years, the prevalence of diabetes in Ukraine has increased by one and a half times, and on January 1st, 2015, the country has registered 1 million 199 thousand patients, which is about 2.9% of the total population. If this trend continues, the number of patients will increase by 40% by 2040. In Ukraine diabetes ranks third after cardiovascular and oncological diseases.

Object-matter: type 2 DM.

Subject-matter: prevalence of DM.

Objective: to estimate the risk of development of type 2 DM in students of Kharkiv Karazin National University.

Tasks: 1) to study the definition, main types, symptoms, diagnosis and treatment of DM; 2) to conduct a survey among the 1st year students of the medical faculty at Kharkiv Karazin National University in order to estimate the risk of development of type 2 DM; 3) to estimate the results of the survey.

Materials and methods: 90 students of Kharkiv Karazin National University were interviewed, the average students' age is 18 years old, the interview was conducted in the form of filling in the table on the FINDRISK (The Finnish Diabetes Risk Score) scale. This scale allows us to assess the 10-year risk of type 2 diabetes with an accuracy of 85%.

Discussion and results. Diabetes mellitus is a group of endocrine diseases that develop as a result of absolute or relative insufficiency of the insulin hormone, the appearance of insulin resistance, resulting in hyperglycaemia. The disease is characterized by chronic course and violation of all types of metabolism: carbohydrate, fatty, protein, mineral and water-salt. Symptoms include irrepressible thirst (polydipsia), disturbance of eating behavior, increased appetite (polyphagia), and excessive urination (polyuria), but these symptoms may be poorly expressed if the level of glucose in the blood increases moderately. There are several types of DM:

1) Type 1 diabetes is characterized by insufficiency of the insulin synthesis and secretion by β -cells of the pancreas, due to their disappearance under the influence of viral infection, stress, autoimmune aggression. The prevalence of type 1 diabetes in the population ranges from 10 to 15%. Most often, this disease occurs in children or adolescents undergoing rapid development. The main method of treatment is insulin injections. In the absence of treatment, type 1 diabetes rapidly progresses and results in severe complications such as ketosis and diabetic coma.

2) Type 2 diabetes is characterized by a decrease in the sensitivity of insulin-dependent tissues to insulin action (insulin resistance). At the initial stage of the disease, insulin is synthesized in normal or even elevated amounts. Adherence to the diet to reduce bodyweight at the initial stages of the disease helps to normalize carbohydrate metabolism, restore tissue sensitivity to insulin action and reduce the synthesis of glucose in liver. However, during the progression of the disease, the biosynthesis of insulin by β -cells of the pancreas decreases, which necessitates the use of hormone substitutive therapy based of insulin-containing medication. The disease develops slowly, the course of the disease is mild. Hyperglycemia leads to the development of micro- and macroangiopathy, nephropathy and neuropathy, retinopathy and other complications over the years.

Diagnosis of DM type 1 and 2 is facilitated by the presence of major symptoms: polyuria, polyphagia, changes in bodyweight. However, the main method of diagnosis is to determine the concentration of glucose in the blood. Glucose tolerance test is used to determine the severity of carbohydrate metabolism decompensation [Tstarkova N.T. 2002: 249-253]. The doctor's main tasks in the treatment of diabetes are: carbohydrate metabolism compensation, complication prevention and treatment, normalization of body weight and patient training. Compensation for carbohydrate metabolism is achieved in two ways: by providing insulin cells in a variety of ways, depending on the type of diabetes, and by ensuring a uniform supply of carbohydrates corresponding the dietary program [Starkova N.T. 2002: 254]. A patient's training plays an important role in the compensation of diabetes mellitus. The patient must understand what diabetes is, how dangerous it should be in case of episodes of hypo- and hyperglycemia,

how to avoid them, be able to independently monitor glucose level in the blood, and have a clear idea of the nature of the reasonable nutrition [Watkins P. J. 2006: 22-27].

The causes of the disease include heredity, overweight, age, nervous stress, viral infections, diseases that contribute to β -cell damage (in particular, pancreatitis, pancreatic cancer).

We interviewed 90 Kharkiv Karazin National University students. The survey was conducted in writing and consisted of the following questions: age, body mass index, waist circumference, dietary intake, physical activity, use of drugs for lowering blood pressure, increased blood glucose, diabetes cases among relatives.

Percent of students



Number of points

The findings show that the largest number of students (90.1%) has scores below 7, which is a low risk of disease (the probability of type 2 DM is approximately 0.01). However, only 9.9% have an increased risk (probability of type 2 DM is approximately 0.04). It is related to the students' lifestyle, their age, body mass index, blood glucose levels, hereditary predisposition to the disease.

Conclusion. People do not realize how seriously DM may affect the country's economy and social life. This fact is the most serious barrier to the introduction of effective prevention strategies that can stop the catastrophic increase in the prevalence of type 2 diabetes. Despite the higher level of awareness and the latest advances in the treatment of type 1 and type 2 diabetes as well as the prevention of type 2 diabetes, the number of people with diabetes worldwide is increasing. We conducted a study to identify the risk of type 2 diabetes in students of Kharkiv Karazin National University. We interviewed 90 students, 90.1% of them had a risk of the disease making up 0.01 while 9.9% of students had a risk 0.04. These are low indicators. The results are due to the fact that most students have an active lifestyle, healthy diet and their relatives do not have diabetes.

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ANALYSIS OF THE INCIDENCE OF EPSTEIN-BARR VIRUS (EBV) AND HUMAN HERPES VIRUS TYPE 6 (HHV-6) IN DISTRICTS OF KHARKIV IN 2012-2016

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Abstract. The dynamics over the last 5 years in the districts of Kharkiv can be noticed the adverse epidemiological situation on the incidence of infectious diseases among which infectious diseases caused by the Epstein-Barr virus (EBV) and herpes simplex virus type 6 (HSV-6) are predominant. Using the post-hoc analysis, the data on morbidity in 9 districts have been collected. On the basis of the obtained data graphs and tables were completed. As a result of carried out post-hoc analysis the increasing incidence of infectious diseases, among causative agents of which EBV and HSV-6 are predominant, has been detected in 6 and 3 of the 9 districts of the city, respectively. The increased sickness rate is due to improved diagnostic, medical aid appealability and reduced level of population immunity.

Key words: Epidemiological situation, Epstein-Barr virus (EBV), human herpes virus type 6 (HHV-6), sickness rate.

Introduction. In the second half of the 20th century the weight and the absolute number of diseases of viral etiology have increased, which led to the fact that this group of diseases began to dominate in the infectious pathology. Among infectious diseases of viral etiology, the leading role belongs to the pathology caused by herpes viruses. Members of the herpes viruses (HV) family are widespread in various parts of the world, affecting up to 95% of the population in both developed and developing countries. There are disappointing evidence that by 5 years about 60% of children are affected by the herpes virus, and by 15 years – almost 90% of the population [Corey L., Spear P., 1986, Chanok E., Hirsch M., Melnick J., Monath T., Roizman B., 1995].

Herpes-viral infection (HVI) acquire one of the leading place in infectious pathology. And one of the adverse outcomes is formation of chronic forms of HVI. From 25 to 65% of the world population have chronic forms of herpes viral infection, and more than half of these patients have several attacks of infection recrudescence. The frequency of transition of acute HVI forms into chronic had the tendency to increase in recent years [Isakov V. A., Arkhipova E.I., Isakov D.V., 2013, Chanok E., Hirsch M., Melnick J., Monath T., Roizman B., 1995].

Despite the increased relevance of the HVI manifestations the medications and measures of treatment, that are used nowadays, remain the same. Nowadays even highly effective antiviral drugs, that show pronounced therapeutic effect, hardly have preventive and anti-relapse effects and activity to prevent or eliminate latence of the virus [Drew W. L., 1988, Arvin M., Moffat F., 2010].

In the structure of HVI the greatest importance in the development of acute and chronic forms of infection belongs to Epstein-Barr virus (EBV), cytomegalovirus (CMV), and herpes simplex viruses type 1, 2, and 6. But namely EBV and HHV-6 lead to development of moderate and severe forms of disease [Isakov V. A., Arkhipova E.I., Isakov D.V., 2013, Drew W. L., 1988].

Objective. The aim of this research was to evaluate the incidence of infectious diseases caused by EBV and HSV-6 in districts of Kharkiv for the last 5 years.

Materials and Methods. To conduct this study, the statistical data of incidence of infectious diseases caused by EBV and HHV-6 in Kharkiv have been studied. Using the the post-hoc analysis of medical histories of patients, that have been admitted to Kharkov Regional Clinical Hospital of Infectious diseases in the period from 2012 to 2016, the data on the incidence of infectious diseases of viral etiology in 9 districts of Kharkiv have been obtained. On the basis of received information the summary tables and graphs have been compiled. The criterion of high morbidity in the districts served stable and growing level of indices, in that has graphically represented.

Discussion and Results. In the result of the investigation carried out in the period from 2012 to 2016, we observed the annual increase of patients with infectious diseases of viral etiology, which were represented by infectious diseases caused by influenza virus type A and parainfluenza, adenoviruses, and herpes viruses of different types (Fig.1), (Table 1). The most severe course of infectious diseases and a longer stay of patients in hospital was due to the diseases caused namely by herpes viruses. The predominant causative agent among representatives of Herpes virus family are EBV and HHV-6 (Fig. 2), (Table 2). In accordance with the specified method the increasing incidence of infectious diseases caused by EBV has

been fixed in following districts: Kholodnohirskiy, Shevchenkivskiy, Moskovskiy, Kyivskiy, Novobavarskiy and Slobidskiy. The increased level of incidence of infectious diseases caused by HHV-6 has been observed in Nemyshlianskiy, Industrialniy and Osnovianskiy districts (Fig. 3 – Fig.7), (Table 3). Thus, in 6 and 3 districts of Kharkiv (66.6% and 33.3% of the total number of districts, respectively) the incidence of moderate and severe infectious diseases caused by EBV and HHV-6 has increased over the last 5 years. In addition, according to statistics, the incidence of EBV and HSV-6 in general during 2012 – 2016 increased from 0.017 to 0.025 per 100 thousand of population.

Figure 1. Incidence of infectious diseases of viral etiology depending on the causative agent in the period from 2012 to 2016 years (percent ratio)

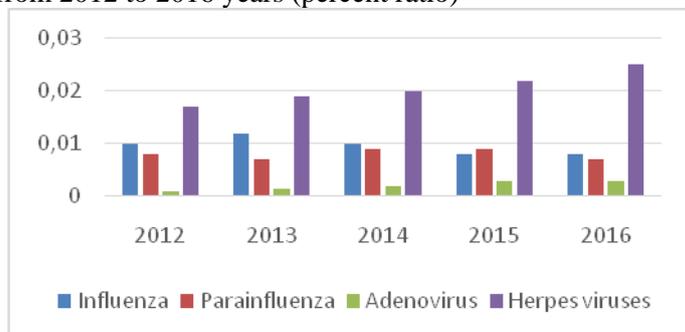
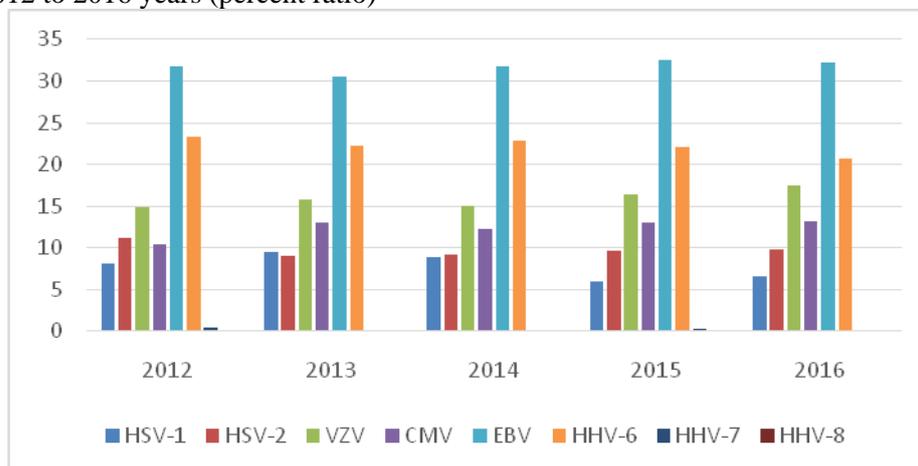


Figure 2. Ratio of representatives of Herpes virus family in the structure of morbidity in the period from 2012 to 2016 years (percent ratio)



HSV-1 – Herpes simplex virus type 1, HSV-2 - Herpes simplex virus type 2, VZV – Varicella zoster virus, CMV – cytomegalovirus, EBV – Epstein-Barr virus, HHV-6 – Human herpes virus type 6, HHV-7 – Human herpes virus type 7, HHV-8 – Human herpes virus type 8

Figure 3. Comparison of incidence of infectious diseases caused by EBV and HHV-6 in districts of Kharkiv in 2012 (percent ratio).

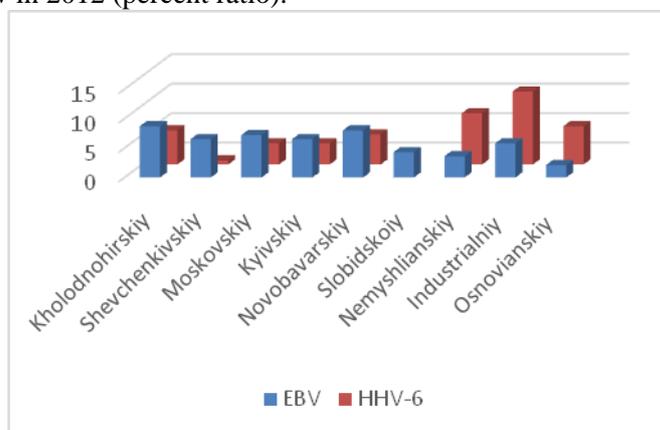


Figure 4. Comparison of incidence of infectious diseases caused by EBV and HHV-6 in districts of Kharkiv in 2013 (percent ratio).

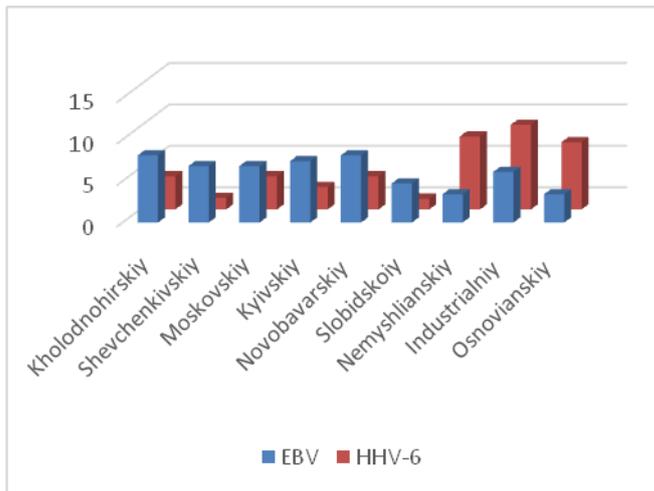


Figure 5. Comparison of incidence of infectious diseases caused by EBV and HHV-6 in districts of Kharkiv in 2014 (percent ratio).

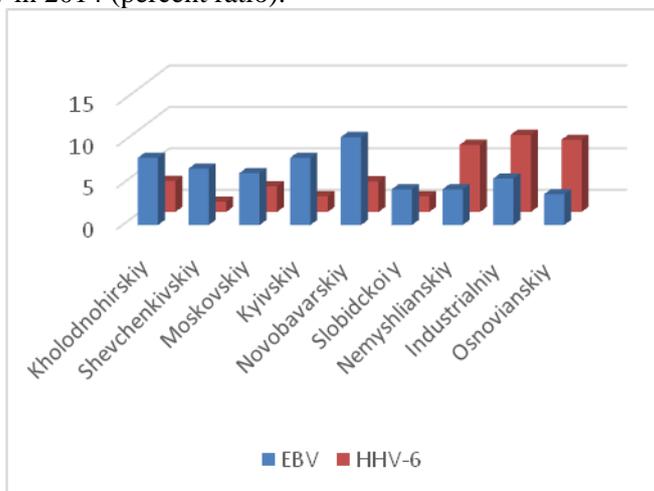


Figure 6. Comparison of incidence of infectious diseases caused by EBV and HHV-6 in districts of Kharkiv in 2015 (percent ratio).

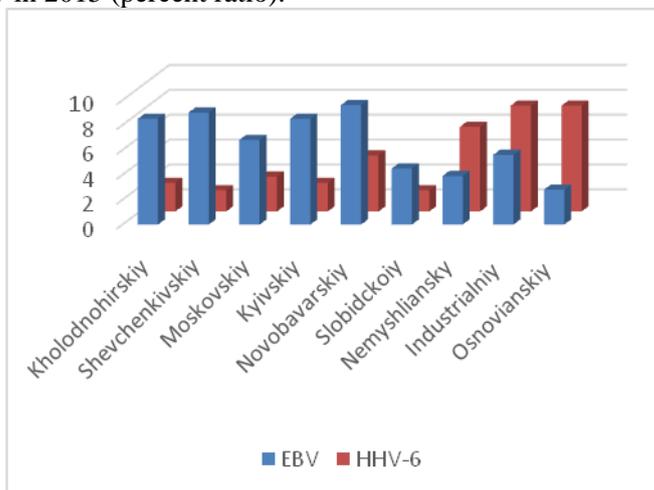


Figure 7. Comparison of incidence of infectious diseases caused by EBV and HSV-6 in districts of Kharkiv in 2016 (percent ratio).

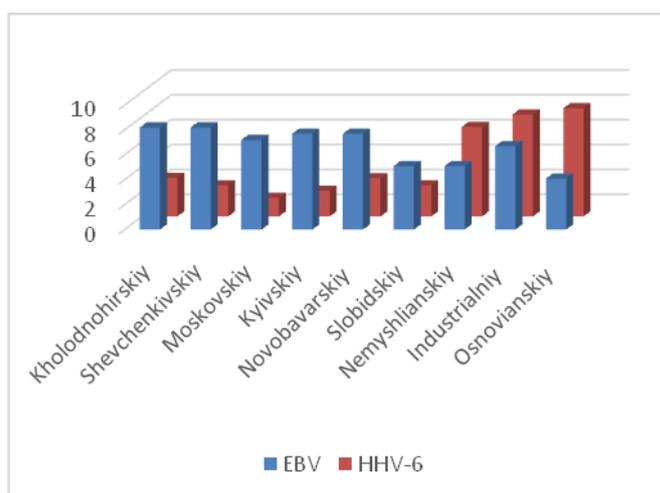


Table 1. Incidence of infectious diseases of viral etiology depending on the causative agent in the period from 2012 to 2016 (percent ratio and amount of patients), N = 1465227*

Causative agent / Year	2012 (patients)	2013 (patients)	2014 (patients)	2015 (patients)	2016 (patients)
Influenza	0,01 (147)	0,012 (175)	0,01 (147)	0,008 (117)	0,008 (117)
Parainfluenza	0,008 (117)	0,009 (131)	0,009 (131)	0,007 (102)	0,008 (117)
Adenovirus	0,001 (15)	0,0015 (22)	0,0019 (28)	0,0029 (47)	0,003 (44)
Herpes viruses	0,017 (249)	0,019 (278)	0,02 (293)	0,022 (322)	0,025 (366)

*N – total model number of residents of Kharkiv

Table 2. Ratio of representatives of Herpes virus family in the structure of morbidity in 2012 - 2016 years (amount of patients)

Causative agent / Year	2012 (*n = 249)	2013 (*n = 278)	2014 (*n = 293)	2015 (*n = 322)	2016 (*n = 366)
HSV-1	20	26	26	19	24
HSV-2	28	25	27	31	36
VZV	37	44	44	53	64
CMV	26	36	36	42	48
EBV	79	85	93	105	118
HHV-6	58	62	67	71	76
HHV-7	1	0	0	1	0
HHV-8	0	0	0	0	0

HSV-1 – Herpes simplex virus type 1, HSV-2 - Herpes simplex virus type 2, VZV – Varicella zoster virus, CMV – cytomegalovirus, EBV – Epstein-Barr virus, HHV-6 – Human herpes virus type 6, HHV-7 – Human herpes virus type 7, HHV-8 – Human herpes virus type 8

*n – amount of patients with established diagnosis “Infectious disease of herpes virus etiology”

Table 3. Comparison of incidence of infectious diseases caused by EBV and HSV-6 in districts of Kharkiv in 2012 – 2016 [amount of patients].

District / Year	2012 (n = 137)		2013 (n = 147)		2014 (n = 160)		2015 (n = 176)		2016 (n = 173)	
	BV	HV-6								
Kholodnohirskiy	2		2		3		5		6	
Shevchenkivskiy			0		1		6		6	
Moskovskiy										

	0		0		0		2		4	
Kyivskiy			1		3		5		5	
Novobavarskiy	1		2		7		7		5	
Slobidskiy									0	
Nemysylianskiy		2		3		3		2	0	4
Industrialniy		7		5		5	0	5	3	6
				2		4		5		7

EBV – Epstein-Barr virus, HHV-6 – Human herpes virus type 6

n - amount of patients with established diagnosis “Epstein-Barr virus infection” and “Infectious disease caused by Human herpes virus type 6”

Conclusion. During carrying out the research work on the basis of obtained data we can draw the following conclusion: we observed the annual increase of patients with infectious diseases of viral etiology which were represented by infectious diseases caused by influenza virus type A and parainfluenza, adenoviruses, and herpes viruses of different types. At present, in most districts of Kharkiv the epidemiological situation on moderate and severe infectious diseases is unfavorable, with the main causative agents of Epstein-Barr virus and Human herpes virus type 6. Compiled graphs and tables have clearly showed an increase in the number of patients infected with Herpes viruses: from 249 infected patients in 2012 to 366 infected patients in 2016. Moreover, the data obtained give us information about increase in the number of patients infected namely by EBV and HHV-6: from 137 patients in 2012 to 173 patients in 2016. We can suspect, that observable increased sickness may be the result of improved diagnostic, medical aid appealability and reduced level of population immunity.

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VASCULAR COGNITIVE IMPAIRMENT AND VASCULAR DEMENTIA. SYSTEMATICS, PATHOGENESIS, CLINICAL FEATURES.

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Abstract. The paper presents the definition of vascular dementia, etiological factors, peculiarities of pathogenesis of vascular cognitive disorders, classification of cerebrovascular diseases and cognitive vascular disorders according to ICD-10, clinical features of vascular cognitive disorders depending on the nature of brain damage.

Key words: cerebrovascular diseases, classification of dementia, mild cognitive impairment, pathogenesis of vascular disorders, vascular dementia.

Introduction. Definitions and Classification. Cerebrovascular disease is the second most common cause of age-related cognitive impairment and dementia, which is widely recognized as vascular dementia. Vascular dementia culminates from general or localized effects of vascular disease, which incurs stroke injury and other tissue perfusion changes. Vascular dementia is characterized as a neurocognitive disorder,

but also incorporates behavioral symptoms, locomotor abnormalities and autonomic dysfunction. Vascular cognitive impairment results from all causes of cardiovascular diseases including cardiovascular diseases that lead to early, late and severe forms of dementia syndromes.

In ICD-10 cerebrovascular diseases correspond to headings I65 ("Blocking and stenosis of precerebral arteries not leading to cerebral infarction"), I66 ("Blockage and stenosis of cerebral arteries not leading to cerebral infarction"), I67 ("Other cerebrovascular diseases" I67.2 "Cerebral atherosclerosis", I67.3 "Progressive vascular leukoencephalopathy, Binswanger's disease", I67.4 "Hypertensive encephalopathy", I67.8 "Other specified cerebral vascular lesions" acute cerebrovascular insufficiency, chronic cerebral ischemia). It is also possible to establish a syndromological diagnosis of chronic cerebrovascular disorders, taking into account the prevalence of cognitive impairment (F01.0 "Vascular dementia with acute onset", F01.1 "Multi-infarct dementia", F01.2 "Subcortical vascular dementia", F01.3 "Mixed cortical and subcortical vascular dementia"), a number of other neurological syndromes considered as consequences of the transferred cerebrovascular diseases (heading I69). Mild (light cognitive impairments, F06.7) characterized by non-structured memory disorders, attention, and training associated with the risk of subsequent dementia development, in particular vascular type, are of great interest to researchers.

Pathogenesis. The leading causes of cerebrovascular cognitive disorders are arterial hypertension, stenosis the lesion of extra- and intracranial vessels, microcirculatory disorders. In arterial hypertension, type 2 diabetes mellitus, and some vasculitis, first of all, arteries of small caliber (50-500 microns), blood supplying the bulk of the white matter of the cerebral hemispheres [Vereshchagin NV, 1977]. These vessels are arteries of the final type, not anastomosing with each other.

The presence of hemodynamically significant stenosis of the internal carotid artery is associated not only with the risk of developing ischemic stroke, but also with a progressive increase in neurological deficits, in particular with disorders of higher cerebral functions. Cognitive decline in particular is expressed when the vessel that supplies the dominant hemisphere is affected.

In the development of cerebrovascular diseases, an important role can be played arterio-arterial microembolism from ulcerative atherosclerotic plaque, platelet aggregates, occlusive arterioles. The risk of microemboli and thrombosis increases with dyslipoproteinemia, hyperfibrinogenemia, increased blood viscosity, abnormalities in the system of hemostasis and blood rheology.

Cerebral ischemia is accompanied by inhibition of aerobic glycolysis and a deficit in energy production [Brown WR, 2002]. As a result, the work of ion pumps is disrupted, calcium and lactate ions accumulate in the cell, lipid peroxidation processes are activated. The pronounced cytotoxic effect has an increase in the concentration in the synaptic gap of glutamate and aspartate, which exert a toxic effect [Gusev EI, 2001]. Acute ischemia triggers a cascade of delayed cell death mechanisms such as apoptosis, neurodegeneration, axonal demyelination. A combination of ischemic and actually neurodegenerative brain damage, especially in elderly patients, is possible. The course of cerebrovascular diseases is more severe in patients with bronchopulmonary pathology, kidney damage, and other physical diseases.

Clinical features. Light cognitive impairments are characterized by a decrease in memory, a safe social adaptation, a normal state of intelligence and no manifestations of dementia. An important feature is the critical attitude of the patient to his condition, the awareness of the existing defect.

There are cortical and subcortical types of cognitive impairment. The predominant subcortical lesion is manifested in a decrease of the ability to remember, slowing down the rate of mental activity and decreasing its quality. Reduction of activity and selectivity of memorization, limitation of ability to concentrate attention are manifested by modal-nonspecific memory impairments.

The patients themselves pay attention to the rapid fatigue even when performing usual intellectual tasks, reducing the ability to assimilate new information. An easy or moderate dynamic aphasia is possible with violation of routine coordination, difficulty in memorizing and reproducing motor programs [Zakharov VV, 2003].

Cortical lesions are characterized by focal disorders of higher brain functions (speech, gnosis, praxis). With the progression of the disease, disorders of object and spatial gnosis, dynamic and spatial praxis, speech functions (depletion of the structure of speech utterances, violation of the understanding of logical-grammatical constructions) increase. Often, both types of lesions are combined, which allows us to talk about diffuse brain damage.

With the progression of the disease, the clinical picture becomes more complicated. Typical for vascular lesions of the brain are an acute (subacute) onset, a step-like growth of the neurological deficit. Carefully questioning of the patient or his relatives, you can identify episodes of significant deterioration of the condition [Cosentino SA, 2004]. Presence of periods of growth of focal neurological deficit (transient ischemic attacks, strokes) is an important diagnostic sign of the vascular nature of the disease.

Emotional-affective disorders are more often asthenic, depressive, manifested in tearfulness, weakness, increased fatigue. In the future, depression comes to the fore with loss of interest in what is happening, narrowing of the range of interests. The growth of dysmnesic, intellectual and emotional disorders can lead to the formation of a psychoorganic syndrome (dementia).

Conclusions. Psychopathological features of cognitive disorders in patients with vascular dementia, depending on the localization of the brain lesion, have not been sufficiently studied. It is necessary to investigate neuroimaging signs of vascular dementia with different localization of brain damage. There is no definition of the frequency of various risk factors in patients with vascular dementia, nor has the role of these risk factors in the development and progression of vascular dementia been assessed. It is necessary to develop a model of therapeutic and preventive measures in patients with vascular cognitive impairment and vascular dementia with various localization of the pathological process.

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PART III. TECHNICAL SCIENCES

УДК 004.722.45

SATELLITE COMMUNICATION

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Abstract: major satellite systems and their types are considered in the paper. The distribution of signals in satellites is discussed, and radio relay communication lines and methods of noise immunity in these systems are analyzed. The subject is of particular importance for such areas as microwave signals, information system networking, radio wave propagation, communication network with mobile objects.

Key words: satellite systems, signal distribution, radio relay communication lines, ground station, noise immunity, polarization separation.

Introduction: Satellite communication is one of the types of space radiocommunications based on the use of artificial Earth satellites as repeaters. Satellite communication system (abbreviated SCS) has been known for a long time. They are used to transmit different signals over long distances. Satellite communication has evolved rapidly and the individual line connection has gradually passed to local and global systems [1].

The object-matter of the research is to investigate the development and application of satellite communication.

The task is to consider the establishment of repeaters and gaps.

The materials include literature for satellite repeaters and data, using which we can determine the advantages and disadvantages of this connection.

We used the **method** of geostationary satellites, through which it was possible to launch the first satellite to receive the communication signal.

With the development of already existing networks the use of artificial Earth satellites for communication expands. Many countries create their own national satellite network.

Satellite communication is an artificial satellite that relays and amplifies the radio signals between the source and the receiver through the use of a transponder. The artificial satellites are used to provide communications between various points on Earth.

Satellite communications play a significant role in the global telecommunications system. Approximately 2000 artificial satellites orbiting Earth relay analog and digital signals carrying voice, video and other data in one or more places around the world [4].

All systems can be divided into two types: working through satellites on the geostationary orbit and not on geostationary orbit. The systems operating through satellites which are not on the geostationary orbit are primarily used for military, scientific and meteorological research.

As for geostationary satellites, they have a similar application, though they have another special technical equipment. These devices can receive signals from the Earth station and transmit them again in different directions. These special devices are called transponders.

A TV transmitter on the Earth station transmits signals in the form of electromagnetic waves. These waves carry audio or video message. The satellite receives and identifies these waves. The transponders in the satellite retransmit the message either at the same frequency or another frequency in different directions. Following this procedure these signals are received by a large number of ground stations. These stations are located in various regions. The signals received from the satellites are very weak. The ground stations amplify the signals before transmitting them again. These signals get the TV sets located far away from the programmer-transmitting stations.

Other means of telecommunication like telephone (mainly for long distances), telex (i.e., printed messages) and FAX (i.e., facsimile of printed matter or pictures) use a similar mechanism. In the case of intercontinental telecommunication, two or more satellites are linked together.

Geostationary communication satellites have enabled not only national but also international television programmes to be relayed among many ground stations around the world. There are three artificial satellites which are located in certain orbits at 120° from one another and can cover almost all of the populated territory of the world.

The transmitters relay wide range of microwave signals to the geostationary satellite above the transmitter. Each microwave channel has a large bandwidth, which can accommodate many TV signals and thousands of TV channels.

Discussion and Results:

The artificial Earth satellite (AES) is a spacecraft rotating around the Earth along a geocentric orbit. Satellite communication is carried out between earth stations, which can be either stationary or mobile. Satellite communication is the development of traditional radio relay communication provided by placing a repeater at a very high altitude. Since the zone of its visibility in this case is almost half the globe, the need for a chain of repeaters disappears - in most cases, one is enough.



Fig.1 Different kinds of artificial Earth satellites

The satellites receive a signal, demodulate and amplify it. In this case we view the demodulation as a reverse process of vibrations. Most often, the power of satellites is provided by solar batteries. The transmitting antenna on the satellite directs the beam to a narrow region on the Earth by the use of a suitable reflector. If the distribution of a signal is small, the transmission "covers" a territory, for example, of one country. For international distribution the transfer is in the direction of one or two satellites of highly directional antennas. The demodulation process of amplification-remodulation-transmission is repeated in the second satellite. In the final "down channel" a signal is received in the same or in another country by a large cross-section antenna. Then it is processed in low-noise receivers and finally re-radiated from regular TV transmitters.

There are a number of INTERSAT satellites over the Atlantic, Pacific and Indian oceans operating as relay stations for forty ground stations around the world. The international system of satellite communication serves the continental 625/50 as well as the American 525/60 systems. The ground station converts the received signal with the digital international converter according to the local standard before it is relayed [5].

