

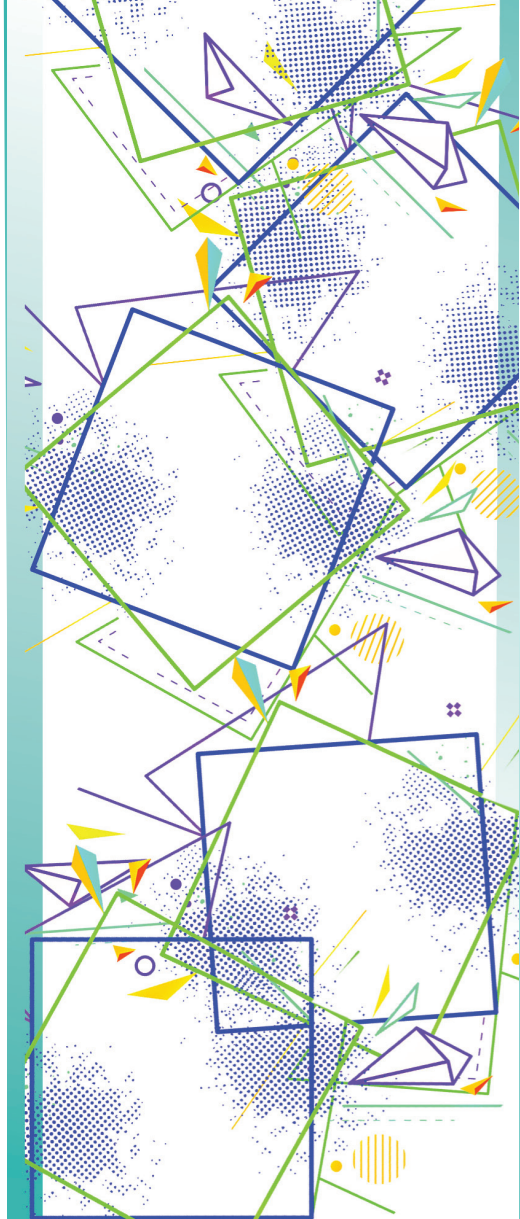
TOP-20 IDEAS

Of students
of Kyiv Minor Academy
of Sciences



Release 1

2018



Dear friends!

There is an unusual publication of the collection of the best ideas and works of students of Kyiv Minor Academy of Sciences for the last 2 years. Why is it unusual? Because it is the first. But, we hope that this collection will start up a wonderful tradition - to show the best works of our pupils among a wide range of Kyiv inhabitants.

History abounds with examples when some amazing tools that are still used today were invented by the children - water skiing, headphones, Braille font, and calculator – these children came out with an idea and made it a reality!

We offer you different ideas of students of Kyiv Minor Academy of Sciences: from technical inventions to poetry, from the establishment of a new chemical to the characteristics of one of the comets of the solar system. We are deeply convinced that such diversity conveys all the multifaceted nature of children's intelligence that is capable to novate in any areas of human activity, because the young intellect knows no boundaries and limits, and it is free of the fear of bold steps.

In 1718, the 12-year-old boy Benjamin Franklin invented the world's first swim fins. And in 1787 he became one of the authors of the Constitution of the

United States of America.

Perhaps, after a while, when the name of one of those 20 young researchers becomes famous far abroad from Kiev, each of you will have the opportunity to say: «But I saw how it all began!»

In any case, these boys and girls, whose ideas are presented in this publication, are those whom one of the «twenty» said perfectly - Maxim Riabokon: «Motivated students who have already sought to change the world for the better».

Young, smart, ambitious.

This collection is also an evidence of our confidence and faith in them. You see, they will succeed!

Director
of Municipal extracurricular educational
Institution
“Kyiv Minor Academy of Sciences for Youth”,
PhD in Chemistry

Irina Polyshchuk

Winners of the III International Forum
INNOVATION MARKET
November 21-23, 2018, Kyiv



Ksenia Abramovich

- Chairman of the Congress YOUNG AMBASSADORS OF PEACE, Kyiv;
- Bronze medalist of the 2nd stage of the All-Ukrainian competition-defense of research works of students of MAoS of Ukraine (2017).

Diana Akimova

- Bronze medalist of the All-Ukrainian competition-defense of research works of students of MAoS of Ukraine (2017);
- Golden medalist of the All-Ukrainian competition-defense of research works of students of MAoS of Ukraine (2018).

Vyacheslav Antsibor

- Gold prize winner of the contest «Intel-Techno Ukraine 2017-2018»;
- Silver winner of the International Student Olympiad in Ecology 2018;
- Silver prize winner of the All-Ukrainian Energy Efficiency Youth Projects Contest «Energy and Environment-2018»;
- Silver prize winner of the All-Ukrainian competition-defense of research works of the students of the Ukrainian Academy of Sciences from 2017-2018;
- Superfinalist of the national stage of the international competition of creative work of school youth of Intel-ISEF in the framework of the VI International Sikorsky Challenge Innovation Festival 2017;
- Silver winner of the contest «All-Ukrainian Junior Water Prize 2018».

Victoria Verkhovetskaya

- The holder of the diploma and cup in the category «Best invention of the year among young people» at the All-Ukrainian contest «Invention of the Year»;
- Laureate of the Kyiv City Mayor Award;
- Prize winner of the All-Ukrainian competition Intel Eco-Ukraine 2017;
- Prize winner of the All-Ukrainian Biological Forum for Students and Students «Touch of Nature» (2016).

Dmytro Kyrychenko

- Silver prizewinner of the All-Ukrainian competition-defense of research works of the students of the Academy of Sciences of Ukraine (2018);
- Winner of the All-Ukrainian contest-defense of pupils' literary works «Become a writer» from the Institute of Philology of the Kyiv Taras Shevchenko University;
- Winner of the XV Municipal Contest of Young Poets «Poetic Spring», winner of the essay contest «Antiwear» from Mystetskyi Arsenal.

Anna Kachkovskaya

- Silver prize winner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2017);
- Winner of the XV International Scientific Conference of Students and Young Scientists «Shevchenkivska Spring: Achievement of Biological Science / BioScience Advances» (2017).

THE TREASURE TROVE

Timofei Nagorny

- Silver prizewinner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2015).

Pavlo Glukhovsky

- Gold prizewinner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2018);
- Laureate of the President's scholarship;
- Many-time winner of All-Ukrainian student Olympiads.

Anna Gusak

- Silver prize winner of the All-Ukrainian contest «Intel Eko-Ukraine 2018»;
- Silver prize-winner of the All-Ukrainian Biological Forum for Students and Students «Touch of Nature 2017»;
- Silver winner of the contest «All-Ukrainian Junior Water Prize 2017».

Yana Zhabura

- Silver medalist at the 29th European Union Contest for Young Scientists (EUCYS) 2017 (Estonia, Tallinn);
- Participant of the Stockholm seminar of young scientists (SIYSS);
- Holder of the diploma of the winner of the All-Ukrainian competition-defense of scientific research works of the students of the Academy of Sciences of Ukraine (2017).

Mykola Ivanchenko

- Winner of the International Natural Science Game «Helianthus» (2015);
- Gold medalist of the All-Ukrainian scientific and technical competition Intel ECO Ukraine (2017);
- Winner of the national stage of the International competition for scientific and technical creativity of students of Intel ISEF 2017;
- Gold Prize GENIUS Olympiad (2017);
- Bronze winner of the International Festival of Engineering Sciences and Technology I-Fest 2018 (Tunisia);
- Winner of the International Expo Science International MEXICO 2018 Science Competition (Michoacan, Mexico).

OF VICTORIES

Maxim Ryabokon

- Bronze medalist of the International Olympiad on Astronomy and Astrophysics (Beijing, China, November 2018);
- Three times the winner of the scholarship of the President of Ukraine;
- Gold prizewinner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine in the section «Astronomy and Astrophysics» (2018);
- Three times the winner and prizewinner of student Olympiads in physics;
- Bronze medalist at UNIT.CITY Olympiad in 2018;
- Member of the International Summer School of Physics at CERN (Switzerland).

Elizaveta Stolyarchuk

- Silver prizewinner of the II stage of the All-Ukrainian competition-defense of research works of the students of the National Academy of Sciences of Ukraine in 2017 in the section «Mechanical engineering and robotics»;
- Winner of the 15th International Olympiad in Linguistics (Dublin);
- Winner of the national selection of the XVI International Olympiad in Linguistics (Prague);
- Participant of the contest «POLYTECO Ukraine 2018-2019»;
- Sikorsky Challenge 2018 competition winner of the start-up competition;
- Bronze medalist of the IX All-Ukrainian Scientific and Technical Exhibition-Competition for Youth Innovation Projects «Future of Ukraine» and the winner of the 2nd Belt and Road Teenager Maker Camp and Teacher Workshop (Beijing).