The main device of our artificial satellite is a repeater. Satellite repeaters may be non-regenerative and regenerative. A non-regenerative satellite taking the signal from one ground station, transfers it at another frequency, amplifies and transmits it at another ground station. The satellite can use a number of independent channels involved in these processes, each of which operates with a certain part of the spectrum. Such channels are called transponders.

Regenerative satellite performs demodulation of received signal and re-modulates it. Due to this fact, error correction is performed twice: on the satellite and on the receiving ground station.

Orbits in which a satellite repeater takes place are divided into three classes: equatorial(1), inclined (2) and polar (3). The geostationary orbit is a type of equatorial orbit [1].

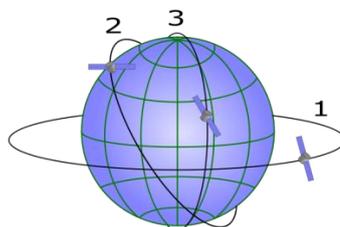


Fig.2 Satellites' orbits

https://ru.wikipedia.org/wiki/%D0%A4%D0%B0%D0%B9%D0%BB:Communications_satellite_orbits.svg Communications satellites are carried generally into space by launch vehicles. Most of them are placed in a geostationary orbit, where the satellite moves on a circular path around the Earth in the plane [7].

As the radio frequency range is a limited resource, it seems possible to use the same frequencies by different ground stations. This can be done in two ways: spatial separation, meaning that each antenna of the satellite receives the signal only from a certain earth surface area. And polarization separation means that different antennas receive and transmit a signal with orthogonal polarizations [6].

A satellite located in a geostationary orbit, includes the following components: a global beam, which produces the connection with ground stations across the whole coverage area on their own frequencies, the rays of the western and eastern hemispheres, which are polarized in a certain plane A, and the zone-rays, polarized in a plane B, that is perpendicular to A [2].

The choice of frequency for data transmission from earth station to satellite and from satellite to earth station is not arbitrary. The frequencies at which the transmission from ground stations to the satellite are different from the frequencies used for transmission from the satellite to the ground station. In this paper we consider the frequency ranges L, S, C, which are described in the table given below.

Fig.3 Table of frequency ranges [6]

The name of the range	Frequencies (according to ITU-R V.431-6)	Application
<u>L</u>	1,5 ГГц	Mobile satellite communications
<u>S</u>	2,5 ГГц	Mobile satellite communications
<u>C</u>	4 ГГц, 6 ГГц	Fixed satellite communications

For data transfer of large users (organizations) C-range is often used. This provides a higher reception quality, but requires quite a large antenna.

One of the systems that use satellite communications is a VSAT station. It is used to interchange information between the ground points, as well as in the systems of collection and distribution of data. SCS with a network of earth stations VSAT provide the type of telephone connection with digital voice transmission and transmission of digital information. An attractive feature of VSAT is the ability to place it in close proximity to the users, who can operate without landlines due to it.



Fig.4 Satellite dish for C-range. Antenna VSAT terminal

In addition to the VSAT systems, there are also other similar systems, such as SCPC connection. These are two VSAT stations, united with the satellite channel and located at users.

Besides, a similar system for VSAT station has been developed. This is a system of personal Earth stations PES, and a satellite interactive network designed for exchange of telephone and digital information within the SCS.

There is also an alternative type of systems - the system of mobile satellite communications. The design feature of most systems of mobile satellite communications is the small antenna size of the terminal, but it complicates the signal reception [6].

The advantages and disadvantages of satellite communication:

Satellite communication systems have several advantages. One of the main benefits is the large bandwidth and unlimited cover area. Also, modern SCS is distinguished by the reliability and quality of communication channels. This explains the rapid development of such systems. These advantages determine

the wide opportunities of SCS, make them unique and effective communication. At the present moment, satellite communication is the main international and national communication used for long distances. [3].

We have considered the types of systems where the satellites operate in geostationary orbits. Despite the fact that they cannot support persistent channels of communication with ground stations for signal transmission they can collect data from a large area of the earth's surface, moving in orbit relative to the Earth's surface.

Satellite communication systems are digital or analog. The transmission of information in digital forms has several advantages, such as privacy of communications, the flexibility of implementation of digital equipment, the simplicity and effectiveness of integrating multiple independent signals and the reduction of energy consumption compared with the transmission of the analog signal. One of the main advantages of this form is the insensitivity of digital channels to the effect of the accumulation of distortion retransmission, which is usually a serious problem in analog communication systems.

However, satellite communications have many unpleasant and intractable deficiencies. One of the main disadvantages of satellite communications is the low noise immunity. Interference can be of different nature. It affects the quality of the reflected signal rather adversely.

Studying the problem, we find out that the great distances between ground stations and the satellite can explain the fact that the radio signal/noise at the receiver is very small. To ensure the acceptable probability of detection of errors, it is necessary to use large antennas and complicated antijamming codes. This problem seems to be particularly acute in the systems of mobile communication, as they restrict the size of the antenna and, as a rule, the power of the transmitter.

Another disadvantage of satellite communication is the signal distribution delay. Anyway the problem of signal distribution delay affects all satellite communications. Maximum delay is inherent in the systems which use a satellite repeater in geostationary orbit. In this case, the delay is due to the finite speed of wave propagation, which is approximately 250ms.

In some systems (e.g. VSAT system) the signal is twice transmitted through the satellite communication channel. In this case, the total delay is doubled, and this is a serious problem.

Artificial satellites are also adversely affected by natural cosmic processes. For example, sun interference occurs when the axis of the satellite has approached with the Sun and a radio signal received from the satellite by ground station is distorted. Most often, this interference is called "lighted" [6].

So, the main problem is low noise immunity that is why the reflection of the signal and its exact distribution are affected by both the atmosphere and the other ion layers and solar activity. A signal delay, distortion or even its total absorption may appear due to natural effects.

Conclusions:

In this article we have considered the general concept of the satellite communication systems and their differences in the form of the transmitted signal, types and their benefits to each other. Geostationary satellite and the communication service for transmitting or receiving signals are of particular interest for our studies.

We examine the types of repeaters, as well as the variety of orbits of the satellite repeaters.

The use of satellite communications, and advanced systems, developed on the basis of satellite communications such as VSAT stations, SCPC, PES, mobile satellite communications systems, etc. have been discussed.

The problems and disadvantages observed occur during the setting and signal transmission.

Thus, the main factors influencing satellite communication are the size of antenna, the position of a satellite on the geostationary orbit, the distance between the satellite and earth stations. In general, different kinds of satellite communications have been discussed in the present article. To sum up we have reviewed the existing advantages and disadvantages of satellite communication. And for sure there is a great field for future researches and developments in this field.

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УДК 1683

NEUTRON STARS. WHAT ARE THEY?

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Abstract: This article is dedicated to the issue of neutron stars, their radiation and emission of heavy metals. The general characteristic of neutron stars is included which allows to understand the phenomenon better. On the basis of scientific articles and their data the conclusion about further investigations and results is made.

Key words: Neutron star, heavy metals, radiation, emission.

Introduction. The space remains insufficiently investigated even nowadays, when modern scientific equipment allows to obtain the most accurate data. To be more precise, it is a neutron star which makes physicists and astronomers face a great amount of different issues such as radiation and heavy metals emission – gold, platinum, lead and others.

This problem is considered to be rather new one owing to the fact that it has been known only for several decades. Therefore, scientists do not have sufficient information concerning the nature of the emission. The key to the issue is believed to give an opportunity to prevent the lack of heavy metals on the Earth, which makes this problem very relevant.

Object-matter: neutron stars.

Subject-matter: radiation of neutron star and its emission of heavy metals – gold, platinum, lead, etc.

Objective: to give the characteristic of neutron stars; to consider the problem of the radiation of the neutron stars and the emission of heavy metals.

Materials and methods include the study and analysis of articles dedicated to the issue of the neutron stars, neutron star radiation and emission of heavy metals.

Discussion and Results. For several decades scientists have raised the question of different ways of extracting gold but the assumption that this precious metal can be found in space has been made recently.

Actually, space is still a mystery to the scientific world despite the fact that the great amount of investigations has been made in this field. Scientists still cannot discover the nature of some phenomena, processes that occur not only when two or more bodies interact with each other but also the processes inside each cosmic body. Nevertheless, it is this knowledge that undoubtedly helps not only to enlarge information in such sphere but also to find necessary approaches to the problems that exist in the twenty first century.

For instance, one of the most relevant issues that worry the humanity is the origin of various metals which would not only provide the planet with necessary resources but also avoid the problem of lack of metals. Since the question of the extracting of gold and other heavy metals in the fusion of neutron stars has been raised it is necessary to cope with the concept of a neutron star.

A neutron star is a cosmic body which is one of the possible outcomes of star evolution. Basically, it consists of a neutron core, which in turn is covered with relatively thin crust of matter in the form of heavy atomic nuclei and electrons. If we compare a neutron star to the Sun it can be noted that despite typically small radiuses of the stars (approximately 10-20 kilometers) their masses are comparable to the mass of the Sun, which indicates a huge density, but further compression of this cosmic body does not follow because the pressure of the nuclear matter interferes with the process which takes place due to the interaction of the neutrons.

Another feature of a neutron star is its extremely high rotational speed which can reach several hundred turns per second. It is worth noting that neutron stars arise from supernova explosions [Potekhin 2010: 1280 – 1282].

The structure of a neutron star can be described as the following. There are five layers in it: atmosphere, the outer crust, the inner crust, the inner and outer core. The atmosphere of a star is a very thin layer of plasma in which thermal radiation is formed. The outer crust whose thickness reaches hundreds of meters consists of ions and electrons. A thin near-surface layer of a hot neutron star contains a nondegenerate electron gas, deeper layers contain a degenerate electron gas which becomes relativistic and ultrarelativistic while appearing deeper. The inner crust consists of electrons, free neutrons and neutron-redundant atomic nuclei. With increasing depth, the fraction of free neutrons increases while the number of atomic nuclei

decreases. The outer core consists of neutrons with a small admixture of protons and electrons. The inner core exists only in massive neutron stars, but its composition is still unknown. There are several hypotheses, but it is not yet possible to confirm one or to refute the other.

There is an interesting fact about neutron stars. They were theoretically predicted before the discovery by observers. However, even nowadays, after the discovery of the stars, they remain insufficiently studied and, therefore, are enveloped by many mysteries despite the extremely intensive research by many scientific groups.

One of the vigorously discussed events became the fusion of neutron stars which happened on August 17 this year. This discovery was recorded by the American detector LIGO in the USA, for the results of which three scientists were awarded the Nobel Prize. The event was called GW170817. The fusion of the stars happened in the constellation Hydra, at a distance of 130 million light years from the Earth. Despite the fact that in the human dimension the distance was more than impressive astronomers claimed that this was one of the cases when gamma radiation was recorded closest to the Earth. About 70 laboratories in different parts of the world observed the event.

The most strenuous work was conducted in August. Scientists managed to track how the stars, 300 kilometers distant, quickly approached each other and collided. Almost simultaneously gravitational waves and powerful gamma radiation were recorded. On the following days, electromagnetic radiation was detected in the X-ray, ultraviolet, optical, infrared and radio wave bands. Most scientists agreed on the opinion that a black hole formed as a result of fusion of the stars, though some considered the version unproven. So, scientists have proved that collisions of neutron stars can be a source of powerful gamma radiation. At the same time, more energy is released in a split second, than the Sun can radiate over 10 billion years [Burtnyk 2017].

When two neutron stars collide their main parts merge into one dense object emitting gamma rays. First measurements of gamma rays in combination with detection of gravitational waves prove the prediction of Einstein's general theory of relativity: gravitational waves spread with the speed of light. Theorists predict that as a result of the collision kilonova forms. It is a phenomenon when the material remained from the collision shines brightly and is ejected from the collision area far into space. This process is accompanied by creation of heavy elements such as gold and lead.

Observations made after the luminescence of the result of the collision enable scientists to obtain additional information about different phases of the collision, interaction of formed object with the environment and processes which produce the heaviest elements in the Universe.

The theory postulates that in case of the neutron-star collision heavier elements that form as subatomic particles are smashed together. The team saw the spectra of the neutron stars' infrared light revealed heavy elements, and that a lot of that material gets thrown free. Scientists had already considered neutron-star collisions good candidates for creating some of the universe's heavy metals, but it wasn't clear how often such smashups occur and how much material they throw into interstellar space [Emspak 2017].

Conclusion. All in all, scientists have to solve not only mysteries of accurate structure of the neutron star but also mysteries connected with consequences of the collision of two stars. The results of further experiments might make the question of the occurrence of gold in space clear and specify some new possible ways of extraction of heavy metals including gold and platinum.

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THE MYSTERY OF THE MISSING NEUTRINOS

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Abstract: In this article the solar neutrino problem is considered. The main content of the study is the analysis of articles devoted to this problem, the process of its detection and solution. It includes a neutrino characteristic that helps to understand the essence of the problem. Conclusions about further prospects of the research of this problem are made.

Key words: Sun, solar radiation, missing neutrinos, elementary particles.

Introduction. It is worth pointing out that the investigation of the Sun had begun much earlier than the humanity managed to design devices which would help to get the precise data. Despite such a long period of time dedicated to research the Sun scientists have not succeeded in solving all mysteries they have faced while making observations and doing experiments. One of the most famous problem in physics is a large discrepancy in the predicted and actual amount of radioactive atoms produced by the Sun. This phenomenon is called missing neutrinos.

Searching for the solution to this problem engaged a vast amount of scientists from all over the world. The answer found almost five decades later revealed that the fundamental description of the world's elementary particles is not yet complete. Consequently, it is clear that the issue of missing neutrinos is still relevant due to new problems which scientists have to solve in the nearest future.

Object-matter: solar radiation.

Subject-matter: the solar neutrino problem.

Objective: to consider the problem of missing neutrinos and methods of its investigation.

Materials and methods include the study and analysis of articles dedicated to the problem of missing neutrinos and solar radiation.

Discussion and Results. The Sun is the only star in the Solar System. The Sun was examined by astronomers of the Ancient Sumer and Ancient China, but the science – in the modern sense of the word – has been studying it for about 300 years – from Galileo and his contemporaries. The study of the Sun has a crucial importance for fundamental science – astrophysics, because the same processes as on the Sun occur on other stars. So, examining the Sun scientists study a small piece of the big Universe. The study of the Sun is also important in practical terms because it affects life on the Earth. With the beginning of the space age there has been a significant breakthrough in science and technology. Scientists began studying the Sun not only in the optical and radio bands, which is possible from the Earth, but in ultraviolet and X-ray ranges from space vehicles. Despite the great progress in studying the Sun there are a lot of problems which are to be solved by scientists.

A lot of attention is paid to solar radiation which has a direct impact on the Earth. Therefore, a vast amount of time and efforts has been spent on the study of this aspect. The period from 2001 to 2003 has become the golden period of examination of solar neutrinos. During this time scientists managed to find a solution to the problem which is important not only for physics but also for astronomy.

According to the scientists' opinion in the beginning of the twentieth century, the Sun shines due to the conversion of hydrogen into helium deep in its interior. Four nuclei of hydrogen – protons – change in the interior of the Sun into a helium nucleus, two anti-electrons and two particles called neutrinos. It is believed that this process of transformation affects sunlight, hence basically all life in the Earth [Bahcall 2004].

Neutrinos – invisible, low-mass particles – are produced as a result of nuclear fusion in the core of the Sun. These solar neutrinos move approximately with the speed of light. Yet recently, the crucial difference between the real and predicted number of neutrinos of the solar model has been noticed. This is the 'solar neutrino problem' [Lisle 2008].

There are three types of neutrinos. Nuclear fusion on the Sun generates only neutrinos associated with electrons, so-called electron neutrinos. Two other types of neutrinos – muon neutrinos and tau neutrinos – can be produced in laboratory accelerators or in exploding stars [Bahcall 2004].

The possibility of detecting neutrino from the Sun is the direct evidence of the presence of some fusion owing to the fact that gravitational collapse or chemical processes do not produce neutrinos, consequently they are not responsible for all solar energy. Since the ordinary substance is essentially "transparent" the detecting of neutrino might be difficult. As these neutrinos leave the Sun without any interaction and reach the Earth with almost the speed of light, they enable astronomers to investigate the solar core [Lisle 2008].

The ability of neutrinos to fly through the Sun resulted from slight interactions is a big difficulty for scientists to record the accurate data. Otherwise, neutrino would proceed with flying through planets without being noticed. Therefore, the problem of measuring solar neutrinos is very complicated.

The first person who tackled this problem was Ray Davis. In the 1960s he devised an experimental setup which uses chlorine to capture electron neutrinos through a reaction where neutrinos should have at least 0.814MeV. This reduces chances of detecting solar neutrinos to 12% because only three of the eleven possible pp-reactions produce neutrinos with the energy over this threshold. Under these conditions theoretically predicted number of produced argon atoms was from 4 to 11 per day, assuming a volume of

378 000 liters of tetrachloroethylene. This large tank was really built. To be more precise, it was built in Homestake mine, about 1500m deep. The soil around the reservoir protected it from particles created by cosmic rays which could simulate the reaction and thus falsify data. For the same reason the reservoir should be thoroughly cleaned and the used chemical should be free of impurities. Produced argon atoms were taken out from the reservoir by passing helium through tetrachloroethylene [Falk 2005: 5]. The amount of produced radioactive argon atoms comprised only the third part of the expected number.

Scientists proposed several explanations so that this mystery would be solved. The first one was about wrong theoretical calculations: the mistake was either in predicted number of neutrinos or in measured amount of them. The second one was caused by inappropriate experimental conditions. The last explanation which was considered to be the most unbelievable one asserted that physicists did not grasp all details of neutrino behaviour while reaching astronomical distances.

In 1989, a new experimental group called Kamiokande (led by Masatoshi Koshiba and Yodji Totsuka) made an attempt to solve the neutrino problem by using a large pure water detector and measuring the rate at which higher neutrino energies were scattered by electrons in water. This detector was sensitive only to high-energy neutrinos – a result of frequent reaction in the energy production cycle. The Kamiokande experiment appeared to be another proof of discrepancy between the number of observed neutrinos and the predicted ones by the theoretical model of the Sun. Nevertheless, the difference in data obtained via the water detector was less severe than in the Ray Davis' chlorine detector. Therefore, in order to solve this mystery scientists had to offer a new theory of fundamental physics.

In June 2001 the announcement concerning the found solution to the neutrino problem was made by the cooperation of Canadian, American and British scientists (led by Arthur MacDonald from Canada), who reported the first data obtained with the detector of 1000 tons of heavy water located in a nickel mine in Sudbury, Ontario in Canada. It became possible to study the same high-energy solar neutrinos investigated earlier in Japan by using this new detector called SNO – for solar neutrino observatory. The SNO collaboration determined not only electron neutrinos but also muon and tau ones. As a result there was no discrepancy between the observed particles and their number predicted by the computer model of the Sun. Among the total number of obtained neutrinos only the third part of them was the electron ones. Consequently, it was discovered that missing neutrinos exist but in other forms – muon and tau – more complicated for detection [Bahcall 2004]. The SNO experiment revealed that the majority of neutrino created in the Sun's interior was transformed into muon and tau ones by the time they reached the Earth.

The standard model of particles in physics assumes that neutrinos are massless, yet neutrino oscillations occur when several neutrinos have masses. Therefore, the standard model is incomplete [Falk 2005: 9]. Nowadays the mass of electron neutrino is considered to be about 100 million times smaller than the electron mass.

Conclusion. All in all, the solution of the problem of missing neutrinos was a breakthrough in the 21st century. This revealed inaccuracies in a standard model of particles in physics. Moreover, neutrino can be used for measuring the total radiant luminosity of the Sun. This discovery has led scientists to a new level of research of the Sun which in the future will certainly help to solve other problems.

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УДК: 544.1+544.7

COMPUTATIONAL MODELLING OF SILVER NANOMATERIALS

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Language supervisor: Matviichuk O.M.

Abstract: In this article, the current trends in computational modelling of silver nanomaterials are provided, varying from small isolated silver nanoparticles up to large hybrid organic/inorganics nanostructures solvated in water. Using classical molecular dynamics simulations, the structural behavior of sharp-edged silver nanoparticles is reviewed, which showed that the morphological stability depends on nanoparticles' sizes and shapes. The water-protecting effects and the role of the coating of the nanoparticle

by the poly(vinyl alcohol) polymer are discussed. Finally, the application of pH-responsive polymers as smart coating agents for silver nanoparticles has been demonstrated.

Key words: molecular dynamics, MD, computational chemistry, nanotechnology, nanoscience, silver nanoparticles, AgNPs, sharp-edged, PVA, polymer.

The object-matter is to study the current trends in computational modelling of silver nanomaterials.

The subject-matter to review findings of silver nanoparticles molecular dynamics simulations.

The objective is to describe MD simulations as a necessary object to advance the theoretical part of the design of novel silver nanomaterials.

Tasks: the structural behavior of sharp-edged silver nanoparticles, using classical molecular dynamics simulations

Materials: books, articles and scientific magazines.

Methods: molecular dynamics simulations.

With the abundance of powerful personal computers, nowadays life could be easily obtained as a supercomputer “time” which is available for studying different nanostructures, bringing about the advancement of nanoscience and nanotechnology. During the last decades, the role of computational methods has become a very important tool in science and technology developing. Such enhanced computational facilities are most likely continued their evolution and this tendency will be towards increased utilization of numerical models and high-tech imaging techniques [Esfarjani, Mansoori 2005: 1-45].

Computer-based molecular simulations and modeling are one of the foundations of computational nanotechnology. The computational investigator has control over the forces that could influence the structure, properties and dynamics of nanosystems and the ability to perform a systematic study of the actions and reactions of each force. The accuracy of such computational experimentations will depend on the accuracy of the intermolecular interactions as well as the numerical models and simulation schemes used. Provided the accuracy of the computational scheme is guaranteed one can use that to investigate various nonlinear interactions, the results of which could be completely unexpected and unforeseen [Mansoori 2005: 162]. Among various methodologies for computational nanotechnology, the method of molecular dynamics (MD) simulation is one of the promising tools to investigate structure and dynamics of metal nanoparticles and nanostructures.

Discussions and Results

Sharp-edged silver nanoparticles have promising perspectives in a broad range of applications, such as localized surface plasmon resonance, surface-enhanced Raman scattering, and metal-enhanced fluorescence [Kyrychenko, Kalugin, 2015: 7888–7899]. Periodic arrays of silver nanocrystals deposited at an absorber interface can serve as plasmonic concentrators in a photovoltaic device and two-dimensional arrays of nanoscale resonators. Taking into account a growing number of practical applications in silver nanotechnology, there are long-standing challenges in studying of the reliability of the classical MD simulations for reproducing of the morphological stability, crystalline structure and the perfect face-centered cubic (fcc) atom packing in the sharp-edged silver cubes, pyramids, octahedrons, and rods (Fig.1) [Blazhynska, Kyrychenko, Kalugin 2017: 139].

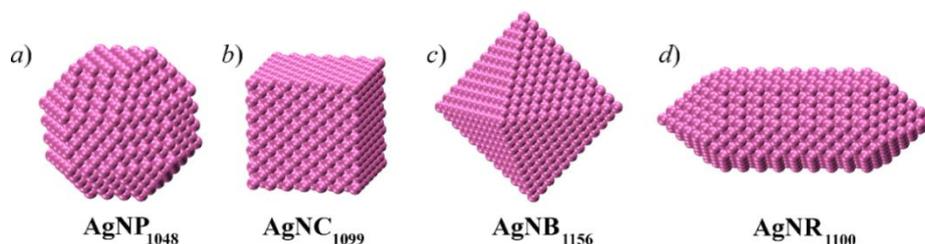


Fig. 1. Silver nanostructures: (a) – truncated polyhedron (AgNP), (b) cube (AgNC), (c) bipyramide (AgNB), and (d) rod (AgNR). Adopted from [Blazhynska, Kyrychenko, Kalugin 2017: 139].

As a first crucial test, a series of preformed silver nanoparticles (AgNPs) arranged as the perfect face-centered cubic (fcc) crystalline structure was considered. We demonstrated that the morphological stability of the preformed silver fcc-nanocrystals is size- and shape-dependent. Importantly, it has been suggested that the coordination number of corner atoms in silver nanostructures play an important role in their morphological stability [Blazhynska, Kyrychenko, Kalugin 2017: 139].

The use of the proper stabilizing agents of metal nanoparticles in solution is crucial. For this reason, the chemical modification of silver nanoparticles (AgNPs) with a stabilizing agent, such as poly(vinyl alcohol) (PVA), plays an important role in shape-controlled seeded-growth and colloidal stability.

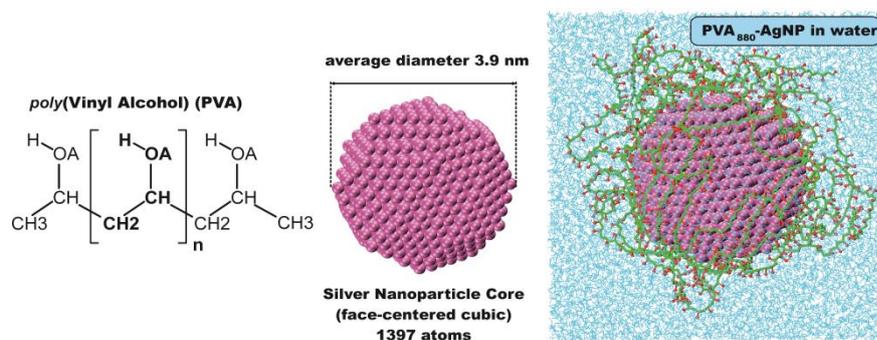


Fig. 2. (Left) The molecular structure of PVA polymer. (Middle) A silver nanocrystal, packed in the fcc quasi-spherical structure. (Right) A MD snapshot of equilibrated PVA₈₈₀-AgNP in aqueous solution [Kyrychenko, Pasko, Kalugin 2017: 8742-8756].

To gain a better understanding of the role of PVA in water protecting effects for silver nanoparticles, we developed an atomistic model of AgNP grafted with single-chain PVA of various lengths.

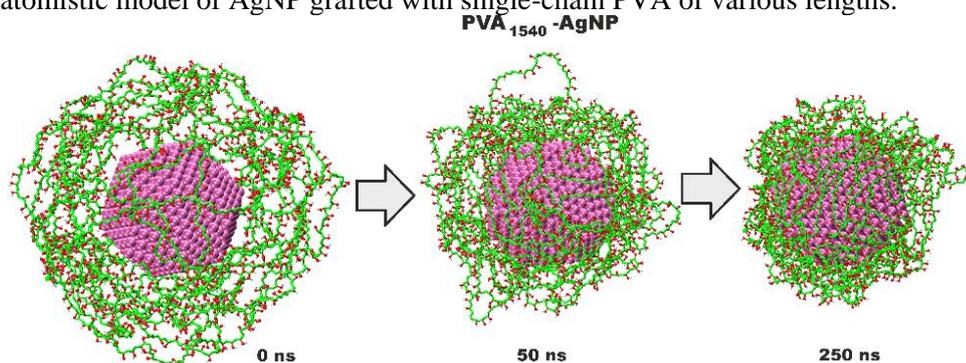


Fig. 3. MD simulations of adsorption dynamics of PVA₁₅₄₀ onto the AgNP₁₃₉₇ core. Adopted from [Kyrychenko, Pasko, Kalugin 2017: 8742-8756].

Our model, designed for classical molecular dynamics (MD) simulations, approximates the AgNP as a quasi-spherical silver nanocrystal with 3.9 nm diameter and uses a united-atom representation for PVA with its polymer chain length varying from 220 up to 1540 repeating units (Fig.2).

We found that PVA adsorbs onto the AgNP surface through multiple non-covalent interactions, among which non-covalent bonding of the hydroxyl groups plays a key role. The analysis of adsorption isotherms by using the Hill, Scatchard, and McGhee & von Hippel models exhibits evidence for positive binding cooperativity with the cooperativity parameter varying from 1.55 to 2.12. Our results indicate that the size of the PVA polymer rather than its structure plays a crucial role in providing water-protecting effects for the AgNP core [Kyrychenko, Pasko, Kalugin 2017: 8742-8756]. The time evolution of the adsorption dynamics of PVA₁₅₄₀ is shown in Fig. 3.

Future and Perspectives

Currently stimuli-responsive polymers have attracted great attention because of their unique physico-chemical properties. The polymer composed of titratable functional groups can respond to changes in pH, solvent polarity, temperature, and other stimuli, depending on their chemical nature. Embedding noble metal nanoparticles in a stimuli-responsive polymer matrix offers the opportunity of surface functionalization and therefore altering the properties of the system. Such hybrid organic/inorganic systems are very promising for smart materials such as biosensors, matrices for tissue engineering, and drug delivery carriers [Yenice 2015: 10348-10358].

A promising example of the stimuli-responsive polymer is given by poly(2-(dimethylamino)ethyl methacrylate

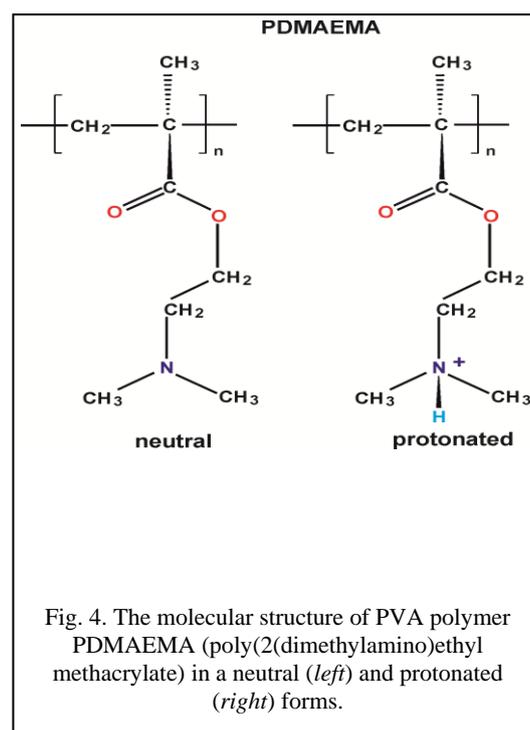


Fig. 4. The molecular structure of PVA polymer PDMAEMA (poly(2(dimethylamino)ethyl methacrylate) in a neutral (left) and protonated (right) forms.

(PDMAEMA) (Fig. 4). PDMAEMA is a weak polyelectrolyte, which exhibits a volume phase transition in water at a critical temperature T_c in the range of 35–40 C, where deswelling of the polymer takes place. According to literature data, this polymer is pH- and temperature- responsive. At $\text{pH} \gg 7$, PDMAEMA essentially is uncharged. At room temperature, the polymer chains are strongly hydrated and extend into the solution. Hydrogen bonds stabilize additional water within the polymer brush. With increasing temperature, dehydration and collapse of the polymer chains take place. The release of water during this phase transition is endothermic but entropically favorable. Protonation of the amine groups at $\text{pH} < 7$ is very much expected to affect this hydrophobic collapse, i.e., increasing the amount of bound water and strengthening the bonding of the water molecules [Thomas, 2015: 13426-13432].

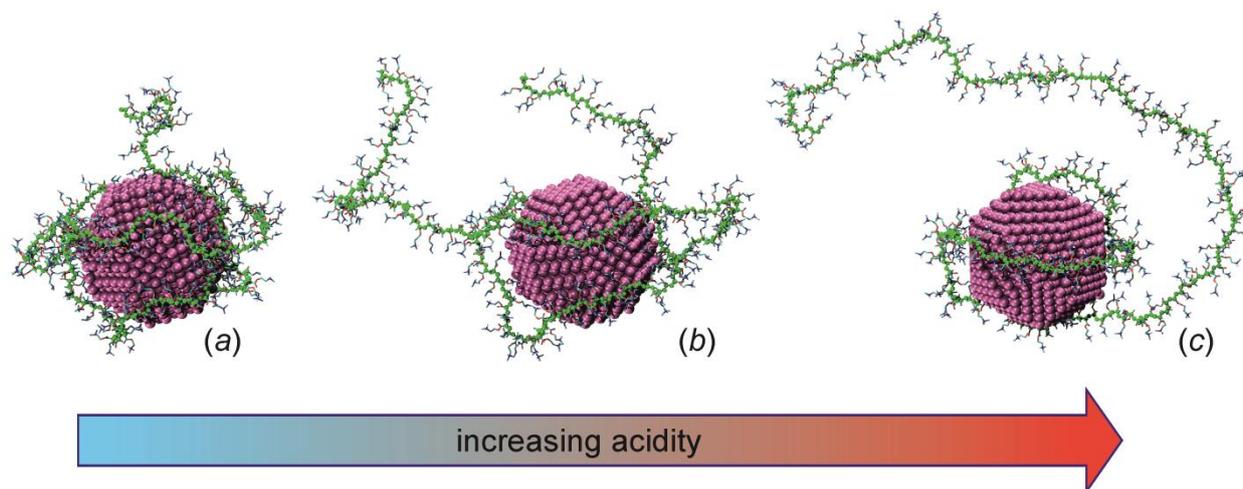


Fig. 5. MD snapshots of pH-responsive adsorption of PDMAEMA₂₂₀ onto the AgNP₁₃₉₇ core. A protonation degree of the dimethyl amino group in PDMAEMA is gradually varied from $\alpha=0.2$ (a), 0.6 (b) up to 1.0 (c).