Nikita Sazonov

- Silver prizewinner of the All-Ukrainian competition-defense of research works of the students of the Academy of Sciences of Ukraine (2018);
- The winner of the competition «POLYTECO Ukraine 2018-2019» - the national stage of the International competition of scientific and technical creativity of students Intel ISEF;
- Holder of the Diploma «Future of Ukraine» within the framework of the All-Ukrainian Festival of Innovation Projects «Sikorsky Challenge 2018».

Nataliya Monina

- Gold prizewinner of the national stage of the International competition of scientific and technical creativity Intel ISEF Students - Intel-Techno Ukraine 2017-2018;
- Gold prizewinner of the All-Ukrainian Scientific and Technical Exhibition-Competition of Youth Innovative Projects «Future of Ukraine» (2017);
- Gold prizewinner of the All-Ukrainian competition-defense of scientific research works of student pupils of the Academy of Sciences of Ukraine (2018);
- Holder of the diploma of the National Security and Defense Council of Ukraine;
- Laureate of the President's scholarship.

Danylo Kovalenko

- Gold prizewinner of the All-Ukrainian competition-defense of research works of the students of the Academy of Sciences of Ukraine 2016-2017;
- Bronze medalist of the national stage of the International competition of scientific and technical creativity of the students of Intel ISEF «Intel-Techno Ukraine 2017-2018»;
- Bronze prize-winner of the All-Ukrainian competition-defense of scientific research works of students of the Academy of Sciences of Ukraine (2018);
- Winner of the Class Idea Festival start-up in the «Startup for a Man» nomination (2018);
- Holder of the winner's diploma of the Startup Competition of the 7th Sikorsky Challenge 2018 Festival of Innovative Projects;
- Holder of the certificate from the Leonid Kuchma Foundation «Ukraine» to «Sikorsky Challenge 2018».

Maria Sokulska

- Bronze medalist of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2018);
- Bronze prize-winner of the All-Ukrainian Student Olympiad in Ecology (2018).

Anastasia Tsilyk

- Bronze prizewinner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2016);
- Silver prize-winner of the All-Ukrainian competition-defense of research works of students of the Academy of Sciences of Ukraine (2017).

Mykhailo Komashnia

- Silver winner of the national stage of the International competition of scientific and technical creativity of the students of Intel ISEF «Intel-ECO Ukraine 2017-2018»;
- Gold prizewinner of the All-Ukrainian competition-defense of research works of the students of the Ukrainian Academy of Sciences from 2017-2018;
- Scholarship student of Kyiv City Council in the field of education for gifted children of Kiev;
- Winner of the Kyiv Classic Ideas Festival 2017;
- Laureate of the Kyiv City Mayor's Award for special achievements of youth in the development of the capital of Ukraine – city-hero Kyiv in the nomination «Scientific achievements».

Sergey Lysin

- Silver prizewinner of the national stage of the International competition of scientific and technical creativity of the students of Intel ISEF «Intel-Techno Ukraine 2017-2018»;
- Bronze winner of the International Competition of Computer Projects «Infomatrix 2018», the winner of the 2nd Festival of Startups «Class Idea» in the nomination «Startup in Nature» 2018;
- Prize winner of the national stage of the International competition of scientific and technical creativity of students of Intel ISEF «POLYTECO Ukraine 2018-2019»;
- Holder of the Leonid Kuchma Foundation Certificate «Ukraine» at the 7th Sikorsky Challenge 2018 Festival of Innovation Projects;
- Gold prizewinner of the All-Ukrainian Scientific and Technical Exhibition-Competition for Youth Innovation Projects «The Future of Ukraine» (2018).

Ksenia Abramovich

The student of grade 11 of a school No.85 of I-III levels with English-intensive curriculum in Kyiv, the student of the section “Sociology” of the Department of Philosophy and Social Science at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”.



«THE PUBLIC MOVEMENT» CHILDREN - THE AMBASSADORS OF PEACE «AS ONE OF THE FACTORS IN THE FORMATION OF THE CIVIC CONSCIOUSNESS OF YOUTH»

In December 2014, a well-known journalist and People’s Deputy, Sergey Leshchenko, published his article “We are humus” the online publication “The Ukrainian Pravda”. The idea of the article was that the then political elite of the country was humus, on which a completely new generation of politicians should appear.

With high probability, it can be said that “the sprouts” of this new generation of politicians with a qualitatively new political culture, are already appearing in our country.

At 16 years old, Ksenia is the *Chairman of the Congress of Young Peace Envoys «The entire world for peace» and the Young Peace Ambassador*. Her credo is a statement attributed to Confucius “**Three things never repeat: time, word, opportunity. And therefore: do not waste time, choose words, do not lose opportunities.**” Therefore, Ksenia is looking for opportuni-

ties, devotes time to convince with words and deed as many people as possible in this world, the peace is the only acceptable form of human existence. One of the works of the young researcher of the civil rights’ movement in Ukraine is the creation of a campaign video called “**I give my vote for peace**” (https://www.youtube.com/watch?v=D94YJUGe1fI&fbclid=IwAR2O2ESisKM_N9vez11avstezWX3W80OK5ra8QX-MhjpVoKvCDzb0Z5WUYy). Refrain pass words are in three languages: «Children cry in one language.» And the Peace Ambassador from Japan, Nobuko Omari was so impressed by this film that its text was

translated in Japanese and English, and she presented this work in Japan and other countries where she was on a peacekeeping mission.

As you have probably guessed, Ksenia’s research is a theoretical generalization of her many years’ practical activity, which was triggered by the events of Maidan in 2014, and Ksenia says that: “*The social movement of partnership and mutual assistance, which were particularly evident at the “Euromaidan, laid the foundation for the development of the civil society and the new Ukrainian democracy. It generates new forms of civil society institutions*

SUPERVISOR

The prime example of the social activity of young Ukrainians is the social movement “Children - Ambassadors of Peace”. The young messengers of Peace demonstrate their readiness to embody the ideals of life for the sake of others, to help solve problems that stand in the way of the world peace; develop respect for the person and his life values; learn throughout life; to realize the key competences of a person of the 21st century — individuals, innovators, patriots. Ksenia Abramovich’s research is a unique combination of scientific research and social activities.

Khoroshenyuk Andrey Pavlovich

PhD in Education, Associate Professor of Department of Marketing and Behavioral Economics at KROK University, Political Expert, Excellence in Education of Ukraine

in Ukraine.

We are talking about a new generation of Ukrainian youth and its dynamic networks of activist groups; they solve problems that are urgent for society

Idea:

social movements and associations should be a significant factor in the process of state-building in Ukraine

without a long-lasting inefficient bureaucratic routine of state institutions.”

According to the author, “the general public is attracted to the active state power through the public associations, socio-political movements, political parties, as well as the political and economic interests of one or another part of society (people, nation, and social group) are realized and protected. They are a form of supporting networks between civil society and the state.” Ksenia argues that the degree of development of the social movement in the country is one of the indicators of the development of democracy in the country.

The public movement “Congress of Young Peace Envoys” has already held numerous peacekeeping actions: “*Angels are nearby*», where the movement

INDEPENDENT EXPERT

Perhaps it’s high time to unite the efforts of the public and people of goodwill and help the authorities to decide fruitfully and seek compromises of world balance. The movement “Children - Ambassadors of Peace” contributes its share to world peacemaking efforts. I want to urge the young peacemakers to become worthy followers of the patriots of the Motherland, to preserve and increase the efforts of their predecessors towards prosperous democratic Ukraine. (From the appeal to the V Congress of Young Peace Messengers of the Movement “Children - Ambassadors of Peace”)

Leonid Kravchuk,

First President of Ukraine, Chairman of the Ukrainian Council of Peace



participants collected toys, books and stationery for children living in the territory of the ATO; thematic exhibition «The Wall of Peace and Goodness»; the action «Umbrellas of the World», «Tablecloth of the World» and many others.

The main message of Ksenia’s activities and research: “**The speech of reasonable balanced diplomacy is more convincing and understandable to people all over the world than the language of violence and cannons.**”

Uncommon intelligence and noble

goals - this is the combination that allows you to believe in the future of progressive humanity, a peaceful future!



Diana Akimova

1st-year student at Taras Shevchenko National University of Kyiv, the student of the section "Geology, Geochemistry and Mineralogy" of the Department of Earth Sciences at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«INFLUENCE OF THE STRUCTURE AND PROPERTIES OF GRANITE OF THE BOGUSLAV DEPOSIT ON THEIR SPHERES OF THEIR USE»

The wise Solomon said: «Time to scatter stones and time to collect it». But Hebrew translators claim that the correct translation of this phrase should be: «It's time to collect stones and time to form it». In this case, it is about the use of stones as building material: in autumn they made fences of land.

Throughout the time, the humanity actively continues to use stones not only in the construction industry, but also in other spheres of economic activity.

Akimova Diana's research is devoted to the study of the properties of granite Bohuslavsky deposit and to determine the areas of their possible use.