Our preliminary MD simulations have shown that, contrary to the previously studied PVA, adsorption of PDMAEMA₂₂₀ onto the AgNP₁₃₉₇ core depends strongly on a protonation degree of the dimethyl amino groups. At a low protonation degree of $\alpha=0.2$, which mimics the low acidity environment, PDMAEMA₂₂₀ forms the compact coating around the inorganic core (Fig. 5a). Upon the partial protonation of the groups $-\text{N}(\text{CH}_3)_2$ ($\alpha=0.6$) PDMAEMA₂₂₀ acquires positive charges that results in stretching of the polymer backbone and facing the polymer chain ends to the solution. Finally, at an acid environment, at $\alpha=1.0$, when all dimethyl amino groups in PDMAEMA₂₂₀ become protonated, the loss of the polymer coating around the AgNP core was observed. Thus, our preliminary MD results indeed suggested that the compactness of the PDMAEMA coating around AgNPs could be tuned by changing of environmental pH.

Conclusions

To sum up, we have shown that numerical modeling and MD simulations help to advance the theoretical part of the design of novel silver nanomaterials, which in turn have promising perspectives in rational design of hybrid organic/inorganic silver nanostructures with precise morphologies.

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ARTIFICIAL NEURAL NETWORKS IN THE MODERN WORLD

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Abstract: The article reveals and defines the concept of artificial neural network, showing the basic algorithm of neural net functioning and the advantages of its implementation in different spheres. The questions of the history of neural networks creation, their application in the modern world, as well as the main potential directions of their development in the coming years are discussed.

Key words: artificial neural networks, deep learning, neural links, pattern recognition, threshold logic.

Introduction: In the recent few years, a technology called ANN (artificial neural network) has gained greater popularity. This creation was a real breakthrough for humanity. Although it is a new model, it has already been used in a number of projects, businesses and companies. The reason for that is simple – ANN is a self-learning mechanism. An artificial neural network is a mathematical model, based on the principle of organizing and functioning of the human nervous system. This concept arose during the attempts at simulating the nerve processes of the human brain.

After the development of the algorithms, it started to be used for practical purposes: in forecasting, for pattern recognition, in control tasks etc [4].

The **object-matter** of the given research is the process of ANN implementation; whereas the **subject-matter** is the enhanced effectiveness of ANN implementation in various spheres.

Objective of the present paper is to research the main branches of ANN implementation and determine the potential directions of its development.

The article considers the following **tasks**:

- a) to research the origins of ANN;
- b) to find out the main principles of ANN functioning;
- c) to consider the existing ways of ANN implementation;
- d) to outline the future possible spheres for ANN to be integrated in.

The following **research methods** were used in the research: theoretical analysis and generalization of scientific articles, practical analysis, formalization and analysis of different ANN types and their implementation.

As far as the materials are concerned, it should be noted that the empirical basis of the given research relies on the analysis of different Internet resources and articles of associates from such companies as «Google», «Microsoft», «Intel» and others.

Discussion and results: the first mentioning of the term «neural net» dates back to the middle of the XXth century. The first works, in which the main results in this direction were obtained, were done by McCulloch and Pitts [5]. In 1943, they developed a computer model of a neural network based on mathematical algorithms and the theory of brain activity. They advanced the hypothesis that neurons are the devices that can operate with binary numbers. This model of neuron structure was later referred to as «threshold logic» [1].

After this, there appeared two different approaches to studying the neural nets. One approach was oriented towards the study of biological processes in the brain itself, the other approach – to the use of neural networks as a method of artificial intelligence for solving various applied problems [1].

Later, in 2006, there were proposed several new uncontrolled procedures for training the neural nets with the application of the so-called deep learning algorithm. It is a machine learning technique that teaches computers to learn by example. Within the framework of this model, a computer learns to make classifications directly from images, texts, etc. Deep learning has gained a lot of attention lately due to the fact that it yields reliable results, impossible to have been achieved a few years ago. With its help, the neural net, as we can see it today, was created [1].

The mechanism of the neural net functioning is quite similar to the learning process of any human being. The process of learning is based on repeating one action for many times, until it is fully assimilated. For example, to learn how a specific object looks like, a human needs to see a vast variety of these object's representations, with different colours, shapes, from different sides etc.

This is the exact way of how the neural net works: when the issue starts to be operated, the net is constantly searching for the «correct» answer. It will discard vast amounts of «blank» information,

comparing and contrasting patterns, texts, until the necessary one is found. The way of «training» the neural net is simple – it is given a specifically developed base of images, letters or whatever else is necessary for the neural net to be able to operate. It starts to define the small parts, correcting the specific details. Finally, the right answer is found [2].

In terms of «how» to teach the neural network – as the most important step of the learning process – it must borne in mind that it must by no means learn the information by rote. This means that it is much easier to learn all the «answers» for a neural net than to determine the differences all the time, if the basis of information is monotonous. That is why there have been created special so-called libraries with different layers of information. For example, the most popular base of these is ImageNet [2].

The neural net is widely known to be a number of neurons that can process different information. The mechanism of «communicating» between the neurons is based on the linking connections. Thus, each neuron has two states: on/off. It «turns» on when it has enough signal strength passing through it, and «turns» off when there is no signal at all. When it is on, it starts to «communicate» with other neurons, sending them its own signal.

For example, some neuron is working at recognizing what we call a car. To make it «turn» on, some number of neurons, connected to it, must be active, like neurons «wheel», «door», «helm», «lights» (fig. 1). After the needed links become active, this neuron activates itself and starts giving out its signal to its «neighbors». After this algorithm is finished, the very process of learning, described above, starts. The neural links that conduct the right response, become thicker, and the wrong ones – thinner. The next time the neural net will determine the car faster.

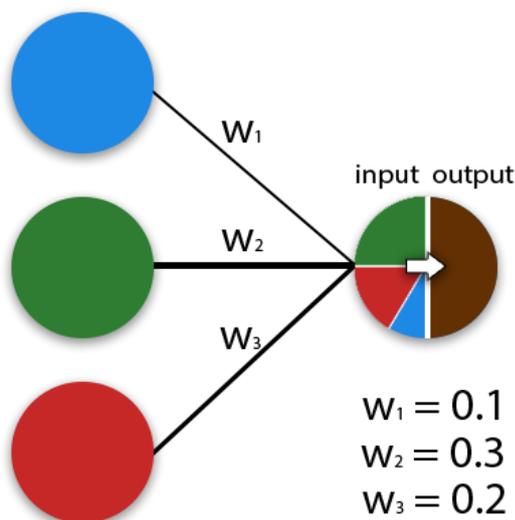


Figure 1. Structure of one neuron and its links

As for the most popular neural nets lately, one that attracts the most attention is «Deep Dream».

This neural net was developed by one of the associates of Google. It is trained by connecting each neuron to a certain pixel, and the signal of this neuron depends on the color intensity of the pixel. After this, it is shown millions of images and it is helped to learn the details, using the algorithm, described above.

This neural net has two states: the normal mode and the reverse mode. In the former, the neural net gives out what it «sees», whereas in the latter, the neural net is shown some fragments, and it returns the image of how it imagines the full picture, using those fragments. By combining these two modes, the following brilliant pictures (pic. 1) can be received [3].



Picture 1 Left: input Right: output

In the modern world, the neural nets have established themselves well in various spheres, such as forecasting, economics, art, pattern recognition, etc. Here are several examples:

1) Pattern recognition:

First of all, neural nets were used in this sphere practically in order to recognize face patterns. Scientists have learnt that many of the uncaught former criminals start up their «new» lives as well as their new social network accounts. That is why, when the neural nets became popular, the authorities decided to develop the neural net that would be able to look through the social net pages and search for criminals. According to the recent scientific researches, in the recent few years, a huge number of outlaws have been caught [4].

2) Forecasting:

Weather forecasting is essential to our daily lives. For decades, the model of forecasting has been the following: we had two weather stations that traced the weather changes in two different points; then, according to their data, weather forecast was made. However, this model had a lot of disadvantages, such as big distances between the stations, huge differences in indicators etc. Nowadays, with the help of neural nets and the radar images, it is possible to make the weather forecast for every 10 minutes with the high accuracy rate [4].

3) Art

Imagine a system that can make up an absolutely new painting in the style of a famous artist. This is the main branch of application of the neural nets in modern art. With their help, some pictures of ancient civilizations have been restored, several new techniques in painting have been discovered. And in 2016, the Google Corp. sold 29 pictures, created by neural nets, at an auction [4].

4) Apps

In the age of cutting-edge information technologies, people do not stop using their mobile devices. Thus, neuro nets are applied here, too. In the vast majority of cases, these are entertaining apps, such as those, which can determine your age by your picture, or those that can establish the breed of the dog in a picture. However, there are some practical applications, too. For example, the neural net that detects obstacles on the road and can stop the car if the obstacle is too close [4].

According to the recent research, the number of projects that use neural nets has grown a lot in the recent few years. That is why it is highly probable that neural nets will be integrated into many other spheres. For instance, specialists state that by the year 2018 we will have the video-analytics systems; intellectual security and monitoring systems; quick-translate systems for business conferences and many others. It is also possible that in a few decades neural nets will also be applied in medicine.

Conclusion: The quickly developing technology of artificial neural nets has had considerable influence on many aspects of our life. It is already used in many spheres and will be used in an even higher number of them. This model can already solve many problems of modern society, science and everyday life. To conclude, neural networks have raised the world's development stage, and now will make it only better.

We are only looking forward to seeing new capabilities of neural networks and the variety of their applications.

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УДК: 004.43

THE IMPOSSIBILITY OF DETECTING THE DIVERGENCE OF THE HARMONIC SERIES IN A COMPUTER EXPERIMENT

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Abstract: The aim of this article is to provide a reader with the results of several experiments that will help him to make a conclusion about the role of preliminary mathematical calculations in solving problems using a computer.

The results show that a direct solution can take a very long time and do not give the desired result.

Key words: computer program, calculus, harmonic series divergence, experiment.

Introduction. Nowadays computer technologies have achieved quite high altitudes. So computers can solve a lot of problems, including mathematical, for real time. However there are some unsolved problems, with which even the most powerful computers cannot cope. For example, there are Riemann hypothesis and Navier–Stokes equations. In the near future, quantum computers will be able to cope with these tasks, because they use new technologies. In this article, we consider a problem that is simple in terms of pure mathematics and show that the phenomenon associated with this task cannot be detected for real time by banal using of modern technologies.

In our paper we consider the problem of the divergence of the harmonic series from the point of view of its practical detection on the computer.

In the first part there are two ways of calculating the partial sums of the harmonic series.

In the second part, a theoretical investigation of the harmonic series is given, a convenient formula is derived for approximate calculation of its partial sums.

In the final paragraph, it is concluded that it is impossible to detect the harmonic series divergence in real time by direct calculation of its partial sums.

Object-matter: the possibility of experimental detection of the divergence of the harmonic series on the computer.

Subject-matter: the harmonic series.

Objective: to show that it is impossible to detect the divergence of a harmonic series in direct computations on a classical computer.

Tasks: to conduct an experiment to show that it is impossible to detect the divergence of a harmonic series in direct computations on a classical computer.

Methods: calculus and computer calculations are used.

Discussion and Results

1. Direct calculation of partial sums of the harmonic series.

In this section, we calculate in two ways the partial sums $S_n = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$ of the harmonic

series $\sum_{n=1}^{\infty} \frac{1}{n} = 1 + \frac{1}{2} + \frac{1}{3} + \dots$.

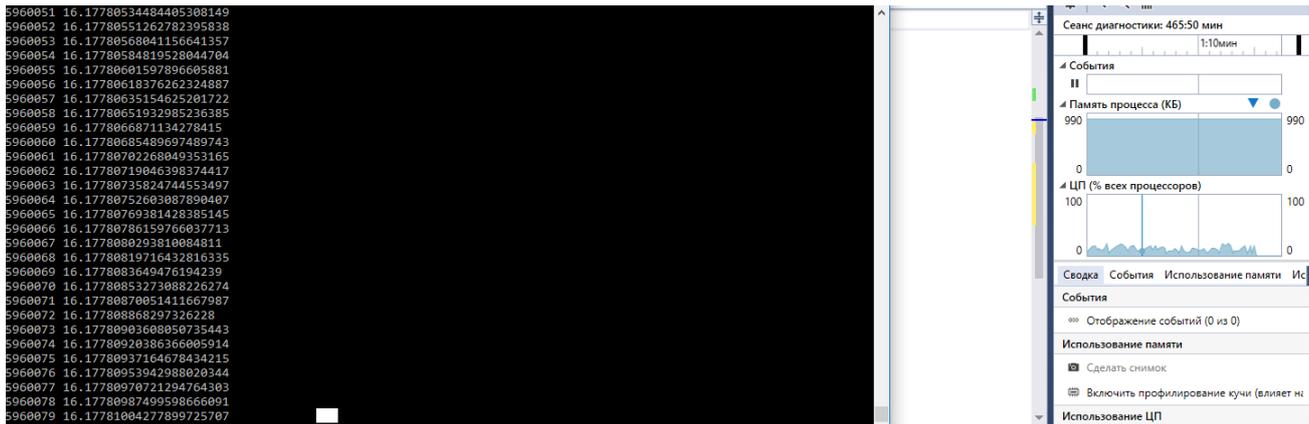
The first method is done with a cycle (see picture 1) and got the following result:

```

double FirstMethod(long long n) {
    double count = 0;
    for (int i = 1; i <= n; i++) {
        count += 1 / (double)(i);
        cout << i << " " << setprecision(22) << count << endl;
    }
    return count;
}

```

Picture 1



Picture 2

We see (picture 2) that the process takes quite a lot of time (465 minutes) and that the sums increase, but the nature of their increase does not show the divergence of the series.

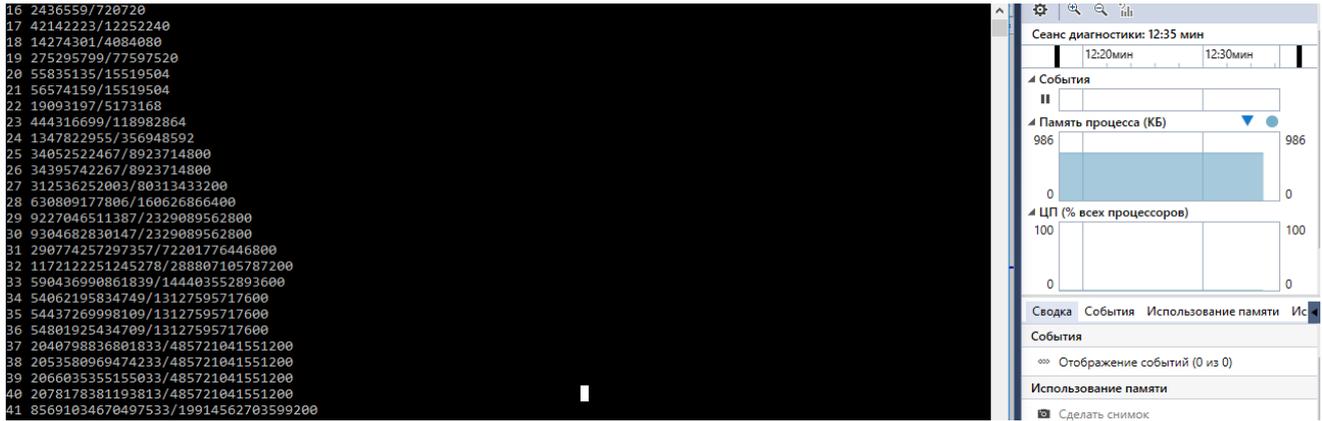
The second method is based on an exact calculus. The solution is described below (see Picture 3).

```

void SecondMethod(long long n) {
    long long a = 1;
    long long b = 1;
    for (int i = 2; i <= n; i++) {
        a = a*i + b;
        b = b*i;
        for (int j = 2; j <= (long long)sqrt(a); j++) {
            if ((a%j == 0)&& (b%j == 0)) {
                a /= j;
                b /= j;
            }
        }
        if (b%a==0) {
            a = 1;
            b /= a;
        }
        cout << a << "/" << b << endl;
    }
}

```

Picture 3



Picture 4

As shown by the experiment, the calculation of 5000000 with an accuracy of -20 takes a very long time in the first case, and in the second much more (see Picture 4), moreover, in the second case we obtain fractions with large denominators, and it still does not give a definitive answer to our question.

2. Mathematical view.

In this section, we show that it is fundamentally impossible to observe experimentally the phenomenon of divergence of the harmonic series.

For this we use well-known integral criterion for the convergence of a number series (see [1], ch. XI, §2). Moreover, we obtain the following asymptotics for its partial sums:

$$S_n = \sum_{k=1}^n \frac{1}{k} \sim_{n \rightarrow \infty} \int_1^n \frac{dx}{x} = \ln \left|_1^n \right. = \ln n,$$

i.e. $S_n \sim \ln n$.

Now we see that to obtain S_n values of the order of 100 we need to take the number of terms n of order e^{100} , which is really impossible on modern computers.

Conclusions. In the work, several computer experiments were conducted to observe the character of harmonic series convergence. It turned out that exact calculations of partial sums of a harmonic series take a catastrophically long time. And real approximate calculations do not make it possible to observe the divergence of the harmonic series. Thus, even in the simplest situations, a direct computer experiment may not yield the desired result. Therefore, to make these experiments more efficient, preliminary mathematical calculations must be carried out.

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ENCODING CLASSIFICATION MODEL TO IDENTIFICATION OF EXTRAGALACTIC SOURCES IN THE ALL-SKY CATALOGUES: FEATURE ENGINEERING STAGE

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Abstract: Classification task is a challenging step for further investigations in any astronomical subject. Here we aim to focus on the identification of extragalactic sources in the wide-field photometric

missions. Encoding Classification Model (ECM) is created to solve this task. We consider our model as independent approach to analyze quality of catalogues of extragalactic objects by magnitude and colour information.

As a result we established that encoding way is the very effective one to choose optimal features for classification within optical-infrared photometric range.

Keywords: Catalogues: astrometry, extragalactic objects; methods: machine learning, data analysis.

Introduction. The Hipparcos Celestial Reference Frame (HCRF) has been the realization of the International Celestial Reference System (ICRS, [Arias et al. 1995]) in optical range since 2000. This revolution has been done by dint of high precision and extensive survey at that date of ESA Hipparcos mission [Perryman et al. 1997; Høg et al. 2000]. The new ESA Gaia mission will provide renovation of optical realization of ICRS in 2020th on a higher level by the most accurate and complete astrometric investigations of our Galaxy to date. The main goal of the GAIA mission is to measure the positions, proper motions and parallaxes for 109 objects in the sky in the three visual (G-bands) magnitudes ranged between about 6m and 20m. Whole this study motivates to explore physical parameters for billion objects in GAIA catalogue which can be calculated from GAIA astrometric and spectroscopic information. Nowadays GAIA mission yields own results with data-catalogues; first data release (GAIA DR1, [Gaia collaboration et. al. 2016a; Gaia collaboration et. al. 2016b]) was done in September 2016. GAIA DR1 catalogue contains of positions, G-band magnitude (for 109 objects), proper motions and parallaxes (for 2 million objects). But unlike strong data processing algorithms of the GAIA team (Gaia collaboration et. al. 2016a) it is necessary to control astrometric and classification solutions by external origins. For example, recently were investigated that proper motions (Fedorov et.al. 2017; Liu et.al. 2017) and parallaxes (Davies et.al. 2017, Gontcharov 2017) in the GAIA DR1 catalogue are prone to systematic errors. From the other hand, astrometric parameters are included in parametric space for GAIA objects' classification. It is clear that incorrect astrometric effects will defect the classification result within GAIA catalogue because classification of objects.

Task of distinguishing extragalactic objects (especially, quasars) in GAIA project is crucial problem due to astrometric solution. This solution is a realization of the some astrometric model; in the GAIA linear relativistic model has been used and in the range of the one the quasars as very distant objects have not any proper motions and parallaxes (their motion on the sky too small for GAIA accuracy). So the correctness of extragalactic objects secretion have to act the astrometric solution. During the GAIA mission, one of the APSIS [Bailer-Jones et.al. 2013] modules, Discrete Source Classifier (DSC) model, is used for classification of objects. Important to notice that in the GAIA catalogue the extended sources will be not included; estimated amount of galaxies and quasars equals about few million sources. According that we can consider that if we have some complete sample of extragalactic sources (with optical magnitudes <20m and greater ones), the GAIA extragalactic objects have to be a subsample of our own set. This way will help us to answer the task: how many extragalactic objects in GAIA are wrong classified?

According that, we can set a star-galaxy classification problem as an **object-matter** of our research. **Subject-matter** is a behavior of the different types of objects in the high-dimensional colour-space. We aimed to solve our **main objectives**: we want to found accurate automatic method for star-galaxy separation and for building colour-space to separate extragalactic objects from the galactic ones. During investigation we worked out the solutions of next **tasks**: how to divide stars from galaxies without limited sample of features; how to produce feature representation and transform to the most accurate classification of the extragalactic objects; how to increase ability to generalization of our model.

Here we present new complex algorithm for classification of objects which is called Encoding Classification Model (ECM). Construction of the ECM is based essentially as follows: 1. Pre-processing data from all-sky photometric catalogues (feature selection stage) 2. Constructing high-dimensional colour-space (feature engineering stage) 3. Creating new photometric catalogue of extragalactic sources (classification stage) 4. Independent evaluating (validation stage) 5. Testing GAIA classification model (final stage).

In this paper we describe a second part of this project devoted to sources' feature engineering for further classification. The main goal of this stage is to create simple, fully-automatic and optimal algorithm for dimensionality reducing of photometric data. We tested our method with the WISE and SuperCOSMOS catalogues as main **materials**, cross-matching of which guarantees 10 photometric in broad optical-infrared range and 45 colour features for analysis. To analyze catalogues we used "Autoencoder" **method** – machine learning algorithm for reducing dimensionality of data.

Discussion and Results

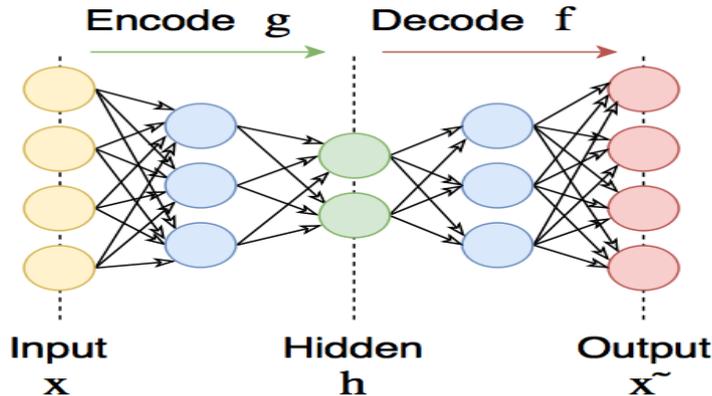
Autoencoder

"Autoencoding" is a data compression method constructed of the two functions: the compression (encoder) and decompression (decoder) functions. These functions satisfy following properties: data-specific (AE will only be able to encode and decode the data similar to what they have been learned on), lossy (the decompressed outputs will be a little differ from the original inputs) and *learned automatically (unsupervised learning)*. Last very useful property of the AE means that it we may not to know of which objects or processes we work – AE have to find all common and distinctive features of the units of data by itself, without foreign hints.

Autoencoder (AE) is a specific neural networks architecture: to produce fine compression, it is clear that number of neurons in the layers in network have to be descending to the end for encoder and rising – for decoder (Fig.1).

Mechanism of AE can be described by the simple equations. We are given input data x and AE that contains encoder g and decoder f functions. Encoder have to represent data in the compressed form (hidden data): $h = g(x)$ and decoder have to uncompressed hidden data into original one: $\tilde{x} = f(h) = f(g(x))$, where \tilde{x} – decompressed (restored, decoded) data. Learning of AE is a procedure during which encoder tries to find latent features of data through which decoder tries to restore input data: $\tilde{x} \rightarrow x \Leftrightarrow f(g(x)) \rightarrow x$ or $|x - \tilde{x}| \rightarrow \min$.

It was shown [Hinton 2006] that AE is the more effective method to reduce dimensionality of the data rather than Principal Component Analysis (PCA) or Kernel PCA. AE is a very good way to produce this because information stored in latent (hidden) layer is some general representation and weighted non-linear combination of the whole units of data, but the most significant features will contribute more information. We used this property of AE to analyze the problem: how strong extragalactic objects may separate from the stars in colour space.



Colour-space construction with AE

The star-galaxy separation problem can be solved by the three general ways: spectroscopic, morphological or colour information. First approach is the most effective because direct spectroscopy with a high accuracy can answer this task, but spectroscopy instruments are not enough sensitive to observe faint objects or to be used for wide-field missions yet. Second approach is the most trivial of the all ones: we can distinguish galaxy from star almost always in the bright part of magnitudes by morphological parameters: galaxies are extended on the images and stars are point-like. But this conclusion is not write when we work with broad magnitude range: faint distant galaxies have to be seen as point sources; quasars on the images also are always point ones. Third way is the most popular way in recent time because it contains no defects as morphological and spectroscopy classification, but it less secure. Colour separation method used to extract sets of extragalactic objects from the PPMXL [Vickers et.al. 2016] and PMA [Akhmetov et.al. 2017] catalogues within infrared and optical-infrared range respectively. Also, recently was shown [Khrantsov et.al. 2017] that optical-infrared colour indexes provide almost clear separation between stars and galaxies in the 6-dimensional colour space. But the colours, used for analysis, were chosen manually, without automatic methods of feature selection. In current investigation we skipped selection stage and started classification with fully-automatic construction of colour-space.

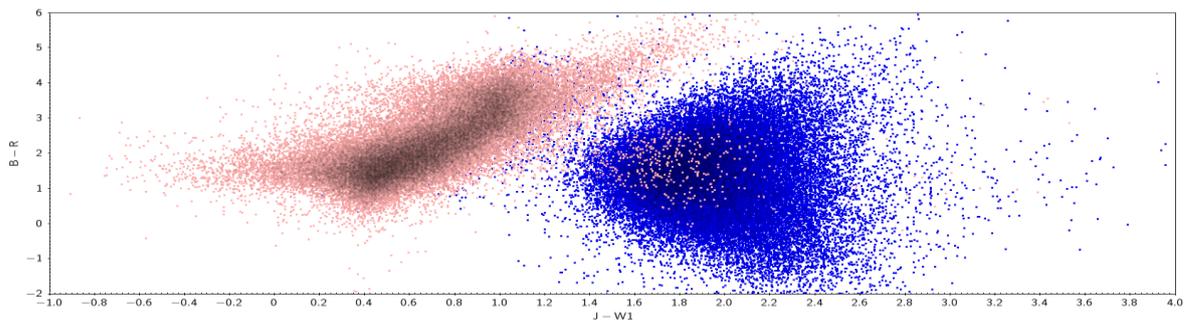
As in earlier work, we used WISE [Wright et.al. 2010] and Super COSMOS (SCOS, [Nambly et.al. 2010) catalogues for investigation. WISE catalogue is a result of near- and midinfrared survey of the celestial sphere that yields photometric information in $W1, W2, W3, W4, J, H, K$ magnitude bands about

280,546,147 objects. SCOS is a collection of digitalized photographic plates in optical range (B, R, I passbands) contained photometry of 698,626,135 objects. Cross-matching these catalogues with 1.5 arcsec radius yields 235,232,381 common objects with wide optical-infrared data in 10 passbands for each object. Constructing initial colour-space based on the colour indexes which can be calculated as $colour = (mag1 - mag2)$ – paired differences of 10 magnitudes; in result we got 45-dimensional colour-space.

Next step is feature engineering – correction, transformation and filtration of colour-space basis. All these procedures are provided by AE compression process. Main parameters, which is called “supercolours”, store in the latent space. To investigate AE accuracy, we used train sample of 100,000 objects from WISExSCOS catalogue and 50,000 of these objects are common to 2MASSx (XSC, [Skrutskie et.al. 2006]) and other 50,000 – to GAIA DR1 catalogue. Using this division we made assumption that XSC catalogue consists of extragalactic objects only and GAIA DR1 includes only point-like galactic ones. The two-colour diagram ($J - W1, B - R$) for train sample is shown on the Fig.2.

Fig.2. Two-colour diagram ($J - W1, B - R$) for 100,000 train objects from WISExSCOS. Blue dots – extragalactic objects (XSC subsample) and pink ones – stars (GAIA DR1 subsample)

For encoding we used deep AE architecture with 3 encoding layers (with sizes 9,6,3) and 3 decoding layers. Input dimension equals 45 (colours) and we accept that latent dimension equals 3 (supercolours), i.e. we compress 45 original optical-infrared colours into 3 supercolours (Fig.3). One can see that separation of the objects is clean and we can separate these sources into two classes easily. After getting supercolour diagram it is easy to provide separation into this space by learning some dividing algorithm on the XSCxGAIA train dataset and then to classify all WISExSCOS objects which colour have to be compressed in such supercolours.



Conclusions

The WISExSCOS photometric data have been tested by AE technique. Eventually this method is turned out to be more accurate and effective rather than visual inspection of the colour diagram. This may be caused by the AE’s compressing all 45 colours into only 3 features whenever by eye we see only two or three colours on the diagram and manual distinguishing is tough way to separate two groups using all

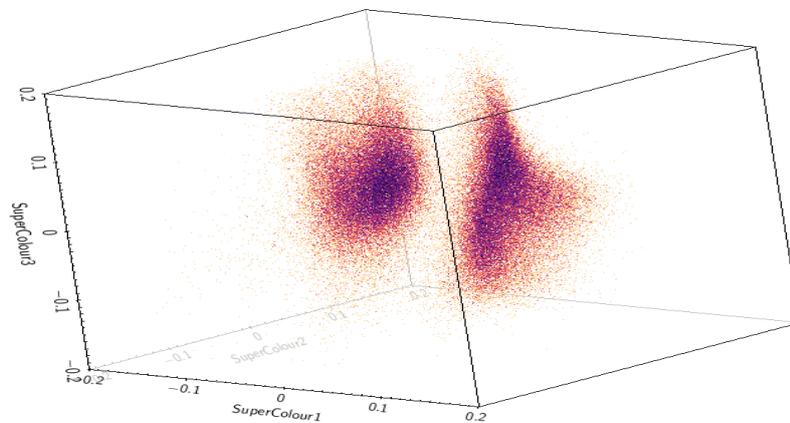


Fig.3. Distribution of train objects in supercolour space

wanted or needed colours. We plan to test different AE’s architecture with different train datasets and with different sizes of the ones before GAIA DR2 release.

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PERSONAL DATA PROTECTION

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Abstract. Almost every person has valuable electronic information that needs reliable protection from unauthorized access and distribution, accidental deletion or modification. All the developed countries of Europe and the post-Soviet space are concerned about the problem of information security. The present article provides a description of what is information security in general and that of an enterprise in particular, considers the key threats as well as the means of protection.

Key words: Information security, leak channels, personal data, protection of data.

The **object-matter** is information security in the developing world. The **subject-matter** is ways of ensuring personal data security. The **objective** of this article is to study the problem of information security of Ukrainian companies. Analyzing leakage channels, calculating losses and offering a way of protecting information are the **tasks** of the article, whereas the **methods** employed are those of statistical and analytical calculations. In the course of the work, we will use such **materials** as findings of the SearchInform company research and the Mediarecovery laboratory.

Problem statement

We live in an increasingly networked world and the first thing that needs to be said is that the main concern around the world is cybersecurity. Moreover, this problem will increase with the development of the “Internet of things” [Yoon, Park, Yoo 2015: 691-696] and global mobility. However, a person can’t independently oppose the encroachment on his private life. With the growth of technical capabilities to collect and process information, care must be taken to protect personal data. Doubtlessly, it is a problem that needs solving, because if hackers steal customer data, it harms the corporate reputation, erodes the public’s “comfort with sharing their data” [Knowles 2012].

It is known that 70% of leaks in Ukraine are those of personal data [InfoWatch 2017]. It is difficult to assess the damage, which was done to the business image. Many clients will refuse to continue to cooperate, if they know that their passport information or phone number fell into the hands of fraudsters, because it is not their fault. According to the SearchInform research company, worst of all in Ukraine is the case with personal data security.