Interestingly, the granite of this location is more than 2 million years old! Imagine how much time the nature has «cherished» this gift for us, but how

responsible we should treat them!

Diana's research helps to solve the problem of the sustainable use of the rocks of the Boguslavsky deposit. A young geologist studied samples of granites from quarries near the village Deshky, Misailivka, Rozkopantsi and town Boguslav.

Diana made a complex physicochemical characterization of granite of the Boguslavsky deposit; at M.P. Semenenko Institute of Geochemistry, Mineralogy and Ore Formation of the National Academy of Sciences of Ukraine she carried out

petrographic studies, that is, she did a description of microstructure of the samples of granite.

Today, in science and industry there is such a relationship between the characteristics of granites and the areas of their use: colour affects the decorative features and the corresponding use area; density, texture and heat conductivity - for its suitability for the disposal of radioactive waste; hardness and blockiness - for use in construction; granularity and chemical properties - for use in the ceramic industry.

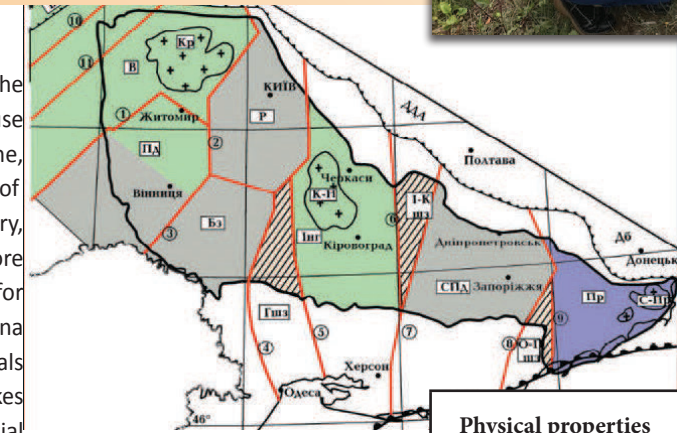
Idea:

Boguslavsky deposit granites are most suitable for use in the building and ceramic-porcelain industry, which are not suitable for the preservation of radioactive waste (established on the basis of well-conducted mineralogical research)



Sample selection at careers of v.Rozkopantsi

Diana has proved that the granites of the Boguslavsky deposit are suitable for use in construction (such as crushed stone, granite screenings, for the manufacture of concrete) and ceramic-porcelain industry, moderately suitable for facing (more quickly destroyed) and unsuitable for the isolation of radioactive waste. Diana found that the high content of minerals in the rock from the quarry Deshky makes it possible to consider new potential directions for the use of granite rocks of the Boguslavsky deposit (as ceramic and abrasive raw materials). The results were transferred to the quarry's administration v. Deshky, and now the experts carry out a supplementary scientific research on the profitability of this area of nature use.



Scheme of the lithosphere of the Ukrainian Shield

Characteristics of Boguslav Granites

Physical properties	An indicator for the Boguslav deposit
density	2,66-2,70 f/cm3
volumetric mass	2,63-2,65 %
water absorption	0,11-0,28 %
compressive strength	117-150 MHa
coefficient of softening	0,81-0,96
mark of frost resistance	Mps «35»

SUPERVISOR

The author brilliantly mastered the methodology of petrographic studies, which allowed not only to study the petrographic composition of samples, but also to determine the diagnostic features of primary and secondary processes, to identify certain stages of the genesis of minerals, to assess the nature of genetic changes in the rock. Diana Akimova concluded that most granites of the Boguslav field are suitable for use in construction (mainly as crushed stones and granite screenings, less for cladding) and ceramic and porcelain industry; marked the important scientific significance of the study of granite rocks to solve various fundamental scientific problems.

Doroshkevich S.P.,

Senior Researcher of the Paleogeography Sector at the Institute of Geography of the National Academy of Sciences Ukraine, Candidate of Geographical Sciences

INDEPENDENT EXPERT

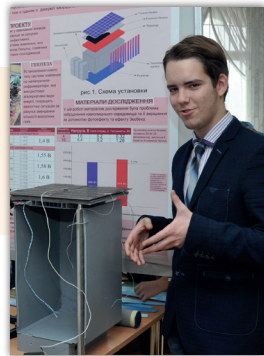
The relevance of the work of Akimova Diana consists in studying an important component of natural resources of Ukraine - granite rocks. Due to its high density, hardness, strength and frost resistance, granites are widely used as building material and, especially, as decorative stones. In addition, the study of the features and properties of granites, as well as other rocks, is important, as it helps to solve a number of other important fundamental scientific tasks regarding their genesis, age, composition, features of distribution, etc.

Spytsa R.O.,

Senior Researcher, Head of the Geomorphology Sector of the Institute of Geography of the National Academy of Sciences of Ukraine, Candidate of Geographical Sciences

Vyacheslav Antsibor

1-st year student of National Technical University of Ukraine (NTUU) Igor Sikorsky Kyiv Polytechnic Institute, the student of the section «Scientific and technical creativity and invention» of the Department of technical sciences at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”



«THE USE OF ALTERNATIVE SOURCE OF ENERGY, A NEW COOLING SYSTEM FOR SEMI-PRECISION-REFRIGERATORS»

Perhaps it is not an exaggeration to assert that there are no people in Kiev who didn't “appreciate” the air in the megalopolis in a hot summer day. Although the air-quality in winter is not better too.

The invention of Vyacheslav Antsibor may help to improve the air-quality for better environment and health. But the problems of cleaning up the air should be resolved jointly.

Vyacheslav is fully convinced in his own arguments as for benefits of his invention; he inspires others with his faith: “As is known, an internal combustion engine is one of the largest sources of environmental pollution. Over the past decades through the massive development of mechanical engineering the number of such engines has increased at an incredible rate due to the high demand for them. Therefore,

hundreds of millions of liters of fuel are spent every day to maintain their work. The result is that their exhaust pollutes the environment, gradually destroying our planet.

The use of leaded gasoline (Tetraethyl lead), containing toxic lead compounds, causes the contamination. More than 70% of the added lead to gasoline with ethyl liquid get into the air during the operation of the internal combustion engine, 40% of which

remain in the air and get into the human lungs, while the remaining 30% precipitate on the ground.”

Components	Component content, %		Note
	Carburetor ICE	Diesel ICE	
N ₂	74 – 77	76 – 78	non-toxic
O ₂	0.3 – 8	2 – 18	-
H ₂ O (steam)	3 – 5.5	0.5 – 4	-
CO ₂	5 – 12	1 – 10	-
H ₂	0 – 5	-	toxic
CO	0.5 – 12	0.01 – 0.5	-
NO ₃	to 0.8	0.0002 – 0.5	-
C _n H _m	0.2 – 3	0.009 – 0.5	-
Aldehydes	to 0.2 mg/l	0.001 – 0.09 mg/l	-
Soot	0 – 0.04 g/m ³	0.01 – 1.1 g/m ³	-
Benzopyrene	10 – 20 mcg/m ³	to 10 mcg/m ³	-

Table 1. The main elements that are part of the waste from the work of ICE

SUPERVISOR

Vyacheslav Antsibor has developed a new type of cooling of solar panel, which will help to increase the efficiency of the power supply system; he counted the possible economic effect of implementation of his idea into life. The relevance of the work and its practical significance are beyond doubt when the environmental problems with the air pollution caused by emissions from gasoline and diesel cars are rampant.

Mikulenok I.A.,

Professor of Chemical, Polymer and Silicate Engineering at National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute» Dr. Tech. Sciences, Prof., Art. Senior Scientist, honored inventor of Ukraine

So what to do?

Vyacheslav proposes to use instead of a gasoline generator an alternative power

battery, is transferred to one of the covers of the Peltier elements, and the other is

Idea:

The author offers an ecological, simple and cheap way of providing energy to mobile semi-trailers, replacing gasoline and diesel engines with the solar panels that are placed directly on the roof of the refrigerator.

source and its new cooling system for semi-refrigerated semi-trailers.

How does it work?

“In the daytime, a solar battery converts solar light into electricity that accumulates in batteries. As is known, the solar battery, during its operation, heats up, which leads to Energy conversion efficiency drop and reduces the duration of work. Therefore, it was decided to install a system that consists of Peltier elements, heat sink tubes and radiators for converting thermal energy into additional electrical energy by means of heat removal.

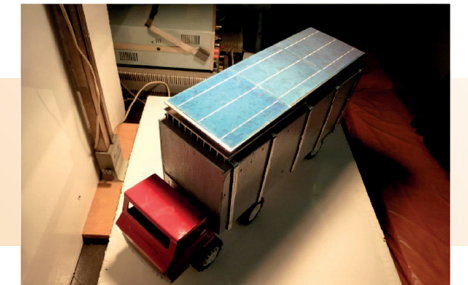
Due to this arrangement of the elements, the heat that is released from the solar

supplied with a passive cooling system, which is installed on the semi-trailer. This system consists of heat sink tubes and two radiators. Thanks to this construction the excess heat energy is diverted from the solar panels and converts into electricity, as a result of which the potential age of the solar battery and its average efficiency increase.”