Discussion and Results

Some time ago the Internet spread the news that the swindlers took a loan of \$ 1.5 million, using published data from Kyiv [SearchInform 2017]. Personal information fell into the hands of fraudsters through a bank, in which one of them exchanged the currency. Despite the fact that neither the name of the customer nor the bank's name appeared, such a situation could have occurred. Today you can find any database, and the only question is who and what purpose they use it for.

However, customers may suffer not only from the direct leakage of their personal data [Mamchenko 2016]. In the summer of 2011 for the first time ever Ukrainian special services neutralized an international hacker group, which included, inter alia, 16 citizens of Ukraine. Within three years, the criminals of that group hacked into foreign bank accounts with the help of a computer virus named *Trojan Horse* [InfoWatch 2017]. A group of financial institutions caused clients to suffer losses amounting to more than \$ 72 million. According to experts, such crimes are often preceded by leaks of information necessary for the security breach [Rashmi Knowles (2012)].

In 2011, companies worldwide officially spent more than \$ 500 million to eliminate the impact of data leakage. Ukrainian business is familiar with information security problem not by hearsay. According to the survey of SearchInform, 53% of Ukrainian companies are faced with leaks of confidential information.

Among the participants there were sociological research banks, industrial, commercial, transport and other organizations (see Fig. 1) [SearchInform 2017].

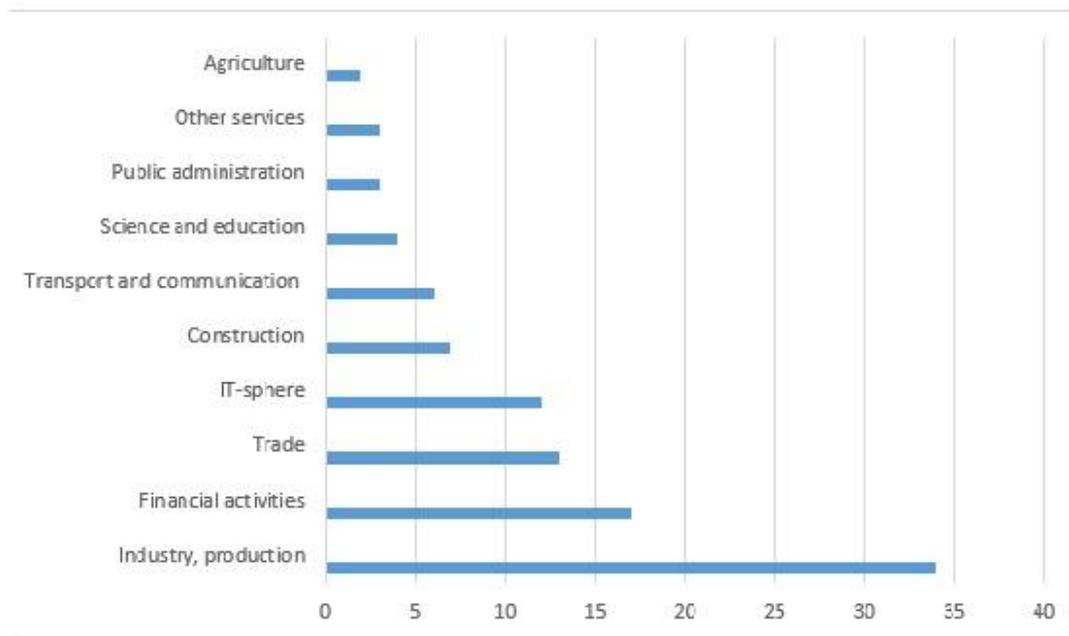


Fig. 1. Companies that participated in the research of SichInform, by industry

The type of protected information depends on the company's activities, that is, what information should be guarded more carefully. If the well-being of the plant is more important than keeping in a secret technological know-how, then, a bank should first prevent leakage of cardholders' data, as has recently happened with the largest and Visa MasterCard payment systems. Reminder: 1-10 million inhabitants could have suffered due to this leak. The famous company was quick to assure that this was not their fault. All the responsibility lies with a third party - the Global Payments payment operator, with which the cooperation was immediately terminated. It is worth mentioning that the leak was known in advance [Brown and Eric 2015].

Leak channels

As the world practice shows, personal information about customers or employees is subject to leakage to a greater extent. According to estimates, about 90% of the stolen data last year were personal [Hossain, Fotouhi, Hasan 2015: 21–28]. In this respect, our country is in step with the entire planet. According to SearchInform, 70% of leaks in Ukraine concerned personal data. Technical and financial information is stolen a lot less (Fig. 2).

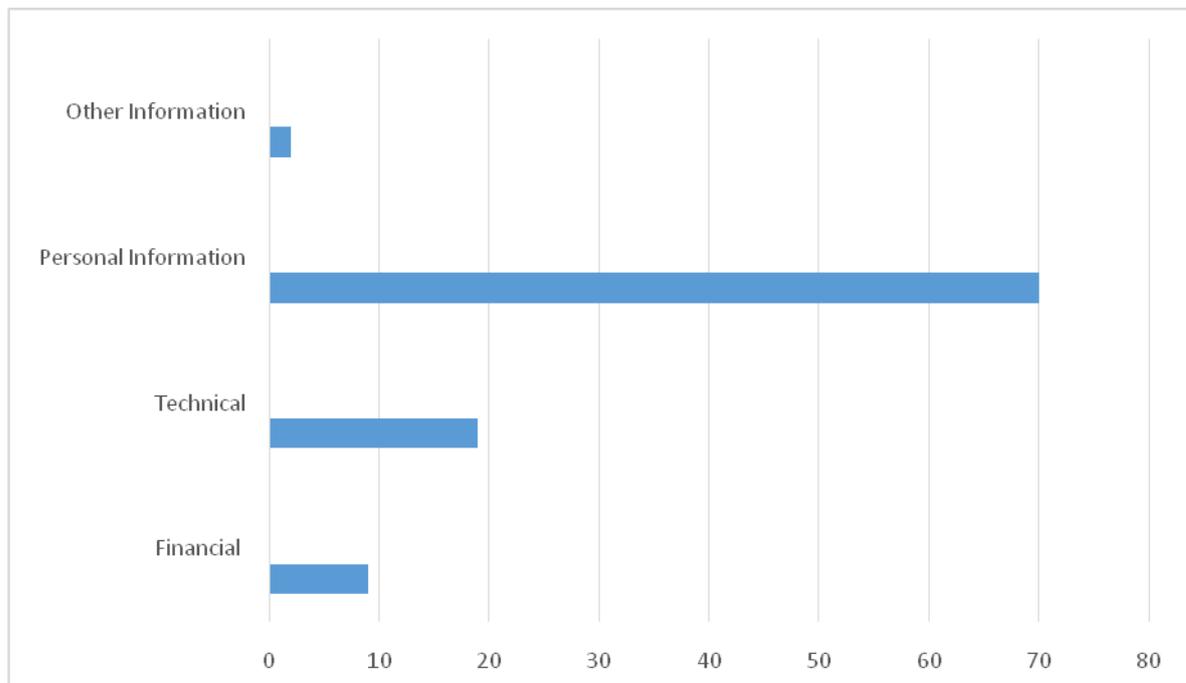


Fig. 2. Corporate information of organizations which has been leaked

Part of such statistics can be explained by the fact that everyone understands that the leakage of financial statements or technological developments threatened lead to losses and can be easily opened, while the safety of personal data only care about their owners. Therefore, selling the customer base, a person thinks it poses absolutely no risk. However, in Ukraine the law "On Personal Data Protection" is in effect.

The question of why certain employees decide to become insiders cannot be answered unequivocally. Firstly, not all leaks are deliberate. Often "talkers" are a godsend for a spy, and then corporate secrets leave the office as if by accident. The ratio of intentional and accidental leaks is about 35 to 45%. The remaining 10% are the cases, the nature of which cannot be established more closely [Hossain, Fotouhi, Hasan 2015: 21–28].

However, if trade secrets were disclosed, then, in any case, the head of the company is guilty, unable to explain what information is not intended for prying eyes. According to the findings of the Polish research laboratory Mediarecovery, trade secrets reveal three types of workers [SearchInform 2017]:

1. Staff who do not realize the importance of the data. They can simply let slip valuable information or inadvertently open access to it.

2. Persons offended leadership. They deliberately reveal corporate secrets, but not so much for the sake of personal gain, but because of revenge. This category includes a lot of laid-off workers. By the way, 65% of Ukrainian companies were faced with the problem of layoffs of employees who tried to get access to confidential information. This study was surveyed by SearchInform [SearchInform 2017].

3. Malicious insiders. They realize the importance of the information available and use them for their own purposes. These people do not hold a grudge against the leadership: nothing personal – just the money. Malicious insiders can be specially dispatched spies.

Often leaks are workers with responsible positions. This is explained by the fact that they have unrestricted access to confidential data. It is therefore reasonable for information security in the company to deal with people reporting directly to senior management. As a rule, in Ukrainian companies this role is performed by IT departments or divisions responsible for ensuring the safety of a particular company (Fig. 3).

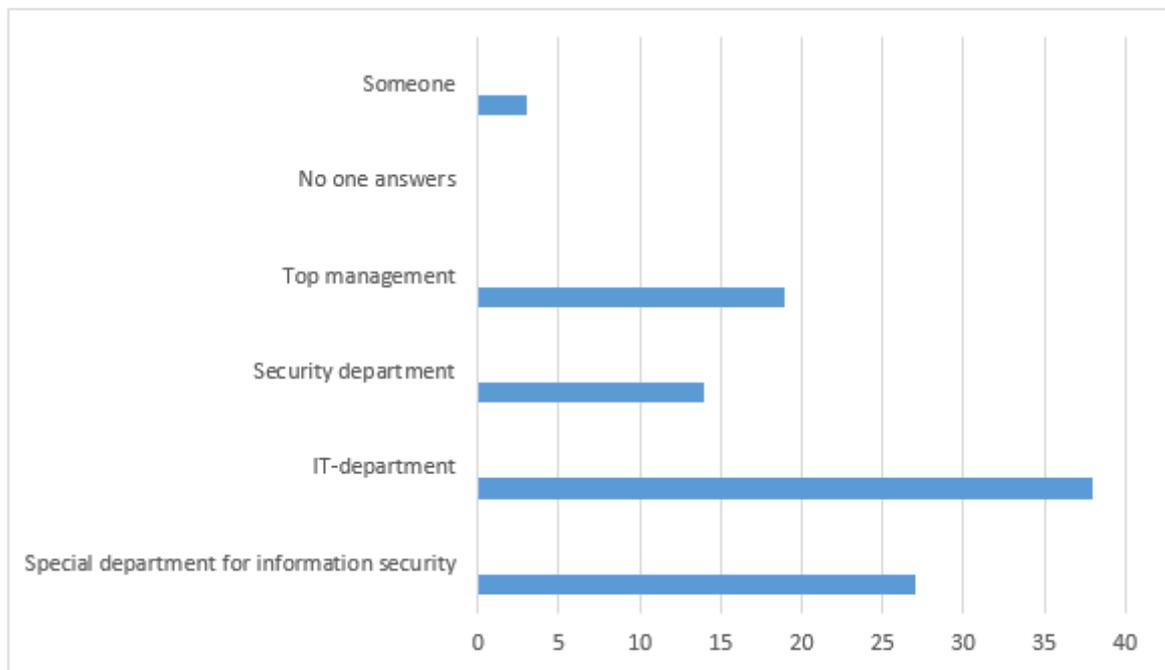


Fig. 3. Departments which are responsible for information security

A way of protecting information

Nowadays the DLP-system (from the English Data Leak Prevention - data leakage prevention) is used to prevent leaks. These tools are based on an analysis of data streams. If the employee starts to share in any possible way, print, send via email or save to an external drive the personal database (or any other confidential information), it immediately becomes known to security officers.

Modern DLP-systems use linguistic and semantic analysis of the text. The simplest example of linguistic analysis is filtering documents on stop words ("secret", "confidential", etc...). But none of the malicious insiders will directly use them. In order to isolate a possible leak, DLP-solution also defines the context in which the term is specifically used. In addition, for the success of the program the head of the company must be able to classify information on the functional accessories (financial, industrial, technological, commercial, marketing), and, within classes, to categorize it by access level (for free distribution to the limited access for official use, secret, top secret, etc).

The DLP-system already uses a quarter of respondents in Ukraine institutions. After the installation of the appropriate software and after the solution is accepted and approved, it is necessary to determine which channels will be monitored. Experts believe that most security companies need to involve the maximum number of data channels.

Conclusions. To conclude, it can be stated that the problem of information security is not new. It appeared long before the advent of computers. The introduction of computers in all activities led to the fact that the threat of loss of confidential information has become an integral part of any activity. Principles of modern information security involve the search for an optimal balance between accessibility and security. However, absolute protection does not exist since a fully protected computer is a computer that stands in an enclosed room and is not connected to a network. One should, however, not forget that offenders are becoming more able to attack. Protection of information is not limited to only technical methods. The problem is much wider. The main lack of protection - people, and therefore the reliability of security system - depends on your relationship with them. Perhaps we should also point out the fact that information security should be continuously improved along with the development of computer networks and technologies.

In summary, it can be noted that for businesses it is the attitude of buyers that is often the primary goal. People cannot allow loyal customers, due to leakage of their personal information, to change their attitude to the company and move to the competitors. Ukrainian customers want their right to inviolability of personal data recognized and respected.

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УДК:577.12

INFLUENCE OF MECHANICAL STRESS ON THE STRUCTURAL PARAMETERS OF EXTRACELLULAR MATRIX BIOPOLYMERS

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Abstract. It has been studied the influence of mechanical stress on the structure of collagen type I and glycosaminoglycans of rat skin connective tissues as collagen fiber stabilization during development and through growth to maturation has now become fairly documented. The findings may indicate that fibrils formed were shorter and had lower thermostability. Under the action of mechanical stress, the range of middle and low molecular mass of hyaluronic acid and chondroitin sulphate was increased, compared to the control where the high molecular weight fractions were dominated.

Keywords: connective tissue, collagen, glycosaminoglycan (GAG), fibrils, mechanical stretching, thermal stability.

Introduction. The overall shape and function of the body depends on the basic framework of collagen polymers that are stabilized by intermolecular crosslinks. Stabilization of collagen molecule is a carefully controlled enzymatic process, which produces intermolecular crosslinks at specific locations. Self-assembly of fibrillar collagen molecules in submolecular aggregates is one of the most important stages of early morphogenesis of the connective tissue, which takes place in different processes – embryonic development, growth, and periodic physiological modifications of organs, wound healing, and physical training. As a result, fibers are virtually inextensible and provide exceptional tensile strength and resistance to mechanical forces. Cell deformation due to mechanical stretching is common and occurs in the body, and it primarily applies to all varieties of the connective tissue, where mechanical loads are extremely diverse [Hyun, Chen 2006: 1444-1451]. It may be permanent or cyclical in intensity and duration. It was recently established that under the influence of mechanical stretching cell deformation in connective tissue intensifies the synthesis of structural biopolymers, particularly those of collagen molecules, which are capable of associating into fibrils by self-assembly [Buschmann, Gluzband 1995; Garbuzenko, Emeth 1997; Hyun, Chen 2006]. There is a mismatch between the intensity of the assembly of collagen polypeptide chains on ribosomes and the level of their post-translational modification, which is carried out by enzymes of processing [Bubakar 2014: 39-46]. This effect may lead to a change in the final structure of the collagen protein, and hence, the properties of its molecules.

At present, however, there are practically no reports on the relationship between the influence of mechanical stress of the skin and disruption of the formation of fibrillar collagen structures. It is, therefore, expedient to deeply study the mentioned relationship as well as the consequential decrease in the thermal stability of fibrils that are formed from collagen structures. To achieve the above mentioned purpose, the following **objectives** were set: 1) to estimate the composition of *de novo* synthesized collagen; 2) to study the influence of mechanical stretching on the structure of collagen type I and glycosaminoglycans (GAG) on the skin of 3-month-old male Wistar rats.

The tasks were to study the influence of mechanical stretching on the structure of collagen type I and GAG, to extract collagen type I and total GAG, to separate the extracted GAG and determine their molecular weight (hyaluronic acid, chondroitin sulphate), to study in vitro the details of fibril self-assembly

from collagen type I molecules on the skin of 3-month-old male Wistar rats, that were synthesized under the action of mechanical stress and without it.

Materials and methods.

The experimental animals were handled in accordance with international principles of the European Convention on protection of vertebrate animals used for experimental and other scientific purposes [European Convention, 1985]. Animals were lulled to sleep by intravenous injection of sodium thiopental [Bubakar, Jibrin 2014: 41], and then decapitated. The skin tissue was divided into five (5) and subjected to different mechanical stresses (0.0,0.025,0.05, 0.12, 0.18 MN/m²) in Ringer-Krebs medium for 6 hours at 37°C.

Type I collagen was extracted and isolated as described. Determination of the concentration of *de novo* synthesized collagen in extracts was carried out as hydroxyproline [Garbuzenko, Emeth 1997: 14].

Fibrils (0.2 - 0.3%) were prepared through their self-assembly [Persky *et al.*, 2006] in type I collagen solution. Both type I collagen (in solutions, pH 7.0) synthesized without mechanical stretching and the one under the influence of mechanical stretching were allowed to stand for 3, 10 and 22 days at 20°C to allow spontaneous formation of fibrils. The presence of fibrils in solution was monitored using polarizing microscope MP-2 at 510- \times magnification, and a digital camera (Canon A410 model).

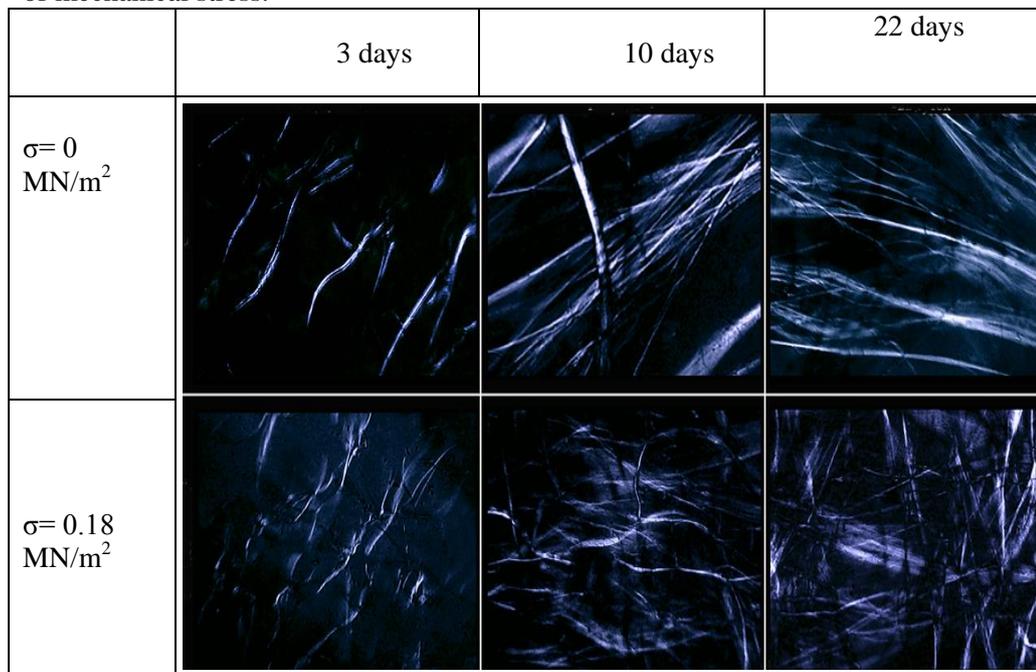
After skin sample incubation, the 5x5 mm fragments were cut out and immersed in 10% formalin for 24 hours for histological examination. The samples were then placed in a mixture of xylene-paraffin and liquid paraffin. After cooling and solidification of paraffin, blocks were cut out and attached to wooden cubes. The sections were placed, after their unfolding, on glass slides. Saturated solution of picric acid in fuchsine was used in staining slides with sections. Carboxylene and xylene were used to remove excess stains. Collagen fibers were stained in bright red color.

Total GAG have been extracted from the connective tissues by stepped papainase enzymatic hydrolysis with acetate buffer solution and collagenases type 1 for 24 hours. Total GAG were extracted from hydrolyzed solution by 2% cetylpyridinium chloride. GAG were fractionated by column ion exchange chromatography method with Dowex 1x2 resin. GAG fractions were separated by gel-chromatography, molecular weight proportional to Sephacryl HR-400 (50 μ m) D-glucuronic acid was determined by carbazole method in the obtained aliquots of GAG.

Statistical analysis of the results was carried out using Student and Mann-Whitney criteria of test reliability, using the software package 'Origin Pro 7.5'. Results with $p < 0.05$ were considered significant.

Results and discussion

Figure 1 shows the microphotographs of type I collagen fibrils formed in the presence and absence of mechanical stress.



Micrographs of fibrils formed from type I collagen synthesized in the skin in the absence of tensile mechanical stretching, and under the effect of 0.18 MN/m² strain, incubated for 10 days at 20°C, are shown in Figure 1, and distributions of both types of fibrils by length and diameter are given in Table 1.

It can be seen from the microphotographs (Figure 1) that the morphology of fibrils formed from type I collagen synthesized in the absence, and under the influence of mechanical stretching in the skin, are different. While the lengths of fibrils in the first layer in a wide range, from 200 to 3200 nm with a maximum of 600-700 nm, corresponding to twice the length of the molecules of type I collagen, their lengths in the second microphotograph do not exceed 1700 nm, with a maximum number of fibers of 300-400 nm long, i.e. the length of a single molecule. It should be noted that the maximum number of these fibers is 13% higher than the maximum number of fibers of the first type in 'A'. Therefore, during the process of temporary development, fibrils formed from type I collagen synthesized in the skin in the absence of mechanical stretching on average become longer than those formed from collagen synthesized under the influence of stretching. The diameters of fibrils in both cases are within the range of 5 to 55 nm (see Table 1). In this case, fibrils formed from collagen synthesized under the influence of mechanical stretching have two diameters – 15-25nm and 35-45 nm, while those formed from collagen, synthesized in the skin in the absence of mechanical stretching, have only one –15-20 nm.

Table 1. Influence of mechanical stress on the length and diameter of rat skin collagen type I formed in the presence and absence of mechanical stress.

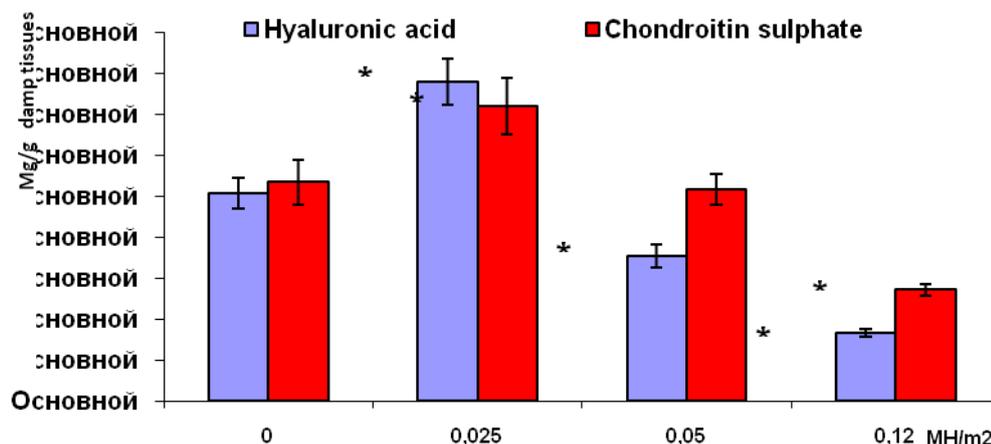
Days	$\sigma = \text{MN/m}^2$	№ of peak	Median of diameter, nm	Fiber ratio	№ of peak	Median of length, nm	Fiber ratio
3	0	1	10 – 15	100.0±4.0	1	600 – 700	100.0±5.0
		2	–	–	2	–	–
	0.18	1	15 – 20	74.4±3.5	1	300 – 400	100.0±4.5
10	0	1	10 – 15	100.0±4.1	1	600 – 700	39.6±1.9
		2	–	–	2	1200 – 1300	60.4±3.0
	0.18	1	15 – 20	69.6±2.9	1	300 – 400	35.7±1.4
		2	35 – 40	30.4±1.2	2	600 – 700	64.7±3.9
		3	–	–	3	–	–
22	0	1	30 – 35	100.0±6.0	1	600 – 700	26.0±4.0
		2	–	–	2	1400 – 1500	36.3±2.4
		3	–	–	3	2000 – 2200	37.7±2.2
	0.18	1	15 – 20	46.8±2.1	1	600 – 700	38.9±2.5
		2	35 – 40	53.2±2.6	2	1200 – 1300	41.3±3.0
		3	–	–	3	2000 – 2200	19.84±1.1

Hyaluronic acid that was formed in the absence of mechanical stress consists of 93% of high molecular weight fraction with $MM \leq 1000$ kDa.

Hyaluronic acid and chondroitin sulphate increase occurs under the action mechanical stress-stretching (0.025 MN/m^2) compared with control samples by 156% and 138% respectively.

The increase of endogenous stretching causes a significant decrease in the level of the mentioned biopolymers below the control level.

Figure 2. Change of concentrations of different types of GAG of rat skin collagen type I formed in presence and absence of mechanical stress.



The results obtained showed that mechanical stress has an adaptive effect expressed by accumulation of structural extracellular biopolymers in connective tissues. But excessive mechanical stretching probably leads to deformation and degradation of disturbances of GAG biosynthesis or enhance their degradation.

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HELA CELLS

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Abstract: This article deals with HeLa cells - the cell culture that was obtained from cervical cancer and began to evolve and develop separately from the organism in culturological environments. The analysis of the evolution of these cells promotes the development of knowledge in the field of genetics. Particular attention has been paid to the use of HeLa cell model as a model of cancer cells. Documenting how aberrant genomes of HeLa are, we also enhance our awareness of the importance of the choice of a cell line for studies.

Key words: HeLa cells, genetic mutation, cervical cancer, cell evolution.

Introduction

The HeLa cell line is considered to be the first "immortal" cell line among human cell cultures. The HeLa cell line was established in 1951 from a biopsy of a cervical tumour taken from Henrietta Lacks, a working-class African-American woman living near Baltimore. The cells were taken without the knowledge or permission of her or her family, and they became the first human cells that grow well in the laboratory.[1]

The evolution process for HeLa is the same as for humans, although the former tend to reproduce asexually by dividing cells. Because the cells divide, genetic mutations inevitably arise together with those that make the cells better adapted to their ecological niche, the Petri dish is preserved by natural selection. When Henrietta Lacks cells first became cancerous, they also acquired the ability to survive endlessly in a culture medium. Massive genetic transformation made them significantly different from ordinary human cells, and after six decades of evolution they became even more different. The process of evolution is the same for HeLa, as for humans, although the former usually reproduce asexually by cell division. As the cells divide, genetic mutations inevitably arise and those that make cells better adapted to their ecological niche, the Petri dish is preserved by natural selection. When cells of Henrietta Lacks first became cancerous, they also acquired the ability to survive indefinitely in culture medium. Massive genetic transformation made them significantly different from ordinary human cells and after six decades of evolution they became even more different.[2]

The subject-matter is HeLa cells as a whole and their significance for science.

The object-matter is using HeLa cells in research and analyzing the results obtained.

The tasks of the article are to give a general idea what HeLa cells are, explain the importance of these cells in science and medicine and consider the results of scientist's research and draw conclusions about their role in the life of mankind.

Discussion and Results

HeLa cells are the cell culture derived from a patient Henrietta Lacks cervical cancer 66 years ago. Moreover, this culture is the offspring of one strongly changed cell. Firstly, HeLa cells are not diploid like

normal human cells and most cancer cells, but often hyper triploid. This means that they have a triple set of chromosomes plus some lumps of chromosomes specific for this cell line. Secondly, they divide very quickly, even in comparison with others (conventional) of cancer cells, they pass a very active telomerase. Thirdly within the period of 66 years, they have adapted to some extent to live outside the body on Petri dishes in a special culture medium and we can say that they are evolving.

HeLa cells are called "immortal" because they are able to divide an infinite number of times unlike ordinary cells that have the Hayflick limit. This is due to the fact that HeLa cells, like many types of cancer, produce a telomerase enzyme that builds up telomeres at the ends of chromosome DNA. A population of HeLa cells proliferate extremely fast, even compared with other cancer cells. Sometimes these cells infect the cultures of other cells.

Since the beginning, HeLa cells have been infected with the papilloma virus, which often happens with cancer cells, from which Henrietta died. HeLa cells have an abnormal karyotype, different HeLa sublines have 49 to 78 chromosomes, in contrast to the normal human karyotype of 46 chromosomes.

We can say that HeLa cells evolved over the years, adapting to growth in vitro, and due to their separation, several branches emerged. At the moment, there are several lines of HeLa cells, they all come from a common ancestor. Besides these cell lines are used as a model of cancer cells. To investigate the mechanisms of signal transmission between cells HeLa cells can be taken. They are also certain to be applied for a number of other purposes. One of the first applications of HeLa cells was the development of the first polio vaccine.

Until recently, no genomic references to this cell line had been published, and experiments were based on the human reference genome. Sequencing the genome and transcriptome of HeLa cells lines is an important milestone in biomedical research. For more than 60 years, scientists have studied many biological processes in HeLa cells, publishing thousands of documents along the way.

Scientists from the European Molecular Biology Laboratory (EMBL) presented a detailed genomic and transcriptomic characterization of a HeLa cell line. They performed DNA and RNA sequencing of a HeLa Kyoto cell line and analyzed its mutational portfolio and gene expression profile.

Segmentation of the genome according to copy number revealed a remarkably high level of aneuploidy and numerous large structural variants at unprecedented resolution. Some of the extensive genomic rearrangements are indicative of catastrophic chromosome shattering, known as chromothripsis. This analysis of the HeLa gene expression profile revealed that several pathways, including cell cycle and DNA repair, exhibit significantly different expression patterns from those in normal human tissues.

The results of the researcher's studies of scientists give the first detailed characterization of the genomic landscape of one HeLa line relative to the human reference genome. During the studies, single-nucleotide variants (SNV), deletion, inversion, duplication and tandem copy number (CN) changes have been integrated along the genome to create HeLa Kyoto genome. This provides a resource for the community. In addition, they provide RNA-Seq data with high resolution HeLa transcripts and analyze them basing on the genome sequence of this cell line.

The most striking genomic property found in HeLa cells is chromotrypsis. Chromotrypsis was associated with 2-3% of all cancers, and examples have been described in many different types. It can be present in HeLa for several reasons. One of the possibilities is that this massive set of reorganizations caused carcinogenesis. Another possibility is that chromotrypsis occurred in vitro during the cultivation of the cell line.[3]

It should be mentioned that HeLa cells were used to study the complex processes associated with the growth, differentiation and cell death processes that underlie the wide range of human diseases. HeLa cells also formed the basis for the development of modern vaccines, including polio vaccine; understanding of viruses and other infectious agents; and the development of new medical methods, such as in vitro fertilization.[4]

We believe that along with these impressive advantages, some acute questions have arisen, especially in the ethically charged field of defense of research participants. Obviously, the tissue that led to the incredible HeLa cell line was obtained without the consent of Ms. Lacks during a cervical cancer biopsy at Johns Hopkins Hospital in Baltimore. At that time, more than six decades ago, this was the norm, because there were no rules about using the tissues left from the clinical procedures in the studies. Ms. Lacks died shortly after her diagnosis, but the scientific uses of her cells are still having ramifications for her children, grandchildren, and other blood relatives.

Obviously, the boundaries of fairness, respect and simple politeness have been violated in the case Lacks family. The gap between them and the scientists - race, class, education - was enormous and made

communication difficult. When the family history became known in the black community in Baltimore, it was perceived as a case with a black woman whose body was exploited by white scientists.

No doubt, the ideas about informed consent have changed over the past 60 years, and the forms that are now given to people who have surgery or biopsy usually indicate that the tissue removed from them can be used for research.

It goes without saying that many scientists are still arguing that the immortal cells of Mrs. Lacks were an accident of biology, rather than what she had created or invented, and were used to benefit countless others. Much of what is removed from people does not matter in any case, and researchers say that this would be too complicated and would impede progress if ownership of such things was assigned to patients and royalties were to be paid. [5]

Certain ethical issues remain problematic. In the spring of 2013, German scientists have sequenced the genome of the cell line HeLa and published data that revealed some very personal information about the descendants of Mrs. Lacks, including the risks of various diseases. After criticism from the Lacks family, scientists, bioethicists, and many others, HeLa genome sequence has been removed from the public database.

To date, it is known that after much discussion, the scientists and the Lacks family came to a mutually agreeable agreement that will serve both to promote medical research and to protect the descendants of Ms. Lacks. They agreed that researchers supporting National Institutes of Health (NIH) would place any DNA sequences derived from HeLa cells in the database of Genotypes and Phenotypes (dbGAP) NIH database and create a process through which researchers can request controlled access to this data. Such requests will be considered by a working group composed of physicians, scientists, bioethicists, and two members of the Lacks family. [6]

In our opinion, the saddest thing is that Ms. Lacks did not receive the gratitude she deserved from the researchers during her life. Nevertheless, now both scientists and patients should to thank the Lacks family for continuing to share their long-term heritage with the biomedical research community. Their generosity extends to millions of people who have won or will benefit in the future from research using HeLa cells.

Conclusions. Firstly, HeLa cells can be useful for studying aspects of the biology of cervical tumors, such as their reaction to cancer drugs. In recent years, the genomes of many cervical tumors have been sequenced, and therefore it can be possible to see how they are compared to the HeLa genome.

Secondly, in the design and interpretation of experiments HeLa use is of great value as a model of human biology, including a model of cancer cells, for studying the mechanisms of signal transduction between cells and other applications.

It is worth mentioning that the wide distribution of cell lines around the world makes it possible to repeat the experiments of colleagues without any problems and use the published data as a foundation for our any research. Having established the basic facts on the HeLa model (and everyone remembers that this is at least convenient, but only as a model of an organism), scientists try to replicate them on more adequate model systems.

A detailed report on genome variants of the HeLa genome gives an idea of their effect on gene expression, cellular functions and their origin. To sum up we can say that HeLa and similar cells are the foundation for the whole of science today.

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ARTIFICIAL INTELLIGENCE IN MODERN TECHNOLOGY

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Abstract: This article deals with problems related to artificial intelligence in everyday use today and in future. From the research, it can be concluded that the use of artificial intelligence now grows in all spheres of modern technology. Artificial intelligence research is a growing branch of computer science, which can improve many aspects of human life.

Key words: artificial intelligence, machine learning, neural networks, deep learning.

Introduction:

Today the computer technology is used in almost every sphere of humans' life and its complexity and power grows very fast, very significant part of its power is due to the extensive use of artificial intelligence. Nevertheless, the mass user does not really know what exactly artificial intelligence is, or what is it used for in technology. The subject-matter of this paper is the influence of the use of artificial intelligence and machine learning on the life of a modern human. The object-matter of this paper is the information about the basic principles of work of artificial intelligence and machine learning and information about the development of machinery related to artificial intelligence and machine learning.

Discussion and Results:

Common definition says, that artificial intelligence (AI) is a computer program that works and reacts like a human, activities, that AI tries to perform like human, include: perception, learning, planning and problem solving.

Computer knowledge is required to perform all of this actions and endowment of a computer with concept of knowledge is a main problem, which scientists, working on the development of AI, try to solve. Knowledge is a fact or condition of knowing something with familiarity gained through experience or association. So to give computer a knowledge of something we need in the first instance to teach it how to build links, connections and associations between different objects and classes of objects. Machines can only emulate human actions and reactions when they have access to sufficient data about the world in which they operate. For this purpose, computer scientists divide information into different categories, give every piece of information its properties and connect it to information, to which it is related.

To acquire a knowledge computer needs to be able to perceive and analyze the information it is given. Computers can accept vast variety of types of information, including: text, picture, audio tracks, video, and even such types of information, that human is not able to understand, such as electromagnetic waves outside of the visible range (longer than red or shorter, than violet) and gravitation. In addition, computer can create types of information on its own, so that information is only readable by the computer, which created it. Such types have advantages of compactness and security, but also disadvantages of complexity and indispensability. It is interesting, that researchers at the Facebook AI Research Lab (FAIR) found that the chat bots, which were allowed to make changes to English to make it easier for them to communicate, were communicating in a new language developed without interfering of researchers.

To make computer able to understand usual for us types of information, researchers recreate the functions of human sensory organs in digital form. It is called machine perception, and includes machine vision, machine hearing, machine touch etc. Some people mistake image processing for machine vision, but in reality these two processes are very different. Machine vision is a technology, designed to extract information from an image, when image processing after some manipulations has another image as output. To understand what is pictured on the image computer needs to decide where the borders of objects are, and then to compare the attributes of different objects to attributes of objects, that computer already knows. Based on the similarities between the attributes, computer makes a conclusion, whether the inspected object belongs to a certain class, or not. The most recent approach to this process is a splitting of features to hierarchical feature levels, such as pixel, edge, part, object. This approach is called deep learning and used not only in the computer vision, but in all types of computer recognition. In text recognition the path would be from character to word to word group to sentence to story, and in voice recognition from sample to spectral band to sound to phoneme to word.

Deep learning is the most advanced and modern method of machine learning, and it is used not only for the information recognition but for actually learning as well. Computer learns to perform different actions and tasks more efficiently with the help of deep learning, for example beating a human in a game, route planning and optimizing, or even creating of a computer program. Deep learning is often referenced as neural networks, because of the similarities between the behavior of neurons in a brain and discrete layers of data propagation in the deep learning machine. We might, for example, consider the processing of an image inside a neural network. Neural network takes an image, splits it into many tiles that are inputted into the first layer of the neural network. In the first layer individual neurons perform their task, then pass the data to a second layer. The second layer of neurons does its task, and so on, until the final layer finishes the work and the final output is produced. Each neuron assigns a rating to the received input — how correct or incorrect it is relative to the task being performed. The rating of the final output is then determined by the total of those ratings. According to the received rating neural network corrects its behavior and during the next task it will perform better. At the beginning of the learning very large percent of results would be incorrect, but as the number of iterations grows, the results become more and more precise, to the point, where wrong answer is almost impossible.

The main reason of such rapid development of machine learning in the recent years is the much more powerful and cheap computers, that hit the mass production. To show the scale of the reduction in price of computer power I will provide one example: the consumer level video card GTX1080Ti, that was released in march of 2017 at the price of 700\$ would be in the top 500 of supercomputers back in 2008.

With every year more and more of the semiconductor chips are designed with regard to the machine learning. The three biggest personal computer microprocessors' developers Intel, AMD and NVIDIA are dedicating much of the time of their research and development departments to the optimization of their products for use in deep learning scenarios. So do the biggest mobile processors' manufacturers, such as Qualcomm, Mediatek, Samsung, Apple and Huawei. Huawei and Apple went even further and dedicated separate circuits for neural networks modules in their newest processors Kirin 970 and A11 bionic respectively. That being said the very process of development of processors changed with the introduction of neural networks, and now design of a new chip is almost fully in the hands of neural networks, that continuously try to improve the architecture of microprocessors cores.

The demand for this calculating power in mobile devices is mostly due to the popularization of digital assistants. Digital assistants are designed to make the life of the user simpler by freeing him of the routine boring tasks, such as checking weather, stock prices, traffic conditions, schedules, news, etc., and presenting the same in a clear, concise, and interesting manner to the user. Unfortunately, these tasks can take much more computing power, than it seems. The first successful and popular digital assistant was created by Apple in 2011, and it was Siri. Popularity of Siri set the trend to include digital assistants and chat bots to almost any sphere of technology, which directly contacts with the user. Now almost every large technology company has their own digital assistant: Apple has Siri, Microsoft has Cortana, Amazon has Alexa and Google has Google Assistant. All these assistants have similar and simple tasks, but competition between companies and advancement of technology gives to them new capabilities faster than ever before.

Another example of use of machine learning in mobile devices is face recognition. To recognize faces accurately and consistently facial-recognition program repeatedly tries to guess whether the face it sees is the face of the owner, or not. After many successful and unsuccessful attempts, the program reaches nearly perfect accuracy, and nowadays even bank transfers can be approved by the face recognition, which makes the process much more simple and fast.

Today one of the main vectors of AI development is the development of self-driven cars. The recently acquired ability to recognize objects, such as cars, road signs, pedestrians and buildings along with the speed of computers, that is very superior to the speed of human brain in the critical moments and the ability of machine to access GPS and radars, made computers a better candidate for a driver place, than humans. All major car manufacturers have their plans on self-driven automobiles, and cooperate with the manufacturers of the hardware, needed for self-driven automobiles.

The main reason why the idea of driverless cars is so popular is the desire to get rid of the human factor in the branch of transport industry, which takes the most lives each year – automobile industry. Nevertheless, it is not the only benefit of the use of autonomous cars. The introduction of self-driven automobiles is beneficial for all sides related to automobile industry: technology companies, passengers, retailers, logistics firms and mineral mining companies, which produce lithium, the main component of automobile batteries. The benefit of technology companies, such as Google, providing the software needed for self-driven automobiles is obvious, because it is the direct increase of customers (automobile manufacturers). For passengers it means more comfortable and secure travels, and it also could lead to

popularization of shared ownership, because automobile will no longer be tied to driver. The benefit for retailers is the more convenient and constant flow of money caused by the possible subscription model, where the customer pays for the ability to use the automobile, but not for the ownership of automobile. Logistics firms benefit of the safety of their goods and the fact, that they no longer need to pay salaries to drivers and worry about their drivers' well-being. In addition, lithium miners would receive more customers, because of the increased demand for the lithium.

However, there will be losers too, in particular: insurance firms, service stations and professional drivers. However, benefits outweigh the losses, and almost everyone involved in the automobile industry sees it, as we can see comparing the investments in self-driven automobiles, and investments to other perspective researches.

Conclusions:

Today artificial intelligence is used virtually in all spheres of technology, and the amount of its use rapidly grows. It is the result of the computing power, that became cheaper than ever before, and advancements in programming technology. The main consumer-grade, non-scientific applications of AI and machine learning are face recognition, digital assistants and self-driven automobiles. The demand for the chips, capable of handling machine learning is increasing, and it changes the directions of the research of the major semiconductor chip developers.

The possibilities that are opened for us because of the use of machine learning and artificial intelligence are almost endless. It is so, because computer, capable of human-level understanding of situation, but with computing power much greater than power of a human brain, will be more efficient than human not only in the simple, repetitive work, but also in complex work, consisting of the multiple levels of tasks.

The research of artificial intelligence and machine learning is a very important branch of computer science, that attracts large amounts of investments, and its importance will only grow, regarding the growing demand. The importance of AI and machine learning research can never be over evaluated, because it leads to general improvements of life and speed of research.

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УДК 72.023+691.175

CLASSIFICATION OF EPOXY RESINS AND THEIR PRACTICAL USE FOR RESTORATION

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Abstract. In this article, the classification of epoxy polymeric materials was reviewed from the point of view of the prospects of their application in restoration works. In addition, various methods for curing polymer compositions with cross-linking agents were studied, which allows to vary the technical-operational and physico-chemical properties of polymers in accordance to the needs of a certain restoration work.

Keywords: epoxy polymers, solidifying agents, resins, restoration

Introduction. Epoxy polymer materials are well studied and have a wide range of practical applications in restoration works. Among them, epoxy resins are commonly used in civil engineering applications and in cultural heritage conservation due to their advanced chemical and mechanical properties,

as repairing materials, adhesives, coatings, and matrices for composites. Thanks to their diversity and possible modifications, they may be used in strengthening and protection of different natural polymer materials, such as wood or natural stone. Treatment of wooden surfaces with epoxy resins helps to lengthen its exploitation term and strengthen its fibers [Chernin 1982]. Impregnation of wood would be more efficient with a solution of epoxy resins with low viscosity – it is necessary for better penetration in fibers of wood. It is important to consider that strengthening of wood with this method may cause such negative consequence as darkening of surfaces where this epoxy resin was applied [Nikitin 1990].

Object-matter: Using epoxy polymeric materials in restoration and conservation works

Subject-matter: Classification, technical-operational properties and practical apply of epoxy resins in restoration

Tasks: To analyze the classification of epoxy polymeric materials and their application in restoration works

Methods: analysis and review of references, description method

Discussion and Results: Products from natural or ceramic stone while ageing will also need strengthening to maintain their exploitation properties on a certain quality. For protection of wall masonry solutions of epoxy resins with low viscosity are used. It provides gidrophobisation of masonry's surface without changes in its appearance and do not prevent vapor permeability. This way it keeps wall's masonry away of cracking due to frozen water in pores of a ceramic/natural stone material. While choosing suitable materials for a certain restoration work coefficient of expansion of polymer material must be considered. It must be equal or approximately equal to coefficient of expansion of material to be restored. Another sphere of practical applications of epoxy polymers is glues for glass materials. While gluing pieces of glass there is a problem with hiding a juncture of glass pieces.

Physical-chemical and technical-operational properties of epoxy resins differ from ones of solidified systems which contain epoxy resins. Nevertheless, there are some difficulties with comparing their properties because indicators of the different epoxy resins solidified with the same cross-linking agent have not been observed properly yet.

Resins

Diane resins. This is the most common class of epoxy resins, which are different from others thanks to their possibility to be modified with mineral compounds that can influence on resin's operational properties. Diane epoxy resins have wide range of properties within the class because they are influenced by many factors such as viscosity, molecular mobility, and possibility of chemical modifying via functional groups connection. In this way molecule structure in diane oligomers has an impact on technical-operational properties of the polymer [Chernin 1982].

Alicyclic resins. Alicyclic resins differ from diane resins by high stability of indicators within the class, they have low viscosity and comparably high heat resistance and they also resistant to ultraviolet radiation and weather conditions. In addition, these resins are resistant to the effects of sliding discharges and electric arcs and also have stable dielectric characteristics in wide range of exploitation temperatures. Alicyclic polymer materials exceed diane analogues by heat resistance, although they are less ductile and elastic.

The main field of alicyclic resins application in restoration works is production of impregnation and casting compounds, foam and press materials and glass-reinforced plastic (GRP). In addition to the above, their resistance to sliding discharges allows applying them in production of insulation shells of power lines. Some representatives of this group may be used as binders for GRP and carbon fiber reinforced plastic providing high strength of products with interlayer shear.

Polymers of this type change their operational properties when they are interacting with glycerol and other polyhydric alcohols meanwhile those polymer compositions have higher resistance to cracking and compressive strength, but lower tensile strength in comparison to those polymers which did not react with glycerol and other polyhydric alcohols [Chernin 1982].

Polyfunctional phenol-based resins and other cyclic compounds. Polyglycerol esters of phenol on the basis of heterocyclic nitrogen compounds are characterized by a large number of aromatic nuclei which provide their stability under high temperatures. This ability of phenol-based resins gives an opportunity to apply them at a wide range of restoration works as binders in heat resistant glues and reinforced plastics production. They provide high-strength gluing because of its high adhesiveness.

In comparison to diane resins polyfunctional phenol-based resins are much more heat resistant, but have less watertightness while alike strength indicators. Hydantoins are an example of polymers of this type – they have prospects in use as epoxy binders because hydantoine-based resins are easily soluble in water. They are also less scarce and more economical in practical terms, which makes their application in



Figure 1. A front view (*left*) and a panoramic view (*right*) of the portal of Eskens House in Torun, Poland.

The Polish portals are examples that the treatment of deteriorating historic stone can be done successfully with epoxy resins. The placement of polymer in stone to stabilize and preserve it is an evolving area of the material science. The stone conservators who designed and executed these projects have provided their colleagues with important tools in a limited armament of materials. They have solved many of the problems associated with the use of epoxy resins and this should encourage others to take advantage of this very useful stone consolidant [Selwitz 1992].

Summary

In summary, this article provides a brief survey of chemical classification of epoxy resins and solidifying agents. The examples of the use of epoxy resins in cultural heritage conservation are given.

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METHODS OF COMMUNICATION AND THEIR IDENTIFICATION IN ARCHITECTURE PRACTICE

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Abstract: This paper deals with the ways of communication inherent to architectural carriers. Special attention is paid to verbal and nonverbal ways of communication. Their positive sides have been analyzed. It also touches such aspects as architectural forms of expressiveness, comprehension of architectural forms by people. The conclusion is made that taking into account psychological aspects of the carrier in various stages of architectural work is very essential.

Key words: verbal communication, non-verbal communication, body language, gestures, eye contact, architectural expressiveness

Introduction. People have an undeniable advantage over other forms of life: they are able to communicate in so many ways. Education, training, work, relationships with friends and family - all this is done through communication. It is considered to be one of the main forms of human social activity. In the

process of communication, what one person knew and was able to do before becomes the property of many people. Communication in the scientific sense is the interaction of people (the impact of people on each other and their responses to this effect) and the exchange of information in this interaction. But is it worth it for a modern person to know about the features of communication from a scientific point of view? At first glance, the issue does not seem so relevant for architects. Nevertheless, if one really approaches rationally the question of education in higher education institutions and further employment, one can still note the professions that initially involve the psychological ground. Being an architect implies expertise in all spheres of the profession, and understanding of psychological nature of human actions are the least but not the last aspect in this complex carrier. It involves dealing with clients, law and city authorities, different government offices, suppliers, etc. It helps to architectural innovations be comprehended and approved by inhabitants and people who just observe it being guests. Thus, this subject is definitely relevant and worth considering.

Object-matter: features of communication as one of the main forms of social activity, its components in architecture.

Subject-matter: application of the observed communicative skills in practice in this field.

Objective: to get better competence in different areas of professional communication.

Tasks: to identify understanding of the problem; to analyze and compare the two main ways of communication; to determine the positive and negative sides of each; to get new skills in communication.

Materials: Internet resources and books.

Methods: empirical (observation and comparison) and experimental-theoretical level (analysis and logic).

Communication in the scientific sense is the interaction of people (the impact of people on each other and their responses to this effect) and the exchange of information in this interaction.

There are two groups of ways in which interaction between people can be realized: verbal and non-verbal means of communication. It is believed that verbal communication gives less information about goals, truthfulness of information and other aspects of communication, while with the help of non-verbal manifestations it becomes possible to establish many points that are not accepted in the conversation.

Depending on the intentions of the individual, a variety of speech texts arise. In any text (written or spoken) the language system is implemented. It allows the verbal method of communication, at first glance, to take more predominant role, in comparison with the non-verbal method.

From an architectural point of view, the language is divided into the language of architectural science (the language that describes architectural works, literary words with moderate terminology), the language of the architectural project (the method of fixing the architect's plan); and the language of the architectural form. The latter describes the graphic language of figures and drawings. Under the language of architectural forms is meant the architectural expressiveness of the building, complexes, town-planning creations.

“The semantic aspect of spatial organization assumes that not abstract functions and forms are projected, but those that have semantic significance for a person” [Shilin 2011:23]. Based on four specific functions of the system of values (orientation, interpretation - difference, signal identification and recognition - recognition), we can draw an analogy between the two methods of communicating one of the main forms of human social activity with the languages of the architectural profession. Consequently, the verbal type corresponds to the semantics section or the language of the architectural project, and the nonverbal type corresponds to the language of architectural forms.

“According to Robert M. Krauss, professor of psychology at Columbia University, signs and symbols are the major signals that make up verbal communication. Words act as symbols, and signs are secondary products of the underlying message and include things like tone of voice, blushing and facial expressions” [3]. This form of communication makes the process of conveying thoughts easier and faster, and so remains the most successful type of conveying information. Yet, this makes up only seven percent of all human communication.

The main function of verbal communication is relaying a message to one or more recipients. “It encompasses everything from simple one-syllable sounds to complex discussions and relies on both language and emotion to produce the desired effect. Verbal communication can be used to inform, inquire, argue and discuss topics of all kinds. It is vital to teaching and learning, as well as to forming bonds and building relationships with other people” [3]. Yet, this way of communication makes up only 10 per cent of all human communication, while the nonverbal is about 70 %.

Nonverbal communication is made of tone of voice, body language, gestures, eye contact, facial expression and proximity. These elements give deeper meaning and intention to your words.

Tone includes the pitch, volume and inflection of your voice. Posture is an important part of body language, e.g. sitting down straight. Eye contact suggests interest.

Gestures are often used to emphasize a point. Facial expressions convey emotion. Proximity can detect aggression when the speaker is too close, or fear when the speaker draws back.

The analysis of David Matsumoto (professor of psychology at San Francisco State University) focuses on the point that "...learning to read microexpressions and nonverbal behaviors in general can be very valuable for anyone whose job is to understand other people's true feelings, their thoughts, their motivations, their personalities or their intentions. So obviously, there's an application for people who are doing interviews or interrogations. That would be people in the criminal justice system, law enforcement, national security, intelligence – those are the kinds of people that we primarily work with because their job is to try to find out whether a person is concealing facts or concealing knowledge or concealing something or has some information that would be useful for solving a crime or getting some other kinds of information" [2].

It should be noted about different means of communication. They are applicable and meaningful, depending on the situation. For example, in the business world, it is important to have verbal communication, since the manager is unlikely to follow his gestures or react emotionally to the next assignment to the employee. In communicating with friends, new acquaintances or native people, non-verbal manifestations are more important because they give an idea of the feelings and emotions of the interlocutors.

"Thus, verbal communication is best suited to convey specific information, and is better suited to communication through technology over long distances. Nonverbal communication is more immediate" [1]. Vladimir Shilin proves this in one of his books: "When modeling the "life cycle" of an architectural space, spatial values are taken into accounts that are understandable to all people who will live in this space" [Shilin 2011:25]. "But its meaning is typically more ambiguous, notwithstanding the fact that certain forms of nonverbal communication, such as the use of the eyes, can convey emotions more effectively than words can. Some technological means of communication, such as film, can effectively convey many forms of nonverbal communication" [1].

Conclusions: as it has been stated, the architectural work is complex and comprises many areas of activities, but psychological aspects should be taken into account in any of them. That is way it is very essential to identify the needs and requirements for those areas and to develop relevant skills and competences in professional communication.

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OBSERVATION OF WARM/HOT GAS FILAMENTS BETWEEN PAIRS OF LUMINOUS RED GALAXIES

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Abstract: This article is dedicated to an approved discovery of warm/hot gas filaments – the structures, which connect galaxies and galaxy clusters and include almost 50% of the expected baryonic matter that scientists have been unable to locate.

According to the generally accepted Lambda-CDM model (the standard cosmological model of the Big Bang), the universe consists of more than 95% dark matter and dark energy, and 4.6% of baryons (protons, neutrons) and electrons. However, the observed baryons in stars, the cold interstellar medium and hot gas in clusters of galaxies account for only 50% of the expected matter and since 2014 there have been reports of the finding of the missing baryonic particles, which were not confirmed as convincing. Direct detection of this matter was carried out by Hideki Tanimura, Gary Hinshaw, Ian G. McCarthy, Ludovic Van

Waerbeke, Yin-Zhe Ma, Alexander Mead, Alireza Hojjati and Tilman Tröster in September 2017, and this event allows to observe the universe in a completely new way.

Key words: Galaxies, clusters, filaments, thermal Sunyaev-Zeldovich effect, cosmology.

Introduction. In the generally accepted Lambda-CDM cosmology more than 95% of the energy density in the universe is in the form of dark matter and dark energy, whereas baryonic matter only comprises 4.6% [«Fraza», 2017].

At high redshift $z > 2$ (redshift is the phenomenon of the shift of spectral lines of chemical elements in the red (long-wavelength) side because of the Doppler effect or gravitational effects and is defined as:

$$z = (\lambda - \lambda_0) / \lambda_0,$$

where z is redshift parameter, λ is an observed wavelength (or frequency) of an object, λ_0 is an emitted wavelength), most of the expected baryons are found in the diffuse, photo-ionized hydrogen intergalactic medium (IGM) with a temperature of 10^4 - 10^5 K. However, at short redshifts $z < 2$, the observed baryons in stars, the cold interstellar medium, residual hydrogen gas and hot gas in clusters of galaxies account for only 50% of the expected baryons [Tanimura, H., 2017].

According to Lambda-CDM model, matter in the Universe forms a three-dimensional so-called cosmic web, which has the nodes, formed under the influence of gravitational forces [Shuplyak, V., 2016]. These nodes consist of large galaxies or galaxy clusters and dark matter and are connected with each other with filamentous structures. Hydro-dynamical simulations suggest that 40-50% of baryons could be in the form of shock-heated gas in filaments. This so-called Warm Hot Intergalactic Medium (WHIM) has a temperature range of 10^5 - 10^7 K and is difficult to observe due to its low density [Ulasovich, K., 2017].

Using the thermal Sunyaev-Zeldovich (tSZ) effect as a tool for probing baryonic gas at low and intermediate redshifts the international team of scientists (Hideki Tanimura, Gary Hinshaw, Ian G. McCarthy, Ludovic Van Waerbeke, Yin-Zhe Ma, Alexander Mead, Alireza Hojjati and Tilman Tröster) examined 260,000 galaxy pairs to find missing baryonic matter [Ulasovich, K., 2017].

Analysis of recent achievements. Before now, all attempts to discover missing baryonic matter were not considered as experimentally reliable, because warm/hot gas filaments are very hard to be detected due to the low density of rarefied gas.

There are listed the most successful researches (the obtained results however are higher than the correct one, except the third paragraph) [Tanimura, H., 2017]:

1. The Planck Team (Planck Collaboration) studied the gas between the merging Abell clusters A399 and A401.
2. Werner et al. (2008) study the gas properties in a filament connecting the massive Abell clusters A222 and A223.
3. Epps & Hudson examined the weak lensing signal between pairs of Sloan Digital Sky Survey-III.

The object of the article is warm/hot gas filaments as a cosmological phenomenon.

The subject of the article is the discovery of warm/hot gas filaments (as a component of the structure of the universe and a cosmic baryonic web) and methods, which were used during the exploration.

The purpose of the article is to review the first experimentally reliable observation of warm/hot gas filaments and methods that allowed scientists to receive convincing results.

The article contains the following **tasks**:

1. The detailed consideration of the used methods.
2. The detailed consideration of the first observation of warm/hot gas filaments and obtained results.

The **material** of the paper is an original article which contains the results of research of warm/hot gas filaments written by Hideki Tanimura, Gary Hinshaw, Ian G. McCarthy, Ludovic Van Waerbeke, Yin-Zhe Ma, Alexander Mead, Alireza Hojjati, Tilman Tröster.

The **method** of the research is descriptive.

The presentation of the main research material. The thermal Sunyaev-Zeldovich (tSZ) effect was a main tool for probing baryonic gas and it can be described in the next way: as the universe expanded, photons in the CMB (cosmic microwave background) stretched to longer wavelengths and cooled to a few degrees above absolute zero in the modern day, and when these photons hit electrons in the cosmic web, they can gain energy and their wavelength can shorten. So by looking for the tSZ effect (changes in the wavelengths of CMB), scientists traced the WHIM in the cosmic web [Mann, A., 2017].

The scientists used three data sets in the research:

1. The Luminous Red Galaxy (LRG) catalog from the Sloan Digital Sky Survey: the catalog provides the position, spectroscopic redshift and classification type for each object; with its help the pairs of the luminous red galaxies were chosen.
2. The Planck Comptonization map (all-sky y -maps of the thermal Sunyaev-Zeldovich (tSZ) effect, based on observations of the cosmic background space Observatory "Planck").
3. The BAHAMAS suite of cosmological hydrodynamic simulations (was used for theoretical control of obtained results).

Scientists combined the two maps, the Planck Comptonization map and a map with LRG's by stacking the y map on a grid aligned with the pairs, and in such a way searched for warm/hot gas filamentary gas between pairs of LRGs. The angular separation between LRG pairs in the pair catalog, which was compiled on the base of the luminous red galaxy catalog, ranges between 27 and 203 arc minutes. For each pair in the catalog a normalized 2-dimensional image coordinate system (X, Y) was created. One LRG was placed at $(-1, 0)$ and the other was placed at $(+1, 0)$. The corresponding transformation from sky coordinates to image coordinates was also applied to the y map (the Planck Comptonization map) [Tanimura, H., 2017]. Y is the Compton y -parameter produced by the tSZ effect.

At first, the scientists detected a strong signal associated with the LRG host halos (Fig. 1), and it was impossible to find a weak signal of warm/hot gas filamentary gas between them.

So, researchers had to subtract a signal associated with the LRG. They selected central LRG's for the pair catalog and assumed that the average single-halo contribution was circularly symmetric about each LRG in a pair. After that they performed the fit (Fig. 2) and subtracted the best-fit circular profiles for each pair (Fig. 3). The bright halo signals appeared to be subtracted, while a residual signal between the LRG's was clearly visible [Tanimura, H., 2017]. The last one belonged to warm/hot gas filamentary gas.

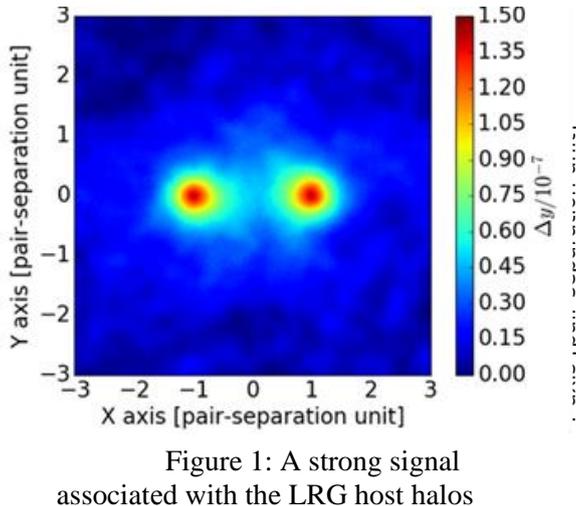


Figure 1: A strong signal associated with the LRG host halos

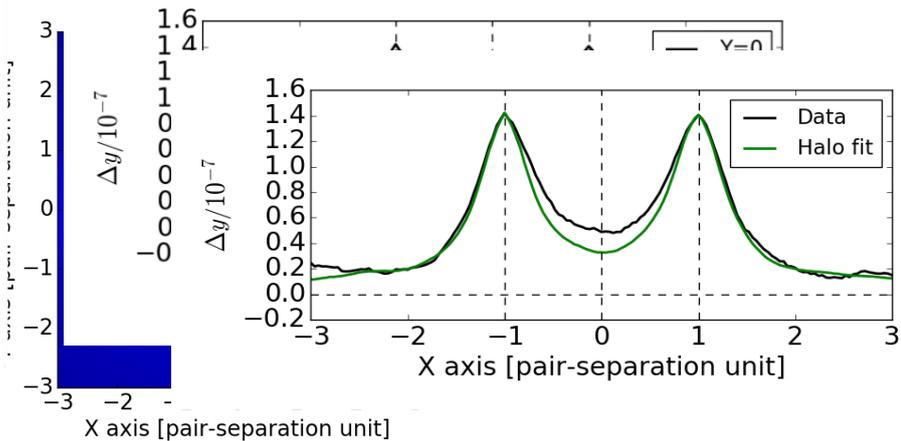


Figure 2: The best-fit circular profiles

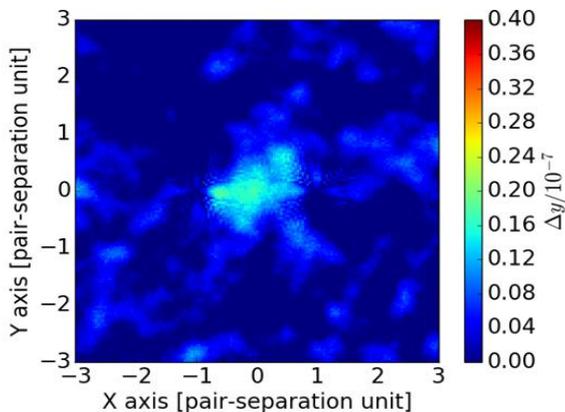
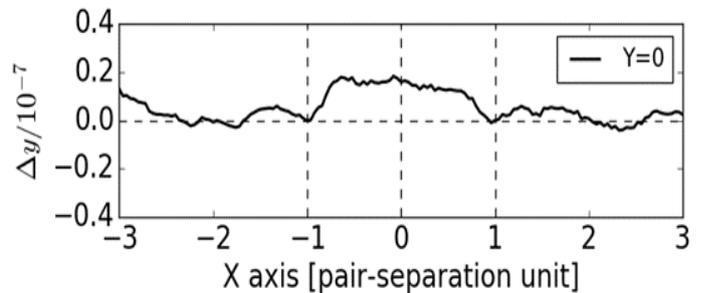


Figure 3: The signal that belongs to warm/hot gas



filamentary gas

Results. Using the Planck Sunyaev-Zeldovich (tSZ) map and the catalog of Luminous Red Galaxies (LRGs), researchers found a trace of warm/hot gas filamentary gas among pairs of galaxies by stacking the y -map on a grid aligned with the pairs. They also defined the density of the gas in the filaments. It is three times higher than the average density of baryonic matter in the Universe.

Experimental results were also compared with theoretical data: scientists applied the same analysis to the BAHAMAS suite of cosmological hydrodynamic simulations and received the values, which were marginally consistent, but the simulations predict a slightly lower tSZ signal.