Why is it worth introducing?

“Such a power supply system will solve the air pollution problem, because the harmful gases are not emitted during the working of the alternative power system. In addition, such a system will be more cost-effective than a gasoline generator, for the reason that the main costs of such

a system will go only to support it, while a gasoline generator requires costs for input



materials, for example, gasoline or diesel fuel. Moreover, such a system can operate at sufficiently low temperatures, which is not always possible for diesel generators.

Thus, this power system will be able to address shortcomings, which characterize the gasoline generators:

- the dependence of the power system of the refrigeration unit on the fuel;
- harmful emissions into the atmosphere;
- high economic costs for fuel and oils”.

The young inventor has calculated that his developed system becomes economically responsible in 3-5 years!

Responsibility, as well as a scientific and creative approach to the problems of ecology of the modern world, give a chance not to forget what “clean air” is ...

INDEPENDENT EXPERT

The scientific work of Vyacheslav Antsibor is a complete scientific research, which is devoted to the problem of search for the alternative, environmentally friendly energy sources. The introduction of his project will reduce the amount of emissions of combustion products into the atmosphere, that is, to minimize the environmental pressures on the environment. The results of the work are of great practical value.

Stepanyuk A.R.,

Ph. T. N., Associate Professor of the Department of Machines and Apparatuses for Chemical and Oil Refining Industries at NTUU Igor Sikorsky Kyiv Polytechnic Institute»

Victoria Verkhovetskaya

2-nd year student of the Faculty of Chemical Technology Poznan University of Technology (Polytechnic, Poznan), a student of the section «Chemistry» of the Department of Chemistry and Biology at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«SYNTHESIS OF NEW MEDICATIONS ON THE BASIS OF CAGE COMPOUNDS»

Influenza – is a common illness that has been known for several millennia. During the epidemic, hundreds of millions of people worldwide are affected by the flu, which causes significant economic damage to countries and worsens public health.

The peculiarity of the virus is its mutation, which causes difficulties in the creation of new medications.

In 1965, American scientists developed a medication Rimantadine that was considered one of the best methods of prevention and treatment of this disease. However, due to the mutation of the influenza virus, the effectiveness of that medicine has significantly decreased, and the toxic effect on the human body has increased.

Victoria has found a way to improve the quality of existing medicines on the market.

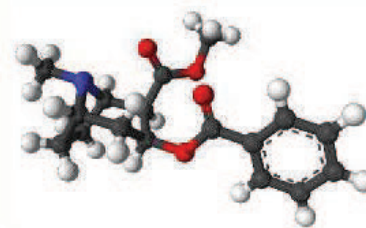
A young researcher proposed to introduce fluorine substituents into Rimantadine molecule, which in turn increases its lipophilicity (ability to dissolve in fats), biological availability, and also positively affects the stability of the substance and its metabolism (metabolism and energy) in the human body. High lipophilicity and volumetric structure of a particle during its introduction into the molecule of various biologically active compounds greatly modify their pharmacological action.

We should add that the inclusion of the fluorine atom into drug molecules is very common. About 20% of pharmaceuticals in the market have at least one fluorine atom.

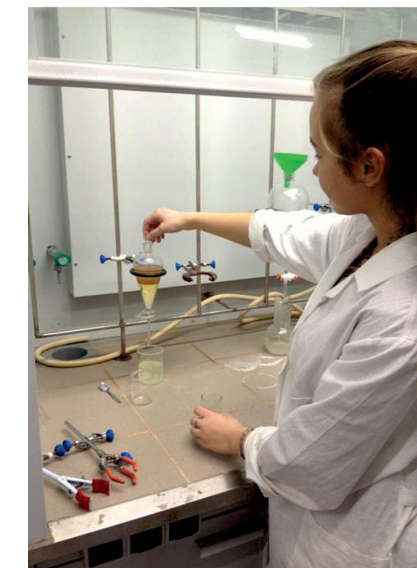
An important advantage of drugs based on cage compounds is the availability of raw materials for their manufacture. Unlike natural compounds, fossil carbohydrates are derived from petroleum or products of its processing, which are available in organic synthesis products.

Idea:

It has been developed a new method for the synthesis of two analogues of anti-influenza medicine of Rimantadine, which will be effective against the influenza virus.



As a result of the research, Victoria developed a new and easy method of synthesis of two analogues of the anti-influenza medication Rimantadine, which will be effective against the influenza virus. These drugs have anti-toxic and immunomodulatory effects, and can also be used to treat herpes simplex and tick-borne encephalitis.