Conclusion. The first experimentally reliable observation of warm/hot gas filaments and the discovery of a missing baryonic matter are the remarkable achievements that allow the humanity to enter a new era of the development of astronomy and cosmology. On the one hand, the obtained results confirm Lambda-CDM model and widen our knowledge about the structure of the universe. On the other hand, the methods that were used in the research give scientists a chance to create a detailed map of the cosmic baryonic web, which will be crucial for the further exploration of the world.

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VARIOUS TYPES OF MAGNETIC LEVITATION AND THEIR TECHNOLOGICAL APPLICATIONS

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Abstract: This work considers various types of magnetic levitation, the stable position of an object in a gravitational field when gravity is compensated by a magnetic force. Magnetic levitation can be of two types: diamagnetic levitation and levitation on superconducting magnets. At present there are many examples of the practical application of the effects of magnetic levitation in various branches of modern technology. However, research in this area continues until now as there are significant prerequisites for improving the technologies for using these effects.

Key words: magnetic levitation, diamagnetic levitation, superconductivity, Meissner effect, Earnshaw theorem, maglev.

Introduction. Magnetic levitation is a method by which an object is suspended with no support other than magnetic fields. Magnetic force is used to counteract the effects of the gravitational acceleration and any other acceleration.

The two primary issues involved in magnetic levitation are lifting forces: providing an upward force sufficient to counteract gravity, and stability: ensuring that the system does not spontaneously slide or flip into a configuration where the lift is neutralized.

According to the theorem of Earnshaw [Earnshaw 1842: 97—112], which is a direct consequence of the Gauss law, the levitation of static objects in a static electromagnetic field in a vacuum is impossible. However, levitation of diamagnetic materials and superconductors, which are magnetized in the direction opposite to the direction of the lines of the magnetic field in which they are located, is possible.

The object of the article is learning of magnetic levitation as physical phenomenon.

The subject of the article is description of different types of magnetic levitation and technological application of magnetic levitation.

The objective of the article is to explain the effects of magnetic levitation from a physical point of view, as well as a description of some applications of these effects.

This article considers the following tasks:

1. To research different types of magnetic levitation and their technological application.
2. To discover perspectives of magnetic levitation transport.

In this article descriptive and comparative **methods** were used.

Discussion and results.

Diamagnetic levitation.

Diamagnetism was discovered by Michael Faraday in 1846 [Urman, Bugrova, Lapin 2010: 9]. Most of the substances surrounding us are diamagnetic: water, wood, plastic, acetone, graphite, etc., as well as living beings. The main feature of diamagnetic bodies is that their magnetic permeability is less than unity and, therefore, in a magnetic field they move in the direction of decreasing magnetic field strength, i.e. they are pushed out of the field. This property of diamagnets makes it possible to create a free suspension of diamagnetic bodies in a constant magnetic field, i.e. compensate the magnetic and gravitational forces so that the diamagnetic body can stably hang in a gravitational field without contact [Berry, Geim 1997: 307–313].

It is commonly believed that the problem of free suspension of bodies goes back to the work of S. Earnshaw who proved the theorem [Earnshaw 1842: 97—112] according to which a static system consisting of bodies attracting or repelling each other with a force inversely proportional to the square of the distance between them is unstable. A hundred years later in 1939 Brownback considered a system in which gravitational, magnetic and electric fields act simultaneously and proved that levitation is possible only in the presence of bodies made of materials with a magnetic permeability less than one (diamagnetic and superconducting bodies).

The most distinctive feature and advantage of diamagnetic levitation, in comparison with other known schemes, including superconducting levitation, is that for a homogeneous material there are magnetic fields with a definite profile of the square of the magnetic induction, when gravity is compensated in fact at the level of individual atoms and molecules. This allows to simulate the state of weightlessness in a very good approximation right on Earth which will replace expensive experiments in space with cheaper ones.

Levitation above superconductors.

The phenomenon of superconductivity was discovered in 1911 by Kamerling-Onnes, in 1908 he also obtained liquid helium and the work was available in the temperature region near absolute zero. Investigating the resistance of mercury to direct current as it approaches absolute zero, Kamerlingh-Onnes found that at temperature 4.12 K (according to modern measurements - 4.15 K), the resistance decreased abruptly to zero or in any case to an immeasurably small value. Further studies have shown that many other metals behave similarly. This phenomenon was called superconductivity and the matter where it was observed was called superconductors. The temperature T at which an abrupt decrease in resistance occurs is called the critical temperature. The state of the superconductor above the critical temperature is called normal, and below – superconducting.

In 1933, Meissner and Ochsenfeld discovered that the magnetic field is completely absent inside the superconducting body. When the superconductor is cooled in an external constant magnetic field, at the moment of transition to the superconducting state the magnetic field is completely displaced from its volume. This superconductor differs from an ideal conductor in which the induction of the magnetic field in the volume remains unchanged when the resistivity drops to zero. The phenomenon of displacement of a magnetic field from the volume of a conductor is called the Meissner effect. The Meissner effect and the absence of electrical resistance are the most important properties of a superconductor.

Since there is no magnetic field in the superconductor electric currents cannot flow in its volume, i.e. inside the superconductor $J_s = 0$. This follows directly from the circulating theorem $rotH = \frac{4\pi}{c}J$. All currents must flow along the surface of the superconductor. These surface currents create a magnetic field that compensates the external applied field inside the conductor. In reality, the current at the boundary of the superconductor does not flow over the surface but in a layer of finite thickness.

The magnetic field must also penetrate into the same layer as can be seen from the equation $rotH = \frac{4\pi}{c}J$. Fritz and Heinz London who developed the first phenomenological theory of superconductivity gave the simplest estimate of the penetration depth of the magnetic field in the superconductor. Write down the fundamental equation of electrodynamics in the form

$$\begin{aligned} rotB &= \frac{4\pi}{c}JrotE = \frac{1}{c}\dot{B} \\ \dot{B} &= -\lambda^2 rotrot\dot{B} \end{aligned}$$

Second equation is satisfied by $B = \text{const}$. To automatically exclude this solution Fritz and Heinz London introduced the hypothesis that in the last equation the derivative of B should be replaced by the vector B . This gives

$$\begin{aligned} B &= -\lambda^2 rotrotB \\ \lambda &= \left(\frac{mc^2}{4\pi n_s e^2}\right)^{1/4} \end{aligned} \quad (2.4)$$

The value of λ is taken as a measure of the depth of penetration of the magnetic field into the metal.

Technological applications of magnetic levitation.

The effect of magnetic levitation can be used in a number of promising technological applications such as magnetic bearings, energy storage systems and many others but first of all the use of levitation opens a new era in the development of transport technology allowing the creation of a fundamentally new high-speed transport.

Maglev (derived from magnetic levitation) uses magnetic levitation to propel vehicles with magnets rather than with wheels, axles and bearings. With maglev a vehicle is levitated a short distance away from a guide way using magnets to create both lift and thrust. High-speed maglev trains promise dramatic improvements for human travel if widespread adoption occurs. Maglev trains move more smoothly and somewhat more quietly than wheeled mass transit systems. Their non-reliance on friction means that acceleration and deceleration can surpass that of wheeled transports and they are unaffected by weather. The power needed for levitation is usually not the largest of the levels of energy. Although conventional wheeled transportation can go very fast the maglev allows the use of higher speeds [Yadav 2013: 2].

Maglev trains do not create direct pollution emissions and are always quieter in comparison to traditional systems when operating at the same speeds.

In high-speed intercity transport using maglev trains can offer an especially good cost-benefit ratio as regards land purchase, construction, operation, maintenance and environmental protection. Future technological advances can be expected to improve this ratio even more.

The two notable types of maglev technology are:

1. *The electromagnetic suspension (EMS)* – uses attractive force system to levitate. The train levitation magnet will be attracted to the conductors on the underside of the guideway. The attractive force between them will overcome the gravitational force. This will in turn levitates the train on the track.

The guidance magnets on the other hand guides the train so that the side of the track will not have contact with the train creating friction and damages the train. The guidance magnets will also guide the train so that it will follow the direction of the guideway track. The EMS train is safer and more comfortable. The regulated levitation of the train makes the train levitates even when traveling at low speed. The magnetic field intensity inside the passenger compartment is also small so it is safe for passengers with pacemakers or passengers carrying magnetic storage such as credit card or hard disk. Its intensity is comparable to the earth's magnetic field and far below the field intensity of a hair dryer, an electric drill or a sewing machine.

In the event of a power failure, the EMS maglev train is equipped with an emergency battery power supply so that the maglev train will not crash onto the guideway. The most successful EMS maglev train so far is called the Transrapid system and it is currently being used by the MagLev in Shanghai, China. It is also being used in Germany.

2. *The electrodynamic suspension (EDS)* train has been developed by Japanese engineers. It uses magnets that have same polarity to create repulsive force between levitation magnet and guideway magnet. This repulsive force then will be high enough to overcome gravitational force and allows it to levitate.

The main difference between EDS maglev train and EMS maglev train is that EDS maglev train uses super-cooled, superconducting electromagnets. This superconducting electromagnet can conduct electricity even after the power supply has been shut off for example in the event of a blackout. In the EMS system which uses standard electromagnets the coils only conduct electricity when a power supply is present. By chilling the coil at frigid temperatures Japan's EDS system saves energy. However, the cryogenic system uses to cool the coils can be expensive.

One potential drawback in using the EDS system is that maglev trains must roll on rubber tires until they reach a liftoff speed of about 62 miles/h (100 km/h). Reaching the liftoff speed the train will levitate and the rubber tires will no longer in contact with the guideway. The EDS train is impressively capable to levitate nearly 4 inches (10cm) above the guideway. Since EDS train will induce a high intensity magnetic field the passenger section of the train will have to be shielded from the magnetic field or else it will be dangerous for passengers with pacemakers and will damage magnetic data storage such as credit cards and hard drives.

Conclusion. In this paper various types of magnetic levitation were examined and the main principles and limitations of the possibilities of diamagnetic levitation and levitation above superconductors were explained.

Magnetic levitation is one of the most effective technologies that can be used to move objects of different nature with the lowest energy costs. Modern magnetic levitation trains are one of the most promising modes of transport in terms of efficiency, operating costs, achievable speeds, etc., even despite the high cost of creating the appropriate infrastructure. However, the possibilities of using this technology are not limited to transport alone. The absence of wear of the parts and friction during operation significantly increases efficiency, reduces maintenance costs and extends the life of products that operate under continuous motion such as various magnetic bearings and centrifuges.

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SUPERFLUIDITY AND ITS PROPERTIES

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Abstract: In this article, we discuss the state of matter, called superfluidity. We discuss it's relation to Bose Einstein Condensation (BEC), and different properties such as absence of viscosity or superfluid vortexes.

Key words: Superfluid, BEC, Vortexes, Quantum liquid, Quantum statistics

Bose Einstein Condensation : In 1924 the Indian physicist S.N. Bose introduced a new statistical method to derive the black-body radiation law in terms of a gas of light quanta (photons). His work, together with the contemporary de Broglie's idea of matter-wave duality, led A. Einstein to apply the same statistical approach to a gas of N indistinguishable particles of mass m. An amazing result of his theory was the prediction that below some critical temperature a finite fraction of all the particles condense into the lowest energy single-particle state. This phenomenon, named Bose-Einstein condensation (BEC), is a consequence of quantum statistic effects.

In Quantum mechanics the particles can be of two types, depending on parity of a wave functions: fermions or bosons. For example, wave function for boson particles doesn't change sign, when we exchange particles. When the temperature is high enough, the properties of bosonic or fermionic gas are the same, but in low temperatures, when the quantum effects appears, we cannot ignore the type of particles. We can estimate the temperature by following consideration, that thermal energy is comparable with excitation energy. Using the fact that $\varepsilon \sim \hbar^2 / ma^2$, we can estimate the temperature[2]

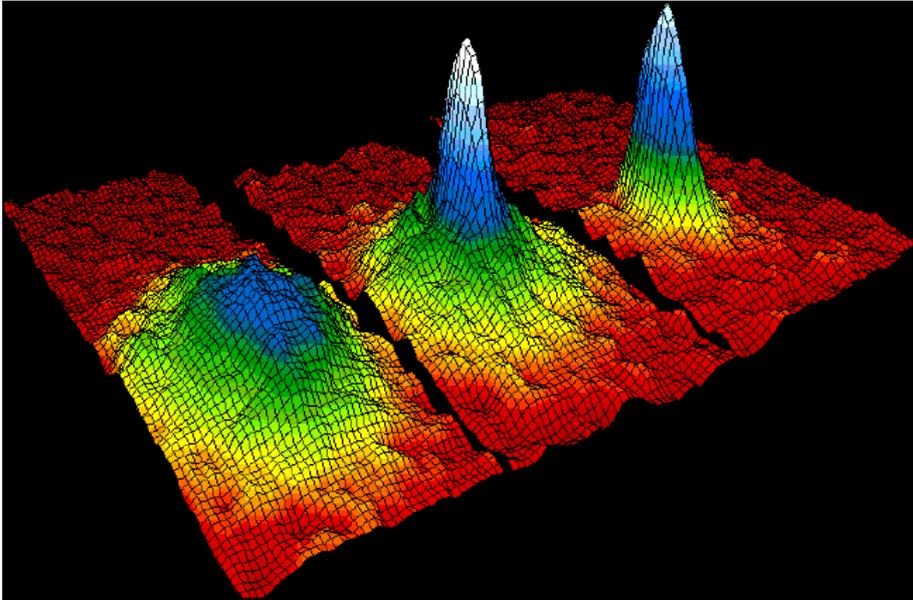
$$T \sim \frac{\hbar^2 n^{2/3}}{m k_b}$$

Using the methods of quantum statistical mechanics we can obtain the distribution of bose particles in momentum space:

$$n(p) = \frac{1}{e^{\beta(\varepsilon(p)-\mu)} - 1}$$

Where $\varepsilon(p)$ is excitation spectrum and $\beta = 1/k_b T$. In the limit of small temperatures denominator of this expression in $p = 0$ vanishes, so particles condensate in the point with zero momentum.

Bose Einstein condensation is an area of active research and it was experimentally justified in 1995[4].



Comparison with superfluid

Another interesting state of matter was discovered in liquid helium, by Pyotr Kapitsa and John F. Allen. HeII has unusual hydrodynamic properties. It flows through the finest capillaries without any resistance. Consider an experiment that pushes HeII from one container to another through a small tube packed with powder. For ordinary fluids a finite pressure difference between the containers, proportional to viscosity, is necessary to maintain the flow. HeII flows even in the limit of zero pressure difference and acts as if it has zero viscosity. For this reason it is referred to as a superfluid.

In 1938, Fritz London suggested that a good starting hypothesis is that the transition to the superfluid state is related to the Bose–Einstein condensation. This hypothesis can account for a number of observations:

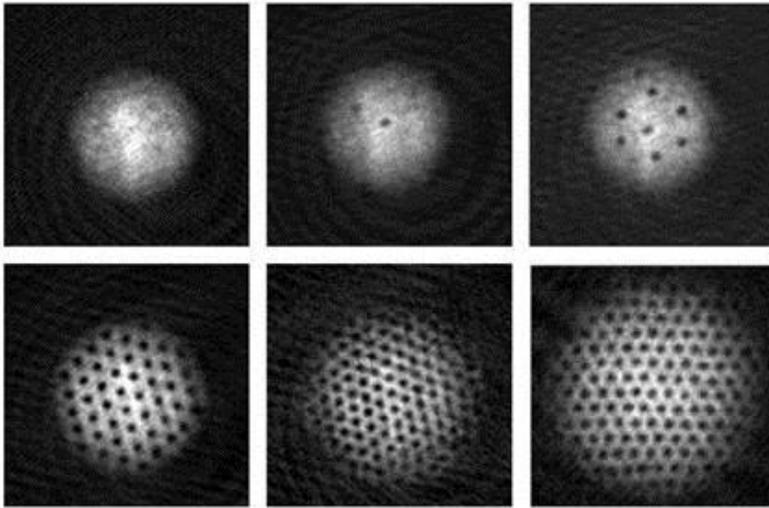
- The critical temperatures when helium become a superfluid and Bose–Einstein condensation occurs are same order.
- The origin of the transition has to be related to quantum statistics as He3, which is atomically similar, but a fermion, does not have a similar transition.

There are, however, many important differences between superfluid helium and the ideal Bose condensate[5]:

- Interactions certainly play an important role in the liquid state. The Bose–Einstein condensate has infinite compressibility, while HeII has a finite density, related to atomic volume, and is essentially incompressible.
- The detailed functional forms of the heat capacity and superfluid density are very different from their counterparts in the ideal Bose condensate. The measured heat capacity diverges at the transition with a characteristic shape similar to λ , and vanishes at low temperatures as T^3 (compared with $T^{3/2}$ for the ideal Bose gas).

Superfluid vortex

Another interesting property of superfluid is absence of vorticity of velocity field. However experiment shown, that in rotating superfluid one can observe vortices.



Feynman assumed, that in liquid there are a special lines(vortex lines) in which potentiality fails. This allows us to derive a speed:

$$v = \frac{1}{r} \frac{\hbar}{m}$$

This speed becomes infinitesimal when r goes to zero. In addition, we can derive critical angular velocity when vortexes becomes advantageous [3]:

$$\Omega = \frac{\hbar}{m r^2} \ln \frac{R}{a}$$

Conclusions

In this paper, we described the phenomenon of Bose Einstein Condensation and its main properties. The temperature needed to reach such effect was derived. We compare BEC with phenomenon of superfluid. The main similarities and differences were pointed. The properties of superfluid like absence of viscosity or appearance of vortex were discussed, and the critical angular velocity was presented. Interesting question arises: whether effect of superfluity is possible in other various systems like gas of excitons or polaritons. Now these questions are being investigated by scientists.

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MATHEMATICS AND MUSIC (CONTINUED FRACTIONS IN IN THEORY OF MUSIC)

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Abstract: The studies carried out in the work confirm the existence of a close historical and internal connection between music and mathematics. The history of the transformation of the musical system from Pythagorean to [equally tempered](#) one is considered in detail. In this system, when the fragment of a melody shifts, the frequency ratio of neighboring notes remains unchanged (the melodic pattern remains). It is shown that the essence of an [equally tempered](#) musical system is well described with the help of continued fractions, which are one of the elements of mathematical knowledge.

Key words: mathematics, music, musical structure, number, continued fractions.

Introduction

Music and mathematics: is there a relationship and what is it manifested in? An investigation of this work is devoted to the search for the answer to this question.

One of the founders of modern theoretical physics, Nobel laureate, honorary doctor of twenty leading universities in the world, a member of many academies of sciences, mathematician Albert Einstein believed: real science and real music require a homogeneous thinking process [Shevchukova 2016: 1].

Many great minds of mankind periodically came to the idea of presenting music in mathematical form. So, for example, the philosopher Leibniz in correspondence with the philosopher Goldbach noted: «Music is a hidden arithmetic exercise of the soul that cannot count». And Goldbach answered him: «Music is a manifestation of hidden mathematics». Greek mathematicians, including Euclid and Claudius Ptolemy, dedicated musical harmonies and musical scale to special musical compositions.

Pythagoras was the first, who put music on a par with mathematics. The philosophy of his school he based on the fact that music should be perceived as a scientific discipline. At Pythagoras school there was a firm conviction: the world and life are governed by numbers, which in turn are subject to music.

As we see, despite the fact that mathematics is the most abstract of sciences, and music is the most abstract kind of art, there is a connection between them. This relationship is conditioned both historically and internally. The searches for mathematical regularities in musical consonances were conducted in two millennia by such great mathematicians as Johannes Kepler, Gottfried Leibniz, Leonhard Euler.

We do not notice the presence of mathematics in music, but in fact – seven notes of the octave, the sound frequencies are a geometric progression, the musical rhythm divides time by ones.

Therefore, the study of the interrelationship and mutual influence of mathematics and music is still relevant today. This paper is devoted to the study of the relationship between music theory and number theory, in particular, its specific section – the theory of continued fractions. The aim of the work is to study and analyze this relationship, describe and substantiate the musical foundations through mathematical laws.

The theory of continued fractions

The theory of continued fractions is one of the oldest mathematical theories. Historically, continued fractions have appeared in connection with the need to find the best approximation of a real number with the help of a rational one [Arnold 2001: 3].

A continued fraction is an expression of the form: $[a_0; a_1, a_2, a_3 \dots] = a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + \dots}}}$.

Letters $a_0, a_1, a_2, a_3 \dots$ with the most general approach to the subject mean here independent variables. Depending on the special needs, these variables can be forced to run through the values of one or another area. So, we can consider $a_0, a_1, a_2, a_3 \dots$ as real or complex numbers, functions of one or several variables, and so on [Hinchin 1960: 7].

Any number k can be represented in the form of (finite or infinite, periodic or non-periodic) continued fraction $k = [a_0; a_1, a_2, a_3 \dots]$ where $a_0 = [k], k_0 = k - a_0; a_1 = [\frac{1}{k_0}], k_1 = \frac{1}{k_0} - a_1;$

$\dots a_n = [\frac{1}{k_{n-1}}], k_n = \frac{1}{k_{n-1}} - a_n; \dots, [k]$ is an integral part of k .

In this way, you can represent all real numbers. If the number is irrational, then this process will be infinite, never stop. For rational numbers, a fraction of this form is finite. The number is periodic (the sequence of its elements, starting from a certain place, is repeated) by a continued fraction if and only if it is a quadratic irrational number (a number of the form: $a + b\sqrt{c}$, where a, b and $c(c \geq 0)$ are rational numbers) [Arnold 2001: 16].

Every irrational number k is uniquely represented by an infinite continued fraction of the form $[a_0; a_1 \dots a_n]$ and, conversely, to each infinite continued fraction there corresponds a single irrational number, which it represents. Therefore, the set of all real numbers is mapped one-to-one on the set of all continuous fractions.

n – th convergent of a continued fraction $k = [a_0; a_1, a_2, a_3 \dots]$ called a finite continued fraction $[a_0; a_1 \dots a_n]$. Convergents of a continued fraction with even numbers form an increasing sequence

whose limit equals k . Similarly, convergents of a continued fractions with odd numbers form a descending sequence whose limit is also equal to k .

The using of irrational numbers in practice is usually accomplished by replacing this irrational number with some rational number. This number should differ little from the irrational number (within the required accuracy). In this case, one usually tries to choose a rational number as simple as possible. By a simple rational number is understood a decimal fraction with a small number of decimal places. Continued fractions provide a very convenient apparatus for solving problems of this kind. Using continued fractions, it is possible to replace real numbers by rational fractions such that the error from such a substitution is small in comparison with the denominators of these rational numbers.

Pythagoras and his contribution to music. The basics of musical art

The great scientist Pythagoras was not only a mathematician and philosopher, but also a music theorist. In music he saw the harmony necessary for the purification of the soul and body, the solution of any mystery and discovered the mysterious guiding role of numbers in nature. In the study of musical art, Pythagoras and his adherents, who called themselves Pythagoreans, relied not so much on real music of sounds as on its mathematical proportions and ratios, which, it was believed, were the basis of music [Voloshinov 1992: 97-98].

According to legend, Pythagoras himself established that pleasant consonances are obtained only in the case when the lengths of the strings issuing these sounds are referred to as integers of the first four: 1:2, 2:3, 3:4 [Voloshinov 1992: 93]. These intervals are «perfect consonances» and their interval coefficients

were later named Latin: $\frac{l_1}{l_2} = \frac{1}{2}$ – octave, $\frac{l_1}{l_2} = \frac{2}{3}$ – quint, $\frac{l_1}{l_2} = \frac{3}{4}$ – quart.

The interval between two tones is the step number of the upper-tier step relative to the lower one in the given scale, and the interval coefficient (I_{21}) of two tones – ratio of the frequency of the upper tone to the oscillation frequency of the lower: $I_{21} = \frac{f_2}{f_1}$ ($f_2 > f_1$) where f_1 – lower tone frequency, f_2 – upper tone frequency.

Interval coefficients are added and subtracted «geometrically», and the intervals themselves are «arithmetically», as usual distances [Voloshinov 1992: 103], namely:

- 1) the sum of two intervals is equal to the product of their interval coefficients: $I_{31} = I_{32}I_{21}$.
- 2) the difference of two intervals is equal to the particular of their interval coefficients: $I_{21} = I_{31} : I_{32}$.
- 3) to divide the interval into n equal parts means to extract the root of degree n from its interval coefficient: $I^* = \sqrt[n]{I}$.

A tone is the interval coefficient between the quint and quart strings, together with their interval. The interval of tone is equal to the quotient of interval coefficients of the quart and quint: $I = \frac{3}{4} : \frac{2}{3} = \frac{9}{8}$.

It can be noted that octave, quint, quartet and tone form a geometric proportion: $\frac{\text{octave}}{\text{quint}} = \frac{\text{quart}}{\text{tone}}$. A

semitone is the interval between the second tone $\left(I = \frac{9}{8} \cdot \frac{9}{8} = \frac{81}{64} \right)$ and the tone of a quart $\left(I = \frac{4}{3} \right)$ and is

$$I = \frac{4}{3} : \frac{81}{64} = \frac{256}{243}.$$

The application of continued fractions in music

An example of the using of continued fractions in musical art can be considered the problem of dividing the octave into twelve equal parts.

This task was caused by the problem of transition from a mode (the interrelation of musical sounds) into the other one. The problem was the difficulty of dividing each tone-interval in half into two semitones,

since half the tone $\left(\sqrt{\frac{9}{8}} \approx 1,0607 \right)$ does not exactly equal a semitone $\left(\frac{256}{243} \approx 1,0545 \right)$. Therefore, if we

take a semitone $\sqrt{\frac{9}{8}}$ as a single scale, then these twelve new semitones will lead us not exactly in the octave,

but a little higher: $\left(\sqrt{\frac{9}{8}}\right)^{12} = \left(\frac{9}{8}\right)^6 \approx 2,0273$. The interval between the octave, obtained by steps of twelve

uniform semitones, and a clean octave is equal to $\left(\frac{9}{8}\right)^6 : 2 \approx 1,0136$ and is termed Pythagorean comma

[Voloshinov 1992: 126]. The consequence of the presence of the Pythagorean comma in the musical structure was a piercing, unpleasant sound that appeared as a result of playing musical instruments. To divide the octave into twelve equal parts meant to divide Pythagoras comma into twelve parts, making it invisible.

So, we need to divide the interval of the octave $1 \leq f \leq 2$ into n geometrically equal parts:

$1 = f_0 \leq f_1 \leq f_2 \leq \dots \leq f_n = 2$, so that the k -th point of division falls on the main consonance of the octave – the quint, that is $f_k = \frac{3}{2}$ ($0 < k < n$). Since $f_k = 2^{\frac{k}{n}}$, we obtain the equation $2^{\frac{k}{n}} = \frac{3}{2}$ or

$2^{k+n} = 3^n$, which has no solutions in integers. Using the logarithm, we represent this equation in the form:

$\frac{k}{n} = \log_2 \frac{3}{2}$. The number $x = \log_2 \frac{3}{2}$ is irrational one therefore it is necessary to find its approximation by means of a rational number. The first four convergents of a continued fraction to the number

$x = \log_2 \frac{3}{2} = [0; 1, 1, 2, 2, 3, 1, \dots]$ are the fractions $\frac{1}{1}$, $\frac{1}{2}$, $\frac{3}{5}$ and $\frac{7}{12}$. The first three fractions, $1 = \frac{1}{1}$,

$0,5 = \frac{1}{2}$ and $0,6 = \frac{3}{5}$, give too rough approximation to the number $x = \log_2 \frac{3}{2} = 0,58505\dots$. The

fourth fraction $\frac{k}{n} = \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{2}}}} = \frac{7}{12} = 0,5833\dots$ is a fairly good approximation.

This fraction was placed in the basis of the twelve-sound system ($n = 12$, $k = 7$, that is, the seventh stage of the twelve-sound scale contains the tempered quint). So in music, temperance triumphed. The term «temperance» means a small detuning of one or another acoustically clean interval for the sake of obtaining the desired system [Klopov 2006: 1]. The new twelve-sound system was called equally tempered one. This musical system, in which the ratio of the sound frequencies of neighboring notes is a fixed value, was practically canonized due to the appearance in the XVIII century of the composition of Johann Sebastian Bach «The Well-Tempered Clavier».

The constancy of the «multiplicative» step in an equally tempered system determined its main advantage over historical predecessors - the ability to shift musical melodies to an arbitrary number of steps. When the fragment is shifted, the frequency ratio of neighboring notes remains unchanged, preserving the melodic pattern.

Conclusions. The results of the conducted studies showed that there is a close connection between music and mathematics from ancient times. A. Nasretdinov, a mathematician, writer and publicist, said that everything in music with mathematics and physics is saturated [Nasretdinov 2015: 1]. All musical buildings are strictly mathematical and physical, otherwise it is impossible. In Ancient times, and in Middle Ages, music was only part of the sciences. Studies of the development of the musical system from Pythagorean to equally tempered showed that the description of this process is quite logical in terms of number theory, in particular, using continued fractions. In academic and variety music, a uniform temperament has gained worldwide recognition and has become the de facto standard of the musical system.

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HOLOGRAMS

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Abstract: The article investigates the evolution of holograms, their characteristics, creation process as well as application of holograms in modern world and benefits gained by their use. Particular attention is paid to the protective property of holograms. The relationship between holograms and household appliances has been considered. The main results of the previous works on the problem are analysed. The prospects of using holograms are discussed.

Key words: Liquid-Crystal Displays, high-phase holograms, Magnetic Resonance Imaging.

The subject-matter of the paper is holograms and their applications in different areas of technological systems.

The object-matter of the article is analyzing various periods and relationship between requirements of modern society and the development of devices based on the use of holograms.

The current development of science, which is caused by the challenges of our life, is the source of things known to people from fantastic films. The future has become real. Holograms are an example of the former dreams realization.

Our banknotes, credit cards, telephones, passports and many other things contain holograms. Holograms are known to protect people's health, privacy and money. Nowadays we know a big variety of materials the holograms are made of. Scientists spent a lot of time studying and developing them. A lot of materials are used for hologram recording. Many of them are worth mentioning here.

A hologram is a fully three -dimensional image of the holographic subject.[1] Or in other words, it is a picture, which is created with photographic projection.

The term "hologram": originated from the Greek word "holos" which means, "whole" and "gramma"- "message". If we compare hologram with 3D or virtual reality in video games or simulations in a truly three-dimensional picture that does not simulate depth of image or requires a special viewing devices as Google Glass etc. these that holograms are sure to make a realistic picture without imitating.

Holography is quite old scientific field. The "Holography" was developed by Dennis Gabor in 1947. He was awarded the Nobel Prize in Physics in 1971 "for his invention and development of the holographic method".[3] To record a hologram such materials as silver halide emulsions, ferroelectric crystals, photochromics, photoresistant and photopolymerizable materials have been used. The last one was chosen for low cost and dry processing. Ionic liquids also attracted the attention of scientists. Recently, they have explored a new application of ionic liquids in holographic materials. The holographic materials with higher sensitivity and higher resolution were synthesized using ionic liquids as additives. Such materials have been used in optic equipment for Liquid-Crystal Displays or just LCD.[2]

The holographic transmission is obtained by means of two-wave interference or by reflecting a laser beam off the object we want to capture. Holography has been used as a tool to determine the 3D motion data of swimming microorganisms. And in digital holography the hologram is recorded digitally and can be reconstructed numerically. Holography is built on quite complex physical laws of optics.[3]

The light is an electromagnetic wave of some wavelength spectrum. The visible light is on the interval ranging from 300 nm to 700 nm. The light with wavelength longer than 700 nm is called infrared and light with wavelength shorter than 300 nm is called ultraviolet. The simplest situation is if two waves travel in the same direction. According to the phase of each wave the resulting electrical intensity will increase or decrease. If phases at some point in a space are the same, the constructive interference occurs at that point. The Diffraction is basically the same phenomenon as the interference. The difference is that the interference is referenced in a case of superposition of several light sources and diffraction is referenced in a case of superposition of many sources.[4]

In fact, we split the laser beam into two separate halves by shining it through a half-mirror. When a laser beam is split up to make a hologram, the light waves in both parts of the beam are traveling in the same way. And after that when they recombine in the photographic plate, the object beam travels via a slightly different path and its light rays are disturbed by reflecting off from the object's surface.[4]

The interest to the three-dimensional images, holograms, is caused by their application in research and in creation of holographic optical elements. It has a lot of functions such as protection and verification of products in the field of medicine, optical equipment etc. From our point of view, the media with photo included alteration capable of recording high-phase holograms are of particular interest, a special place among them belongs to the media with latent image. Thus, they are frequently made use of.

Holograms and holography are much bigger field than most people can perceive. Recording and displaying three-dimensional images are only small parts of it. Applications of holograms exist in many areas of science. For example, holographic optical elements or just HOE can perform the functions of mirrors, lenses and optical devices. There are many types of holograms and there are various ways to classify them. The simplest way of hologram classification is supposed to be when they are subdivided into two types, namely: reflection holograms and transmission holograms.

The first type is the reflection hologram, which gives a truly three-dimensional image and is usually produced on the credit-cards such as Visa card. It shows a reflected light and effect of "mirrorizing" back. The second type, the transmission hologram is used to perform the recording of an object. In fact it serves as a safety measure to protect privacy. This type is certain to be applied for virtual images.

Besides, holograms also have some military applications. Geographic intelligence is an essential part of military strategy and therefore holograms are being used to improve reconnaissance.[4] A civil user can expect it from 3D Google Maps at some points. We observe that holographic digital storage capacity increases every year and we have to store our data and keep it for a lifetime. Holograms do not have to record only the information about visual object - they can record pure data, pages as well. Therefore it seems useful to make an optical hologram of a page of information and reconstruct it if necessary.

As it has already been mentioned, holography could also revolutionise medicine as a tool for visualising patient data while training surgeons, for example. Many medical systems generate complex data using advanced imaging technology, such as Magnetic Resonance Imaging or just MRI and ultrasound scans. The electronic information obtained that way is a computer-generated 3D holographic image.

Holograms are known to be rather complex optical devices and they are really difficult to produce and this feature gives them an incredible advantage in the commercial security market.[2]

However, speaking of the fields where holograms found their application, we should also mention art. These "creative" holograms have been widely adopted in the United Kingdom, being commonly utilized as a practical optical process. We can find first artists using the three-dimensional recording to make animated 3D works and sculptures.

One of the major advantages of image-matrix technology which is used in such special 3D-pictures over other ones is that it allows recording a huge amount of microstructures. Since 1970, holography has been the object of a large number of studies which cover a great field of investigations, particle study and natural science.

The research into holography is carried out for application in non-contact and non-invasive measurements. Holography enables scientists to provide the evaluating of the quality of visualization by means of the simple visualization of the things.[4]

Over the last few years, digital holography has been much developed and has been used with some success in the numerous fields described above.

Digital holography is also a technology of the future which will be used in comparison and recognition of 3D objects as has been shown by recent works on the subject shown.

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УДК 004.383.8

ARTIFICIAL INTELLIGENCE EMPLOYING QUANTUM COMPUTERS

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Abstract: This work considers the possibility of creating an artificial intelligence based on a quantum computer. It explores the features of a quantum computer such as possibility to solve complex

computational problems in a completely different way more effectively. Also artificial intelligence specifics are described in this article. It is supposed that it functions similar to human brain. That allows us to recreate process of human thinking on basis of quantum computer.

Key words: artificial intelligence, density matrix, matrix of consciousness, quantum computers, quantum system.

Introduction. In recent years quantum computers have been attracting enormous attention. A theory appeared whether it is possible to engage them to create artificial intelligence. Scientists hope that quantum computers can be used not only for carrying out complex calculations that are not available for conventional computers, but also for creating unique machine learning and artificial intelligence systems. Let's sort it out in order and begin with understanding of what is meant by artificial intelligence, how it evolved, how it is developing now, how we can create it with the help of quantum computers. Also let us consider what reason for.

Object-matter of our research is artificial intelligence. Our **subject-matter** is a quantum computer which we use to implement artificial intelligence. Our **objective** is to gain advantages by combining artificial intelligence with a quantum computer. We will use purely theoretical **methods**, since this idea has not been implemented yet. As a **task** we want to consider features of artificial intelligence, quantum computer and their properties. The **materials** of our research will be various attempts taken at the moment to create an artificial intelligence.

Discussion and Results. The rapid growth of the amount of data generated and used by humans in modern life makes programmers, engineers, physicists and other scientists today seek new ways to process information. The major hopes are placed on two directions: quantum computers capable of processing huge amounts of data much faster, and artificial intelligence, able to find the necessary information in large volumes without spending big computational resources. Therefore some scientists began to delve into the possibility to combine these two technologies.

Quantum computers use quantum-mechanical phenomena such as superposition and entanglement to perform operations on data. Quantum computers are different from binary digital electronic computers based on transistors. Whereas common digital computing requires that the data be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1), quantum computation uses quantum bits, which can be in superposition of states. Quantum superposition is a fundamental principle of quantum mechanics. It states that any two (or more) quantum states can be added together ("superposed") and the result will be another valid quantum state; and conversely, that every quantum state can be represented as a sum of two or more other distinct states. An example of a physically observable manifestation of superposition is a quantum logical qubit state, as used in quantum information processing, which is a linear superposition of the "basis states" 0 and 1. A quantum computer with a given number of qubits is fundamentally different from a classical computer composed of the same number of classical bits. For example, representing the state of an n-qubit system on a classical computer requires the storage of 2^n complex coefficients, while to characterize the state of a classical n-bit system it is sufficient to provide the values of the n bits, that is, only n/k numbers (where k=32 or 64). Although this fact may seem to indicate that qubits can hold exponentially more information than their classical counterparts, care must be taken not to overlook the fact that the qubits are only in a probabilistic superposition of all of their states. This means that when the final state of the qubits is measured, they will only be found in one of the possible configurations they were in before the measurement. It is generally incorrect to think of a system of qubits as being in one particular state before the measurement since the fact that they were in a superposition of states before the measurement was made directly affects the possible outcomes of the computation [Kaje, Laflamm, Moska, 2009].

So, let's discuss what an artificial intelligence is. There is no single answer to that question or even what it actually does. Almost every author who writes a book about artificial intelligence starts from some definition, basing achievements of that technology basing on that. One of definitions of artificial intelligence is that it is the property of intellectual systems to perform creative functions that are traditionally considered to be ability of humans. How can that be useful to us? The fact that it is actually an opportunity for a certain algorithm to go through a lot of combinations and ask not rigid "if something" connections but to set up the variant scenarios of how computer could choose the best alternative from the set of available good ones. The history of artificial intelligence as a new scientific direction begins in the middle of the 20th century. Well known that neurons are responsible for processing, storage and transmission of information in our brain. In the human brain there are about 85-86 billion neurons. Neurons are connected one with another forming biological neural networks. The complexity and variety of functions of the nervous system are determined by the interaction between neurons. This interaction represents a set of different signals transmitted between

neurons. Signals emit and propagate by ions. Ions generate electric charge which moves through a neuron's body.

Some of the first steps in concept of an artificial neurons and an artificial neural network appeared back in 1943. That was one of the first articles where attempts were made to simulate the work of the brain. Its author was Warren McCulloch. Further, those ideas were continued by the neurophysiologist Frank Rosenblatt. He proposed a scheme for a device that models the process of human perception, and called it a "perceptron". Also he developed the first neurocomputer. Perceptrons have become to be researched very actively. Big hopes were entrusted on them. However as it turned out, they had serious limitations. And enthusiasm in this area gradually faded away. Neural networks were forgotten. The next step in the development of artificial intelligence was the Turing test. The purpose of this test is to determine the possibility of an artificial thinking close to the human. The standard interpretation of this test sounds like: "A person interacts with a computer and another person. Based on the answers to his questions, he must determine which one he is talking to: a person or a computer program. The task of the computer program is to mislead a person, forcing him to make an incorrect choice." General approach supposes once a machine will become smarter it is able to maintain a conversation with an ordinary human. And the human will not be able to understand that he is talking to a machine [Hant 1978; Lor'er 1991].

Later on "dark times" came for the artificial intelligence. It was the 60-70s of the 20th century when the idea of developing of the artificial intelligence extended further than computers. To verify and realize that idea the machine power was just not enough.

The artificial intelligence and its embodiment in the computer turned out to be again relevant when at the end of the 20th century a series of computers capable of playing chess was developed. The best one is Deep Blue, which in 1997 won a match of 6 games against the world chess champion Garry Kasparov. Since then the artificial intelligence has developed more and more actively covering new areas of application [Devyatkov 2001].

The major directions of research in the field of the artificial intelligence at the moment are: representation of knowledge and development of systems based on knowledge and software for artificial intelligence systems.

To understand how the artificial intelligence can make decisions let's find out which types of randomness exist. Among events that can be considered random one can distinguish two different types of events: classical and quantum. Classical random events represent a situation with events that are incompatible disordered, which do not depend on knowledge about their system. However in quantum theory things are completely different. In quantum mechanics the state of the system is characterized by the wave function of the "coordinates". According to the modern ideas the probabilistic definition of the state is complete and the cause of the probabilistic nature of quantum physics is not in any "hidden" factors – it is due to the nature of the processes themselves. In quantum physics any interconversion of different particles is possible, not restricted by any conservation laws.

One of the methods for describing the state of a quantum-mechanical system is the density matrix. Unlike wave function which describes only pure states, the density operator can equally set both pure and mixed states. If system is confused then its components turn out to be in a mixed state. To be able to represent the space of pure states of a quantum-mechanical two-level system it is convenient to use the Bloch sphere. The Bloch sphere is a single two-dimensional sphere, where each pair of diametrically opposite points corresponds to mutually orthogonal vectors of the state. It is generally agreed that the northern and southern positions of the Bloch sphere correspond to the basis vectors 0 and 1. The points on the surface of the sphere correspond to the pure states of the quantum system while the points inside the sphere represent mixed states [Baumeyster, Ekert, Zeilinger 2002].

Suppose that we can represent the human opinion about an object in the form of the similar quantum matrix of consciousness. We will consider only one phenomenon and the person's representation about it. For each subject should be provided its own matrix of consciousness. Then our matrix should depend on two time coordinates but not from one as we used to in all surrounding phenomena. One of the time coordinates will represent the moment of time when we consider the state of consciousness. Another time coordinate will relate to the moment representing the consciousness. That is about which moment of time we are thinking now. Considering human thoughts about an object we can understand that a person doesn't think about an event only at the moment when it occurs but he can also remember about it.

Also our memories weaken over time. Images of different times, being superimposed makes a noise. Hence it is possible to model decoherence of consciousness that is the communication disturbance caused by the interaction of the quantum mechanical system with the environment. If we consider the perception of the situation by a person then we can say that new information appears about the system state that is an

instantaneous change in the description of the quantum state (wave function) of the object. It turns out that wave function collapses during the hard measurement.

Conclusions. Thus we came to the conclusion that combining the artificial intelligence and the quantum computer is quite possible and can lead us to interesting results. Of course there are some apprehensions about the artificial intellect. However the most scientists understand that this is a step into the future that needs to be done. Because new computing systems can speed up the work of many existing algorithms and operations, ranging from molecular, financial modeling and cryptography, to weather forecasting, the evolution of particle physics and the development of new technologies in virtually all spheres of human activity.

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REPLACING CONCRETE JUNGLE

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Abstract: The paper deals with new opportunities of timber as a building material which appear due to modern technologies. Special attention is paid to skyscraper construction using timber instead of so common reinforced concrete and steel. The feasibility problem of such a decision was mentioned. It was stated that people in our country are not ready yet to conceive this conception as a proper decision because despite of the experts' opinions they do not believe that such wooden constructions can be safe enough.

Key words: skyscraper, wood, roofing laminated wood, laminated wood glued panels.

Introduction. For centuries, the main building material was timber. Later it was replaced by stone, and only during the industrial revolution did steel and concrete enter into use. Today we can observe the revival of interest in wood as an environmentally friendly and conditionally renewable building material. However, wood as a building material is associated with low-rise construction. The reason for this is in the individual qualities of the wood material:

- limited dimensions (diameters, length) and, accordingly, the ability to withstand the required loads;
- small module of a single element;
- high percentage of destructibility under the influence of environmental influences (temperature gradients, humidity, dryness);
- high degree of flammability.

The modern need for the construction of tall buildings increasingly requires the use of ecological and comfortable human materials. This is what wood is like. But, obviously, it's not necessary to apply it only in its pure form. Modern technologies make it possible to create composite materials with specified characteristics. At this stage, certain experience of building "wooden skyscrapers" from new materials based on wood has been accumulated. It needs to be evaluated for large-scale building and "working on mistakes".

The object-matter of this scientific research is construction of wood.

Wood almost entirely consists of a "skeleton" of dead cells of a plant, more precisely, from the spongy structure that their cell walls form. This design can show tremendous durability. Specific strength of some types of wood is comparable to aluminum alloys and even alloyed steel [1].

The subject-matter of this research is wooden skyscrapers, their features, properties, since this theme is the focus of many experts in the field of architecture and construction.

Objective: It is aimed to study the modern use of wood, to study all the features of wooden construction, and specifically ways of skyscraper erection using timber.

For many decades in the construction industry, the concept of "skyscraper" was strongly associated with another concept, i.e. concept of "concrete". And indeed, the absolute majority of high-rise buildings all over the world is still being built from this material. However, a "concrete" monopoly will sooner or later come to an end.

Plyscrapers are skyscrapers entirely made of wood, or rather from CLT panels. They consist of glued together lamellas of coniferous tree species, somewhat reminiscent of plywood, only much thicker. The lamellas are perpendicular to each other, which makes them stronger than concrete.

Tasks

1. To study the primary sources concerning the research subject.
2. To consider all information available concerning the construction of wood, wooden skyscrapers.
3. To analyze the construction of wood, to highlight the pros and cons of its use.

Materials: An 18-story (53 m) wooden student dormitory built on the Green Project on the campus of the University of British Columbia, the Technology for the production of multi-layered laminated wood panels (Cross-Laminated Timber, CLT).

Methods: Methods of empirical research (observation, comparison) and methods of theoretical investigation (abstraction, analysis and synthesis, mental modeling, climbing from the abstract to the concrete, etc.) are used in this research.

Discussion and Results

Our ancestors used wood as a building material not only for lack of cement and brick, but also because of its useful properties:

- trees and, consequently, wooden products have a unique ability to interact with the environment, so that in a house built of wood, the air contains the optimum level of humidity and oxygen balance;
- the thermal insulation properties of wood are several times higher than those of other building materials;
- modern wooden houses have high fire safety;
- wooden log houses are unique structures that can withstand an earthquake of 10 points without damage.

For example, sequoia wood is easily handled and machined by any tools. Even with profiling, you can get very smooth surfaces for softwood. Sequoia is famous for its resistance to fire. In fact, the sequoia-clad buildings are recognized as the reason for which fires were limited after the Great San Francisco earthquake of 1906. Historically sequoia was used for firewalls and fire exits. Sequoia goes to the height of a 35- or 40-story tower; but it can reliably connect individual wooden parts which enables building a house of unparalleled size [1].

Record buildings - such as the famous 13-storey wooden log house of Nikolai Sutyagin, burnt in 2012, or the house of the like-minded person in America, Horace Burgess, reaching a height of 30 m - from the engineering point of view look oddities [2]. They were built without a definite plan, so that everyone who had been inside remembers the shaking floors with trembling, not without trepidation. However, several cardinal innovations that architects have mastered in recent decades make the impossible not only possible, but also quite probable.

Roof-laminated wood is made of two or four sheets, which are combined together with special fire-resistant glue. The fibers of each layer are rotated 90 degrees, which allows the strength of the material not to yield to steel [1].

The main advantage of the construction of wood, namely of the roofing laminated wood, is the sustainability of the future building [2].

Up to 39 percent of all carbon emissions in large countries are related to construction, directly or indirectly [2]. Timber is much lighter than steel, which will facilitate its transportation to the construction site, and will reduce the depth of the necessary foundation. Both factors are significant and will reduce greenhouse gas emissions.

Of course, there are some disadvantages in the construction of houses of wood. Despite the fact that wood is a renewable resource, it is critically important not to use it irresponsibly and excessively [1]. In addition, people are afraid to live in wooden buildings because of possible fires, not trusting the builders' assurances that the wood is treated with special compounds that are not afraid of fire.

Technologies for the production of multi-layer glued wood panels (CrossLaminated Timber, CLT) were developed in the 1990s in Austria, Germany and Switzerland [3]. A strong impetus to development they

received in the early 2000's, when the fashion included the "green" construction technology. In fact, steel and concrete production are serious consumers of energy and cause significant emissions of greenhouse gases into the atmosphere [3]. In contrast, growing wood does not emit, but binds atmospheric carbon dioxide, accumulating mass: it turns out that the production of building materials will not increase, but reduce its content in the air.

CLT-board is formed from dried boards with thickness from 16 to 50 mm and more. They are connected with spikes in flat panels and folded as a "sandwich" of three to seven layers, the fibers of which are oriented perpendicular to each other. In this case, usually the direction of the outer layers is chosen so that their fibers go vertically, increasing the rigidity of the entire structure. The wooden layers are pressed with polyurethane, phenolic or melamine adhesives - and, finally, polished. Of these panels, in 2009, a 9-storey Murray Grove residential building was erected in London by the Waugh Thistleton Architects project [3]. And in July 2017 the results were surpassed by the construction of the 18-level Canadian high-rise Brock Commons, which appeared in a residential area of Vancouver.

But, as you can see, wooden skyscrapers began to appear in different parts of the world, and their construction became possible thanks to the invention of so-called cross-laminated wood [2].

This material provides construction structures with the same strength as steel, while remaining environmentally friendly.

Cross-laminated wood is a material that was actually invented back in the late 70s of the last century. However, its mass production and application in the form of laminated panels began only about 20 years ago.

Conclusions

For many centuries, wood was one of the main materials for the construction of housing. During the industrial revolution, the wood was replaced by steel and concrete. However, it seems that these days we are witnessing a renaissance of wood as a competitive building material for the construction of high-rise buildings.

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FROM SKYSCRAPERS TO VERTICAL CITIES

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Abstract: the paper deals with a modern urbanism problem in city development defined as a 'city in the city' or a vertical city. The relevance of such an approach is analyzed. Special attention is given to evolution of the problem and to consolidation of multiple vertical links as well as multiple horizontal ones to make infrastructure more adaptive and functional to various human demands.

Key words: building, skyscraper, vertical city, urbanization, city-planning.

Introduction. Skyscrapers of the future will not be just buildings – they will turn into real vertical cities. It is some kind of evolution: first skyscrapers amazed people, but now any city cannot do without them. Initially they were used as office buildings, and now they have become residential, entertainment and scientific centers.

Architects of the new era have ideas about construction of the vertical city of a super convenient building for full comfort of people where different levels serve for definite purposes connected with activity of the inhabitants. It is 'the city in the city' where people will have all that they need, for example, they can buy products and do shopping, attending different levels but staying inside.

Statement of the problem: Nowadays the process of urbanization is followed by increase in urban density and deterioration of life due to such factors as:

- lack or low adaptability of infrastructure;
- drastic reduction of natural components of the environment;
- lack or reduction of recreational and communicative spaces;

- increase in a temporal and spatial gap between points of accommodation and employment.

Relevance of a research:

This situation tends to rapid growth under new circumstances; for example, it is aggravated by powerful migration processes of the present. The subject of vertical cities becomes especially relevant as an attempt of solution for the above-mentioned problems by means of architecture enabling the practical implementation.

Short analysis and allocation of unresolved items: in the modern world practice certain experts of various branches, architects and architectural offices conduct and publish their own researches dealing with vertical cities and skyscrapers. But, as a rule, they are limited to the area, considering, for example, an economic or social, innovative and technological or architectural component. These data need consolidation in one information field for the comprehensive analysis and creation of concepts.

Therefore, the **object-matter** is the vertical city, its unique opportunities for mankind; it is a solution of global problems including population density or environmental problems. Such a solution contributes into communication between people making them closer to each other. **The subject-matter** is skyscrapers as an optimal variant of realization of the vertical city. At first skyscrapers were just built, because it had become technically feasible and justification for their construction was the high prices of the land. Later people opened more and more advantages for construction of skyscrapers. **Objective:** to study skyscrapers as a modern type of structures; to reveal their advantages and conveniences to people and also to detect if they are ready to such serious changes of the city structure.

Tasks

1. To study primary sources dealing with the problem of research.
2. To consider all available projects of the vertical cities.
3. To analyze all the primary sources available and to define the most favorable aspects in construction of such cities.

Material of the research are some primary sources, such as "Triumph of the city" and "Delirious New York", as well as the research, carried out by *Why Factory* in cooperation with architectural bureau MVRDV, in attempt to find an alternative to the existing type of skyscrapers, and also the project of the famous team of engineers and designers of ARUP which has published the project of a skyscraper of the 2050th year under the name "It's alive!". **Method** of the research is the comparative analysis to compare the social, economic, figurative and constructive components in interpretation (understanding) of the considered authors. The research is founded on generalization of results and doing conclusions on the basis of their works for identification of the subject's features and potential of the concept realization.

Discussion and Results

Nowadays many people think that skyscrapers are prototypes of future vertical cities.

Edward Glaeser is the Professor of Economics in the Faculty of Arts and Sciences at Harvard University who has focused on the determinants of city growth and the role of cities as centers of idea transmission. In his book *Triumph of the City* he wrote that high population density is a necessary condition for the prosperity of cities. He believes that human communication is the main resource of economic growth. The smaller the distance between people, the more inevitable and easier their interaction becomes. Therefore, the best architectural form is a skyscraper. There is also an ecological argument in favor of a skyscraper. An apartment in a skyscraper comparing to a private cottage takes as less space on the Earth's surface as the trace from a ladies' heel-stud comparing to a print of a men's boot.

Glaeser says that we should be more tolerant to demolition of low buildings for the sake of construction of high buildings, and be less tolerant to activists who resist growth of the cities which reduces pollution of the environment [1].

Also, Rem Koolhaas was engaged in this phenomenon; his skyscraper bears in itself the capacity of the autonomous settlement, "the city in the city". He did sketches and on one of them he represented a skyscraper where each of floors have separately standing lodges, that its floors are as sites of small residential areas of the city. He considers a skyscraper as the village: *«Each of these artificial levels is treated as a virgin site, as if the others did not exist, to establish a strictly private realm around a single country house and its attendant facilities, stables, servants' cottages, etc. Villas on the 84 platforms display a range of social aspiration from the rustic to the palatial; emphatic permutations of their architectural styles, variations in gardens, gazebos and so on, create at each elevator stop a different lifestyle and thus an implied ideology, all supported with complete neutrality by the rack.*

The 'life' inside the building is correspondingly fractured: on level 82 a donkey shrinks back from the void, on 81 a cosmopolitan couple hails an airplane. Incidents on the floors are so brutally disjointed that they cannot conceivably be part of the same scenario. The disconnectedness of the aerial plots seemingly

contradicts the *fact* that, together, they add up to a single building. The diagram strongly suggests even that the structure is a whole exactly to the extent that the individuality of the platforms is preserved and exploited, that its success should be measured by the degree to which the structure frames their coexistence without interfering with their destinies. The building becomes a stack of individual privacies» [2, 85]. The skyscraper was for the first time described here as the vertical city which parts are more tolerant to each other, than in the habitual horizontal city.

In January, 2013, the famous team of engineers and designers of ARUP has published the project of a skyscraper of the 2050th year under the name "It's alive!". According to ARUP, the skyscraper will be able to feed and heat its inhabitants, and even to reconstruct itself.

Parts of building have different degrees of durability. The steadiest part is horizontal levels and their bearing construction. Meanwhile, walls of the skyscraper are designed on operation only within 20-30 years. Then they can be updated or replaced. The most interesting is that the robot which is a part of the building will be engaged in it. Thanks to solar batteries and wind power plants, the skyscraper will make more energy, than it consumes. It won't release carbon dioxide into the atmosphere, because it will be held by a special membrane, and then it will be processed into oxygen. Several floors will be occupied by livestock farms and kitchen gardens; that is why food need not to be brought from the far village. There is the funicular in the building. In addition, the walking paths conducting from a skyscraper to a skyscraper are not only on the ground level, but also at the level of some floors. So, transition from one floor to another will become equivalent to movement in the city and will give not less wide range of opportunities, for example visiting an administrative office, the park, shops, etc. The special system will regulate power supply and communications of the whole city. Naturally, there is an underground platform for transport [1].

Conclusions: Technologically the world is capable to embody any of the described concepts already today. But probably there is the psychological barrier of we accustom to move horizontally. Therefore, to develop our world and especially its infrastructure we should step outside of old habits towards to new modern construction.

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THE MOST EFFECTIVE INTERNET SERVICES FOR WEBSITE CREATION

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Abstract: This research shows the most effective tools for websites creation by providing comparative characteristic of the most popular services by such criterions: usability of interface, learnability, price, basic equipment, flexibility, maintainability and offline-editor usability. The central idea of the article is about specific properties and important features of the overviewed systems. The aim of the present paper is to help a reader choose suitable and practical service for his needs. The results are presented in table with the short conclusion of each method and general recommendations for their employment.

Key words: CMS, site-builder, WWW, website

Introduction. The last decade is characterized by the active introduction of computer technologies in all spheres of human activities including everyday life work and leisure. In our time, everyone feels the need for the ability to use all the capabilities of modern computers. Thus, people have to comprehensively master new areas of knowledge for them, develop their skills in dealing with various devices in order to keep up with the present rhythm of life. At the same time, new needs and complexities that have arisen as a result of rapid technical progress, stimulate the use of previously not so necessary computer methods. Practically in all areas of activities the issue of social communication, advertising and easy access to information is aggravated. For example, the university needs to be able to report the latest news of the university, provide information about exams, applicants entered or describe the activities and prospects of a particular faculty, without using the ancient methods of informing with the help of a "spoiled phone" or campaigning in schools. Also to run a successful business you need to provide the complete set of information needed by the buyer, create a decent advertisement, but the way of sticking ads, distributing booklets and promoting has not attracted due attention for quite long time. And the solutions to these problems are websites.

The modern WWW available to anyone almost anywhere in the world is an excellent way to provide information and more importantly allows you to take full spectrum of its advantages. At the moment, the creation of websites using Internet services can be provided by two instruments: CMS or site builders. Therefore, this research is aimed to make their comparative characteristic, consider their attributes and find the most proper tool for various situations.

Relevance: a wide range of different systems(platforms) does not allow to choose the most comfortable and most profitable solution for a particular situation, most of the auxiliary resources create exclusively advertising articles, in which the essence of each method is distorted.

Object of research: Tools for creating websites.

Purpose: Find the most optimal version of service for creating websites .

Methods of research: Studies (study of materials and books), experimental (exploration of products on specific problems).

Material: references, sites.

The task: To undertake an accurate comparative analysis of different CMS and site builders.

Subject: WordPress, Wix.

Discussion and Results:

CMS-platforms.

General terms and abbreviations

To begin with, let's give a definition of the CMS. CMS (Content Management System) is a computer application that supports the creation and modification of digital content. User is able to add and correct variable templates and text, work with databases, choose hosting etc. In the broadest sense, CMS is a ready engine, the core of the site, which ensures its functioning on the Web and interaction with the user. It is a software package that is installed on a web server (hosting) and, units design templates and information from databases, link pages and provide them to visitors.

The WordPress Codex is the online manual for WordPress and a living repository for WordPress information and documentation.

Search engine optimization (SEO) is the process of affecting the online visibility of a website or a web page in a web search engine's independent results.

Introduction of the platform

The most outstanding example of CMS which is overviewed is WordPress. Using reference between WordPress and its next competitor, Joomla, is 60% to 7.5%, so it is constantly the most popular CMS in the world. This CMS is based on PHP with MySQL data bases. Wordpress is a free platform with wide technical support from its creators. Started as a tool for blogs, Wordpress extended to multitasking system and the widespread decision for a big amount of tasks. The main advantage of this platform is source code availability. You can easily correct it if you have some knowledge in HTML and PHP. Every developer can use this code to improve it so you can find a great support even from common users on forums if you have any problems or mistakes. However, this platform has a big popularity among people, who doesn't know programming. Each user can employ a great spectrum of abilities of this tool without deep inculcation into programming and its essence. And the site, which is created by this way, can be innovative, creative, and convenient. Moreover, with coding skills you can improve your product and update it into high-level ramified invention.

Offline-editor usability

Other important benefit of Wordpress is generation content with an offline editor. Sometimes, it is easier and comfortably to write an article or post in the environment which is more suitable and naturally for you and then upload it on website. Or it depends on your habits and wishes and you just like writing slowly, without hurry and publish from applications. These operations are provided by one of two technologies: XML-RPC or AtomPub by using standart protocols of the platform.

Usability of interface

Wordpress has very simple administrative panel so it is comfortable enough to understand all interface. Moreover, installation and tuning is simplified by developers so it doesn't take a lot of time to do preparatory jobs. WordPress by default has a visual editor with a WYSIWYG interface. Further, by connecting some plugins your site can acquire new elements such as comments.

Learnability

You can create a site and upload first publication for 5 minutes. Of course, it will be a template, but this opportunity is available constantly. Creation an original web-site on Wordpress is not fast for the first time. Relying on the statistics, an average threshold of occurrence is about 2 weeks to use this platform on a

proper way. But from the beginning you can practice in creation simple blogs and varying different custom designs, turning them into your specific product.

Price

As was said before, Wordpress is a free CMS so you can download it and start using without paying. It has a few templates in basic equipment but you preferably should buy another or check and edit free templates whose amount is more than great. If your decision is a purchase, it will be cost from 25 to 100\$. Furthermore, you must choose and pay for hosting and domain, which are necessary for all sites. For example, cost of “.com” domain name is 15\$ per year, “.com.ua” – 10\$. Average price of hosting among different companies is about 4\$ per month for the smallest volume of storing(1-2 GB), so it depends on your needs. Thereby, the cheapest full cost without templates purchase will be 58\$ per year.

Basic equipment

Despite the fact that WordPress does not include the page builder as standard, it comes bundled with many templates. But it is still not enough for building something creative because of their wide utilization in a big count of other sites.

Flexibility

It should to be said, one of the best things which Wordpress can offer to you is its universality. First of all, it has language localization so it extends the community of this platform, improve the service and simplify the ways of application. The second thing is that you can create absolutely any site on any topic. This is largely due to the huge number of ready-made designs for various applications. All the tools that you can use to work with WordPress are developed by different specialists and not just by the team that stands for a particular solution. This is because anyone can participate in the development and support of templates, plugins and many other tools. All these tools, even free ones, are strictly controlled by a team of WordPress experts. But abundance of plugins can cause excessive load on the web server so you should choose and employ them attentively. Nowadays, there are about 35 000 only official Wordpress plugins, so you can make site more comfortable and widen its functions and abilities. Moreover, WordPress was originally created as a very flexible system in terms of various settings, including those related to SEO so to improve the search engine's friendliness to the site you can use special SEO plugins among the thousands. Therefore, it is the single-valued benefit of this platform.

Maintainability

WordPress provides a number of different ways of support for users. Some are officially recognized and the projects and experience behind them. On the other hand, others serve as places where WordPress users gather “off the books”.

The official Web-based location for support is the WordPress forums at <http://wordpress.org/support/>. The support forums are staffed by volunteers and provide a way for users to ask questions and receive answers. Also they provide users with information about other incidents that may help them through a problem. The WordPress Codex provides example usage of template tags, plugin compatibility guides, and other instructions on how to use the WordPress software. Furthermore, due to the overviewed consequences Wordpress has regular updates thus all the bugs are being fixed by developers straight away.

By and large, the main goal of site builders is to create a product fast, simply and qualitatively, so there are many differences between them and CMS-platforms. In modern world a great deal of this systems exists in the World Wide Web. Both high-developed, popular and low functional, practically unknown solutions are presented in the Internet so the most interesting and upcoming example was chosen for this article such as Wix. It has the largest number of created and still working web-sites among site builders, simultaneously due to its appointment and main audience. Nevertheless, it has a rather narrow focus and Wix is the closest site builder to some Wordpress's solutions. At the same time, Wix can provide specific interface facilities which are noticeably better than other offers on the industry. Therefore, its functionality will be compared with Wordpress's in this article. Created on HTML 5.

Offline-editor usability

First of all, significant disadvantage of Wix is absence of ability to edit your web site offline. It is connected with the fact, that page needs constant communication with servers. Thereby, Wix loses a great deal of opportunities and potential clients. As we know, this option is important a lot for making blogs and writing articles, but unfortunately Wix does not have such necessary thing, even despite its positive features.

Usability of interface

The most outstanding positive side of the Wix is its visual interface. It is provided with drag&drop mechanic, so it is very comfortable for every user to employ this site builder from the first seconds after downloading. Moreover, the main consumers of Wix are people without any knowledge in programming and

common users, so this platform is simple and cozy for working and using. The control panel is pleasant, well thought out functionally with widely variable settings. These options are the other benefit of Wix, among the most interesting: geometric shapes, icons, adding video to the background of the project, widescreen strips such as lending paging, parallax effects and animation.

Learnability

Moreover, there is one more obvious advantage of this platform and the main aim of all site builders - low threshold of occurrence. In other words, you can employ all capabilities of this platform immediately, without adaptation. This editor is perceived as the fastest and the simplest solution for your projects and intentions in the Internet areas. Besides, after registration you already can work with your draft and create a first site without a delay. It will take about 2 minutes to fill a template and start your web site from scratch. Of course, it won't be high-grade, but it will work, so you will be able to improve it at any time.

Price

The main interest in Wix is represented by paid tariff plans:

Connect Domain (49 \$ / year) - allows you to connect your domain, get premium technical support and gives 500 MB of disk space, but does not remove Wix ads;

Combo (99 \$ / year) - 3 GB of space, free domain, ad removal, favicon;

Unlimited (149 \$ / year) - increase in disk space up to 10 GB, form designer, Site Booster application;

eCommerce (194 \$ / year) - 20 GB of space, the ability to connect the basket. The tariff for creating a store.

VIP (294 \$ / year) - all the advantages of eCommerce, plus 10 E-mail mailings / months, as well as site audit by Wix experts (design, usability, SEO).

The system allows you to use yourself completely free of charge, but with very serious limitations. The main one is the impossibility to connect your own domain. This is what ruins the appeal of the Free-account Wix to the nines. It can be used for a first time, but for creation a serious site you should pay. Moreover, this service limits your site in throughput. Due to this point, with a large number of templates, media content and visitors suspensions and delays can be noticed. In this way, as much you pay, as effective site you get. So too high price and lack of capabilities in free tariff are very important disadvantage of this constructor.

Basic equipment

In free version you have third-order domain such as "username.wix.com/yoursite". Also, it offers various kinds of templates, applications and designs, so even with paying only for domain (but it isn't profitable), web site with weak opportunities can be created.

Flexibility

Unlike Wordpress, Wix hasn't source code availability. Thus, the situation with it is similar to Wordpress's - it is also disadvantage and benefit of the builder. Only developers have access to edit the code and add new tools, so they are controlling changes in platform and watching out for mistakes. But users are unable to improve capabilities of Wix, change functions and add new, so it is less suitable for large projects and aware community. For example, in Wordpress 35 000 plugins are available, while in Wix - only 300. But there are some other sides of this platform. One of the most interesting - the editor. You can customize your design, paint, change each block and widget, add photos and interactive flash-elements as much as you want. Also, it saves your downloads, add videos to the site from popular video hosting, create playlists SoundCloud, connect comments through all the famous social networks, create colorful galleries, images in which you can immediately correct in conditions similar to those in Photoshop. Therefore, it is suitable a lot for creative solutions. Wix code, Wix ADI and SEO-master are completely budding tools, created to help people ameliorate their drafts, increase attendance and position on market. However, because of particularity of site-builders and a great number of projects with similar templates, the site can't take the top positions in search, if only it is not unique and remarkable solution.

Maintainability

The method of technical support is feedback. You may leave your comment or ask at the forum necessary information or advice and after a period of time their service will connect with you. From experience, it will take for about a half an hour to get a valid answer on your problem. Moreover, Wix has permanent updates, so developers always improve their creation.

Some examples of sites

Goods for beard <https://www.beardedsoldier.com/>

Designer <https://www.atlblanc.com/>

Conclusions

On balance, Wordpress is the best solution for big projects, as news or large company's web site. For simpler tasks and fast results Wix is the proper way to solve the problem. It is perfect for small and medium business, portfolios and cutaways. The results are reviewed in the following table:

	Wordpress	Wix
Usability of interface	Plain administrative panel, other – depending on plugins(also can be drag&drop)	Can be complicated by adding different plugins; drag&drop, intelligible menu; easy to use from the first minutes
Learnability	2 weeks to seize all opportunities of the platform, first simple site in 5 minutes; skills in programming help improving the site, fix mistakes, create and upload templates	Very simple solution, skills in programming have no use, attractive sites in few minutes
Price	58\$ per year – the cheapest, but without limits in throughput, you can choose domain name by your own; Extra – 20-100\$ templates, outstanding domain, more volume of data	50\$ per year – the cheapest 300\$ per year – the most expensive Price is constantly exaggerated
Basic equipment	Free platform, different official templates	A big amount of plugins and templates, fast creation
Flexibility	For a large amount of tasks, can edit the code, upload plugins and templates, choose hosting and domain	Can't shift to another hosting, can't use your domain, flexible interface, various designs, special facilities
Maintainability	feedback, experienced users, supporting forums	Tips in the interface, feedback, forum.
Offline-editor usability	Cozy, fast and exquisite	-

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DISGUIISING METHODS OF COMPUTER VIRUSES

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Abstract: The article is devoted to the main methods of disguising of computer viruses which are used to remain undetected by antivirus programs for as long as possible. The attention was paid to STEALT - viruses, polymorphic and encryption viruses. The difference between two similar notions as “encryption” and “polymorphic” viruses was outlined in the article. The behavior of these three types of viruses was investigated as well.

Keywords: decryptor, encrypting, polymorphism, signature, virus.

Introduction: The number of new viruses is constantly growing despite the laws adopted in many countries and despite the development of special software for virus protection. The main task of the virus is spreading. The various methods of disguising help to accomplish this objective. If the versions of the viruses are improved all the time, it is necessary to investigate the nature of viruses, the ways of its disguising to improve the protection software. This is the **relevance** of this topic.

The issues of the history of computer viruses and their classification are thoroughly investigated by specialists (for example, by Richkov [5]). As for the practical questions, the methods of combating viruses were proposed by Mostovoy[4], the ways of the spreading were observed by Kaspersky[3]. The area of the “viruses” is very wide to study. In this case, we drew attention to certain features of algorithms of viruses.

The object-matter of our work is the notion of “computer viruses” and its nature; **the subject-matter** – the ways of its disguise.

The objective of this work is the analysis of the masking methods of computer viruses. In this regard, it is important to highlight the following research **tasks**:

- to explore the concept of “virus” in computer science;
- to analyze the basic methods of the disguise;

During the study, the following **methods of research** were used: analytical and data aggregation.

Discussion and Results: A computer virus is a program or script designed to cause damage, steal personal information, modify data, send e-mail, display messages, or some combinations of these actions. All of the major operating systems can contract a computer virus. It is loaded onto your computer without your knowledge, runs against your wishes, infect programs and files, alter the way your computer operates or stop it from working altogether. Moreover, viruses can replicate themselves.

The term "Virus" was first coined in 1949. The concept of a computer program capable of reproducing itself was first mentioned by John von Neumann "Theory of self-reproducing automata" essay. Viruses need to hide the presence in the system as long as possible in order to capture as much space as possible. They hide their presence in different ways [8].

The four main types of viruses have been highlighted.

1. Stealth – viruses. In the cyber-security field, a stealth virus is a computer virus that uses various methods to remain unnoticed by antivirus software. Usually virus authors replace some components of the operating system, for example, drivers so that the virus program becomes invisible to other programs. Such viruses are called invisible viruses or stealth viruses. It should be noticed that Stealth-virus is invisible only when its resident module is in the computer's RAM. The virus may have a copy of the original information and must monitor system activity. When an antivirus program tries to access data that's been altered, the virus redirects it to a storage part containing the original information.

So Stealth viruses are hidden from many antivirus tools that perform a virus scan by changing the lengths of files.

In order to avoid detection, stealth viruses self-modify using some next methods:

- modification of code – the stealth virus changes the code and virus signature of each infected file;
- encryption – viruses encrypt data via simple encryption and use a different encryption key for each captured file.

One of the most first successful stealth viruses was Brain that appeared in the mid-1980s [6].

2. Encrypting viruses ("ghosts"). Signature is a code fragment that occurs in all copies of a virus and only in them. Signature uniquely determines the presence or absence of the virus. To find the body of viruses on disks with antivirus tools, it is impossible to store the complete code of the virus program. Authors of antivirus programs store signatures to search for viruses.

The simplest encryption technique is as follows: a virus infects a new program, it encrypts its own code using a new key. The encryption key depends on the infected file (for example, its name or length). As a result, two copies of the same virus can differ significantly from each other, and even have different lengths. This makes it difficult to detect a virus through a signature search.

The encrypted code does not already have the same signature. An encrypted code of virus begins with a decryption algorithm and continues with encrypted code of the virus. A virus scanner is not able to detect directly the virus using signatures but it can still find the decrypting module [2].

3. Polymorphic viruses. Polymorphism, in computer science, means that a single definition can be used with varying amounts of data.

Encrypting viruses hide the signature of their code. However the encrypted code must be decrypted before execution, that is why, a decryption procedure is needed which itself can not be encrypted (it is executed before the main code of the virus). The decryptor contains a specific code and it is possible that the descriptor will become a signature. Very often antivirus tools use the decryption procedure code as a signature.

The authors of viruses responded with polymorphic viruses. These viruses use the different keys for encryption and the different encryption procedures (and decryption). Two instances of this virus do not have any matching code sequence. Viruses which use the different decryptors to change their code are called polymorphic viruses. These viruses are supplemented by the decryption generators. Such generator creates for each new copy of the virus its own decryptor different from all the others but performing the same function.

In order to detect polymorphic viruses, it is important to use a scanner with strong string detection. It has to scan several different strings including one for each possible decryption scheme [8].

4. Combined viruses. Viruses are not limited to infect files of the same type. File-boot viruses spread both through executable files and through boot sectors of hard disks simultaneously hitting files and sectors. At the same time, they usually place the resident module in RAM. Viruses combine all the known methods of disguising to achieve the greatest invulnerability: from less experienced users and one type of antivirus are hiding using Stealth technology

from more powerful antivirus tools – implementing polymorphic mechanisms. This kind of viruses is called combined viruses [7].

Conclusions: In the course of the study a virus is a type of malicious software. When the program executes the virus is active too. Viruses use the different ways not to be noticed by protection software. We organized information about some of the most known ways. A stealth virus is a hidden computer virus that attacks operating system processes and averts typical antimalware scans. This type of virus hides in files and is adept at deliberately avoiding detection. Stealth viruses hide altered computer data and other harmful control functions in system memory and self-copy to undetectable computer areas effectively tricking antivirus software. Encoding viruses are viruses that encrypt their body and thus avoid detection by testing the signature of the virus. Before starting work such a virus decrypts itself with the help of a special decryption procedure. The decryption procedure turns encrypted information into an ordinary one. To decrypt the body of the virus, the decryption procedure captures the control of the machine. After decryption computer control is transferred to the decrypted virus. Further improvement of encrypted viruses was aimed at hindering their detection. To this end, polymorphic viruses have been developed. Polymorphic viruses are much harder to detect than normal ones, since instances of such viruses differ from each other. Many viruses cannot be unequivocally attributed to this or that type, because they have the properties of several types of viruses. Viruses or malicious programs of the same type can carry viruses of other types. A combined virus is a virus that has a combination of several essentially different methods or algorithms of infection. Thus, viruses are constantly upgraded, they improve the methods of disguising as the protective software is also improving all the time. It seems impossible to break this circle. Nevertheless we can analyze the situation and continue to search for different methods of defense from viruses and other kinds of malware.

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SOLAR BATTERIES

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Abstract: Every day humanity increases its requests for electricity consumption. A huge amount of fuel is burned daily to give us light in our homes and to make our computers, TVs, fridges and other electrical appliances work. However, sooner or later the resources of our planet will be exhausted and then the extraction of electricity will become problematic. This article considers such a way out of this situation as alternative energy sources and in particular solar energy. This article describes the ways of extracting electricity from sunlight in general and the principle of solar cells and the examples of their use are shown.

Key words: solar panel, solar battery, photocell, semiconductor.

Introduction. Since a long time, people have tried to simplify their lives by using natural energy sources. People built windmills and water mills in order to grind grain, built dams in order to get more drinking water and made water systems to irrigate their crops. Particular attention was also paid to solar energy: the harvest depended on the number of sunny and warm days in a year – if there were few such days, the harvest did not grow, or was very scarce; if there were too many of them a drought occurred and the whole crop dried up.

However, solar energy was used not only for agrarian purposes. Even in ancient Greece people used a system of mirrors to focus a lot of sunbeams into one point to set a fire. There is a well-known legend of how Archimedes helped to protect the city. According to the legend he told the commander to order his soldiers to polish their shields to shine and after that to build a pier out of them. When enemy ships approached the city, Archimedes focused the sun rays on the ships using a system of mirrors, as well as shields. As a result the enemy ships caught fire. It is not known for sure if this legend is true but it definitely points at the fact that mankind has praised the Sun and tried to use its energy since the ancient times.

Nowadays, in the era of advanced technologies most homes have electricity, gas stoves and central heating. It is necessary to receive energy from natural resources to make all these appliances function.

Mankind has found a way out of this situation – the thermal and nuclear power plants were built, and natural resources (oil, gas, coal etc.) are produced on an industrial scale to be sufficient for all needs of the mankind. However, oil, gas, coal and other natural resources are not unlimited and if humanity continues to use them so intensively they will soon be exhausted. It is at the best time for us to recall the alternative sources of electrical energy, which are **the object** of this article.

Alternative sources of electrical energy are the ways of gaining electricity which mean the production of energy without burning natural fuels (oil, natural gas, coal etc.) and the subsequent release of carbon dioxide into the atmosphere. And **the task** of this article is to give information about solar energetic and solar panels. **The objective** of this article is to explain the principle of how solar batteries function and to show the examples of their use. There are many alternative ways of generating electricity such as wind generators, hydroelectric power plants, tidal power plants (exist only in France, the UK, Canada, Russia, India and China), bio power plants, thermonuclear fusion (currently is not maintained), solar collectors and solar power plants (power plants where electricity is obtained from the solar batteries which are **the subject** of this article) etc.

Materials and methods include the study and analysis of articles dedicated to the issue of the alternative sources of energy.

Discussion and Results. Among all these methods we should allocate solar panels and solar collectors. The latter is a device that heats up under the influence of sunlight and passes heat to the heat carrier. There are 2 types of solar collectors: flat and vacuum (tubular) ones.

A *flat collector* consists of the element which absorbs sun rays (the absorber), transparent surface (it provides protection from the wind and rain) and thermal insulation (to reduce the energy loss due to heat exchange with the roof of the house). The absorber transfers heat to the heat carrier and the carrier in its turn transfers heat to the radiator which heats the room or to a vessel with warm water for household needs.



1.



Flat Solar Collector

A *vacuum or tubular collector* is made of two coaxial tubes between which a technical vacuum is created. The outer tube is transparent in order not to impede the passage of sunlight and the inner tube is made of a well-absorbing material. The inner tube is filled with the heat carrier. Otherwise, the structure of the vacuum collector is similar to the structure of a flat collector.



Vacuum Collector

Vacuum collectors have a greater efficiency than flat ones due to the fact that heat loss in heat exchange with the environment is very reduced.

But solar collectors are used not only in homes: there are the cases when large installations that produce enough electricity to power even a small town are built. For example, in Spain in Seville such solar tower was built in 2007:



In this system the sun rays are focused with the help of the massive of mirrors on the tower which is filled with water. The water heats up and turns into water vapor. Under the pressure of water vapor the turbine rotates which leads to producing an electric current.

However, solar collectors still have rather low efficiency due to the fact that most of the energy is lost in the heat exchange of the system with the environment. Even during further research and improvements the efficiency of solar collectors is unlikely to increase significantly. And so we face *solar batteries*. A solar battery is a device that converts the energy of sunlight directly into electrical energy due to the photoelectric effect. The results of the first studies of the action of solar radiation in chemistry and electricity were published as early as the 19th century by the French physicist Alexander Becquerel.

The first solar battery was invented in 1883 by an American researcher Charles Frits. This battery consisted of a selenium lining covered with gold, and its efficiency was about 1%. A Russian scientist Alexander Stoletov discovered the first law of the photoelectric effect which explains the fact that the number of electrons leaving the substance as a result of the photoelectric effect is proportional to the radiation intensity. Albert Einstein pointed out that the energy of photoelectrons depends on the frequency of the incident light. In this case light demonstrates a corpuscular nature and is absorbed by quanta. The second law of the photoelectric effect states that the energy of a quantum of light is spent on the ionization of the atom and the electron exit beyond the boundaries of matter and also on the transfer of the kinetic energy to the electron.

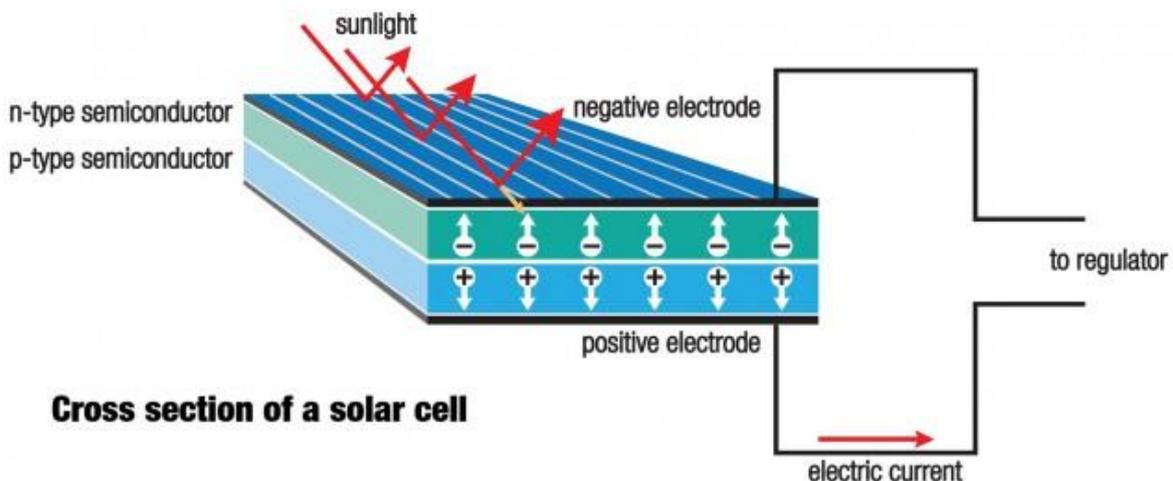
In photoelectric converters direct sunlight transforms into photovoltaic, therefore they are called solar batteries which consist of photocells. Several combined photoelectric converters (photocells) which directly convert solar energy into a constant electric current are called a solar battery. The basis of the photocell is a silicon crystal grown in laboratory in the form of a cube which is cut into plates approximately two hundred microns thick which is three to four times the thickness of a human hair [4].

To obtain a current source with a high electromotive force several semiconductor crystals are connected in series one to the other. Every crystal is a current source with the electromotive force which equals $\varepsilon_1 \approx 0,5V$. Series conduction of 10 crystals make possible to devise a solar battery which electromotive force would be approximately equal $e \approx 5V$. Since the internal resistance of such battery is 10 times higher than the internal resistance of a single crystal the output current of the battery is sufficiently small and approximately equal to $0,1 \div 1mA$. To increase the received current the solar cells are connected in

parallel line. Thus, to build a solar battery with electromotive force $\varepsilon \approx 5V$ and with the current 1A it is necessary to use 10^4 crystals which create p-n-junctions [1].

A silicon plate is covered with a very thin layer of phosphorus from one side and with a very thin layer of boron from the other side. On the side where silicon is in contact with boron the surplus of free electrons emerges and they transit from silicon to boron. On the other side, where silicon is in contact with phosphorus, there is a lack of electrons. Electrons from phosphorus pass into silicon and the "holes" appear in this region. As a result, we obtain a double layer where some electric field of an uncompensated volumetric positive charge in the n-layer and a volumetric negative charge in the p-layer region is created. These zones together create a p-n-junction. The electric field of the p-n-junction blocks the motion of the main charge carriers (the holes in the p-type-semiconductor and electrons in the n-type-semiconductor) through the junction.

If we illuminate the p-n junction by light with a frequency of more than $\nu > \frac{\Delta E}{h}$, which is sufficient for the formation of an electron-hole pair in optically transparent p- and n-type-crystals electrons in the conduction zone and holes in the valence zone emerge (in addition to those that have already existed). Electrons in the conduction zone of the p-type semiconductor and holes in the valence zone are non-main charges which can pass through the p-n-junction freely. The intensity of the field which is created due to the diffusion of electric charges is the intensity of some field of external forces E^{ext} under the action of which surplus electrons (which arise in the region of the p-n junction due to the photoelectric effect) move from the p-type- to the n-type-semiconductor and the holes move in the opposite direction. As a result, charges are separated in space.



On the front surface that is illuminated the surplus of electrons from the p-semiconductor region is collected by metal tracks that are at the same time the rigidity ribs. To provide protection of the photocell from the influence of the environment it is covered with a glass plate. During the manufacturing of photovoltaic cells the photocells are connected in series and in parallel modules to obtain the required voltage and current [3].

Silicon is a very glossy material that reflects falling light so an antireflection coating is applied to the top layer of the photocell which reduces the losses caused by reflection by at least 5%. If the electric circuit is closed, these electrons after having performed work in the load pass through the connecting wire to the n-type-semiconductor. As a result, an electric current the value of which depends on the level of external illumination flows in the circuit. Solar panels are also used simultaneously with batteries. In this case, photovoltaic cells accumulate the charge all day and give it to the consumer when it is needed.

Photopanel of three types are produced on the basis of silicon:

1) *Single crystal photopanel.* For their production single crystals with a homogeneous structure are grown. Such photocells have a plane surface and as a result absorb sunlight better so their efficiency is higher, but they are more expensive.

2) *Polycrystal photopanel.* Such cells have an inhomogeneous polycrystalline structure. Their efficiency is a bit lower because the uneven surface reflects part of the rays.

3) *Thin film-based photopanel.* The main principle of such solar cells is analogous to crystalline but they are produced in the form of flexible cells that can be installed on curvilinear surfaces. These batteries

are cheap in production and are rather effective but they are rarely used for household purposes because in comparison with crystalline ones they occupy a larger area (approximately 2.5 times) per unit of power [2].

Solar panels are widely used all over the world. In Europe people install photovoltaic panels on the roofs of their homes in order to spend less electricity and preserve the environment. Large countries are building huge arrays of solar panels that generate electricity in amounts that can supply even the whole city. Germany is leading by the percentage of solar energy to all the energy consumed by the state. There has been set a record – 56% of all energy consumption was covered with solar power. And in France they have already made the road which is completely composed of solar panels and can fully supply with the electricity the whole lighting system of that village. The samples of solar cells with the highest efficiency are used in aviation and the space industry to power satellites in space.

At present the efficiency of silicon photocells based on charge separation is rather low and is in the range of 10-20%, although the best ones show much higher results. For example, in 2014 scientists from the University of Solar Energy Systems Fraunhofer developed solar cells with an efficiency of 46%.

The main disadvantage of solar panels is that they are quite expensive. As a result, the electricity that is obtained from the use of solar batteries is more expensive than the electricity received at nuclear and thermal power plants. The efficiency of modern solar batteries is enhanced by improving the design and improving the properties of materials that are used in the production of solar cells. To improve the efficiency of photocells new methods and materials of a new generation are being developed in which the results of research in chemistry, physics and nanotechnology are used.

Conclusion. However, solar energy is a new and fast-evolving branch of energy. And what is much more important it is entirely ecological. Solar energy can give mankind an inexhaustible source of energy and all we need to receive electricity from photocells is just to place them and connect to the consumer. With further research and improvement of solar batteries their performance can be increased to a sufficiently high level and then mankind will be able to switch to the technology of receiving electricity which will definitely benefit the ecology our planet.

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INSTABILITY OF THE FERROFLUID DROPLET IN THE PRESENCE OF INHOMOGENEOUS STRONG MAGNETIC FIELD

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Abstract. This article deals with ferrofluid droplet instability in the external inhomogeneous static magnetic field. We show that the droplet shape is determined by the minimization of the sum of magnetic, surface and gravitational energies, and the system comes to this minimum by first elongating, then shrinking of the droplet. We compare the cases of the homogeneous and inhomogeneous fields to reveal that the field gradient decreases the height of the droplet in agreement with experimental studies.

Key words: ferrofluid, magnetization, superhydrophobic surface, instability, droplet fission.

Introduction: The process of forming different structures in liquid media subjected to external fields is essential in a wide variety of natural systems [1,2]. Patterns are often created due to static self-assembly, it happens because of energy minimization. Archetypical examples are structured block copolymers, nanoparticles, liquid crystals, and hierarchical supramolecular systems [3]. They find applications in data storage and structural colors, for instance [4]. On the other hand, dynamic self-assembly denotes a process in which the structure forms when the system is forcefully kept away from an energy minimum (out of equilibrium) by continuous energy supply and dissipation. Dynamic assembly is challenging to realize and understand because it cannot be predicted by energy minimization. The investigations of ferrofluid done in Ref. [1] rose interest in scientific society. The interplay between static and dynamic self-assembly and switching between them was studied in Ref. [1]. The manipulation of mobile magnetic ferrofluid droplets on a low-friction lotus-leaf-like superhydrophobic surface with an external magnetic field was examined in Ref.

[5-7]. They first showed how an external magnetic trigger can be used for creating self-assembled ferrofluid droplet populations from a single parent droplet. Then, they demonstrate that the static equilibrium patterns can be transformed reversibly to dynamic dissipative patterns by feeding them energy through an oscillating magnetic field.

This experimental study requires theoretical verification, so in this paper we consider static case of self-assembly and find the shape of the droplet and the reason for its fission. We explain all different cases of droplet behavior and do stability analysis to find the minimal value of the droplet radius which can be obtained by increasing the external field magnitude.

Discussion and Results: Mechanism of droplet division. Consider the following experiment. A neodymium magnet is brought close to a ferrofluid droplet suspended on a superhydrophobic surface. As the magnet approaches the surface, droplet starts to elongate, then as the field further increases it shrinks. Finally, at some critical point, the droplet divides into several parts. The split of the droplet therefore results from the interplay of high magnetic field and high vertical magnetic field gradient and, does not take place in a homogeneous magnetic field [1]. As the magnetic field increases in the vicinity of the droplet, the magnetized elements of liquid form chains to minimize magnetic energy. Moreover, the inhomogeneous magnetic field gives additional force that presses down the droplet. Let us consider a small deviation of the droplet shape. In this case the surface energy increases while the magnetic energy decreases, so the deformation in the horizontal plane is favorable and the droplet is unstable. Thus the splitting of the droplet is determined by the minimization of magnetic, surface and gravitational energy in such system. The droplet starts to divide as the value of magnetic field reaches critical point and to find minimal size of the droplet that can be achieved we need to find the relation between the volume of the droplet and magnetic field in the system.

Theoretical analysis of the dependence of critical magnetic field in which the droplet splits on the volume of the droplet. When an object is in the presence of magnetic field it acquires some magnetization. In the case of infinite object the magnetization is proportional to the strength of magnetic field, but in the real systems the magnetic field near the object deforms depending on its geometry and the magnetization is not proportional to the magnetic field. The magnetic energy of the objects depends on its magnetization and thus on its geometrical parameters. That is why the droplet initially deforms as we increase the magnetic field, the deformation of the droplet shape leads to the minimization of its energy. During the process of elongation and shrinking of the droplet the surface and the gravitational energy increase so we need to study the full energy of the droplet as a function of magnetic field. We will approximate the droplet shape by an ellipsoid, so its magnetization is proportional to the magnetic field but with an additional, demagnetization factor n .

Here M is the magnetization, H_{ext} is external magnetic field, n is demagnetization factor, χ is magnetic susceptibility.

This relation defines the magnetic energy of the droplet,

Here V is the volume of the droplet, μ_0 is vacuum permeability.

It is known, that for the sphere $n=1/3$ while for elongated ellipsoid $n<1/3$ so we see that indeed as the droplet elongates its magnetic energy decreases.

Let us consider full energy of the system

First of all we need to understand that the dependence of magnetization on the magnetic field strength is empirical and we find it experimentally for our specific ferrofluid

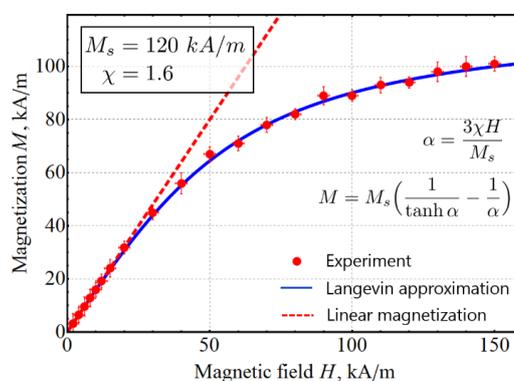


Fig.1 The dependence of magnetization on magnetic field.

We approximate this dependence by Langevin curve and will use this in further calculations.

Now as we can model the magnetization of the material, we can calculate the magnetic energy of the droplet by integrating over its bulk. Figure 2 demonstrates the dependence of the magnetic energy term and the full energy including the magnetic, gravitational and surface inputs as a function of the droplet elongation.

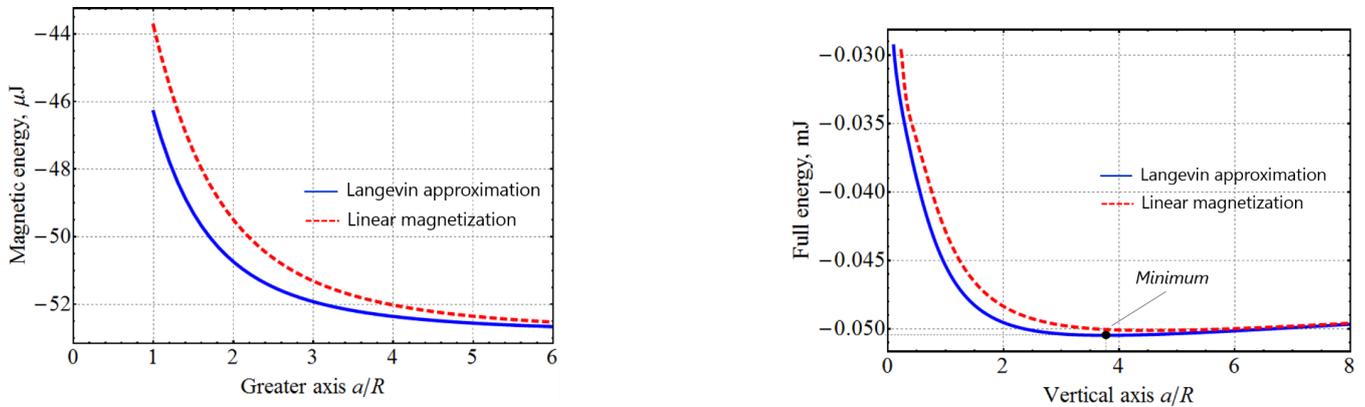


Fig.2 The dependence of magnetic energy on greater axis (left panel). The dependence of full energy on greater axis (right panel).

We find the magnetic energy to decrease with the elongation, but the full energy of the system has some minimum which is exactly the result of the different behavior of the energy terms when the aspect ratio of the droplet radii changes. The value of the critical axes of the droplet corresponding to the minimal energy is the one which the droplet acquires during the experiment.

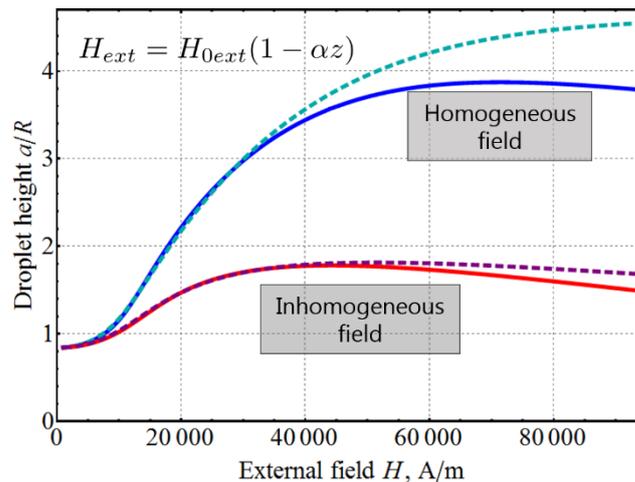


Fig.3 The dependence of droplet height on external field.

In Ref. [1] it was experimentally shown that the behavior of the droplet in the presence of the homogeneous magnetic field strongly differs from the case with the inhomogeneous magnetic field, so we take into account this effect theoretically. We show the dependence of the droplet height on the external field for the two cases (see Fig. 3). We see that taking inhomogeneity into the consideration leads to much shorter droplets, the fact which was experimentally observed in Ref. [1].

Conclusions: Thus, in the paper we show that the instability of the ferrofluid droplet is due to the minimization of the total energy of the system including the magnetic, surface and gravitational inputs. We thus find the droplet height as a function of the external field strength which can be experimentally observed. We take into account not only the field itself, but also its gradient thus show that the inhomogeneous fields lead to considerably different aspect ratios of the droplets.

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Наукове видання

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