THE VIRUS IS INSIDIOUS, AND THE HUMAN IS SMART. THE VICTORY WILL BE IN INTELLIGENCE!

SUPERVISOR

Verkhovetskaya Victoria made the synthesis of derivatives of cage compounds, potentially biologically active substances, which can be used to create new drugs after further research and development.

The subject of Victoria's research is extremely relevant. This is due to the emergence of a large number of new mutated strains of the influenza virus, which are practically not affected by the drugs existing in the pharmaceutical market, therefore many leading pharmaceutical companies are working on the creation of anti-influenza drugs of the new generation.

Lewandowski I.O.,

PhD in Chemistry, Senior Lecturer of the Department of Organic Chemistry and Technology of Organic Substances at NTUU "Igor Sikorsky Kyiv Polytechnic Institute"

INDEPENDENT EXPERT

The work of Verkhovetskaya Victoria Viktorovna is devoted to the development of effective and safe new generation drugs against mutant strains of the influenza virus, which is an extremely topical issue now. The creating of new drugs is a very responsible, complex and multi-stage study. Verkhovetskaya Victoria independently conducted all experiments, analyzed the results and made relevant conclusions.

Kushko A.O.,

Senior Lecturer of the Department of Organic Chemistry and Technology of Organic Substances at NTUU "Igor Sikorsky Kyiv Polytechnic Institute"

Pavlo Glukhovsky



1-st year student of Taras Shevchenko Kiev National University, a student of the section «Mathematics» of Department Mathematics, at municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"

«QUADRICS AND N-DEGREE EQUATIONS. BUILDING OF REGULAR POLYGONS»

The German mathematician David Hilbert argued that there is always a subject of study in geometry: "In a huge geometry garden, everyone can choose a bouquet to his taste."

The "bouquet" that Pavel Glukhovsky has chosen for himself is the task in construction.

So, Pavlo Glukhovsky says:

The solution of construction tasks is one of the oldest branches of mathematics. It is necessary to draw an exact image of certain figures, using only the tools specified in the condition. The most famous and oldest such construction tools are dividers and a ruler (it is important to remember that here the ruler has no divisions, that is, it helps to draw only a straight line and not measure the distance). However, even the ancient mathematicians were faced with some problems that could not be solved using only the so-called

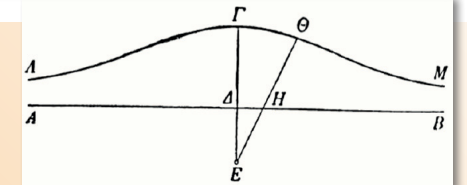
«Plato» methods. That was when the new construction tools were invented, such as French curve rulers (for drawing parabola, hyperbola, and ellipse) and Nicomedes conchoids.

For a long time it was not clear, you can still do without their use in some tasks. The answer to this question was finally given by Gauss in the 18th century. For the first time, he applied analytical methods in construction problems.

Considered in the work, logically continues the preliminary: which tasks are unsolvable even with the help of

Idea:

It is shown the practicality and efficiency of non-use of Plato's methods for solving construction problems; proved the effectiveness and relevance of the use of the Gauss method in the solutions of tasks in construction in geometry.



On the basis of all the facts described above the great mathematicians Gauss (1796) and Wantzel (1836), proved the sufficient and necessary conditions for the building of the regular n-gon with a divider and a ruler.

Johann Goethe found an interesting thing in the mathematical language: "Mathematicians are like the French: whatever you say, they will translate everything in their own language. It turns out the opposite. "If we try to interpret this phrase from the opposite, then we can conclude that translating from the language of mathematics, we can expect completely different meanings. So, in order not to distort the content, let us give the floor to the young researcher, he will tell about his research better in the language of mathematics!

conic sections, that is, which constructions are impossible to perform, using also French curve rulers?

In the work:

1. *The well-known but insufficiently explored mathematical objects, such as conical sections and conchoids (tools for performing constructions on a plane) were investigated.*

2. *It has been proved that it is impossible to solve such classical problems as building a cube twice as large for a given one and dividing the angle into three equal parts using Plato construction methods (by dividers and rulers).*

3. *In conjunction with the Gauss-Wantzel theorem, it has been established what regular polygons can be constructed with these tools and which ones cannot (that is, remain only our fantasies).*

4. *It is clearly defined which of the geometrical objects in general can be constructed using dividers, rulers and conic sections, and which ones cannot.*

Here is a real "bouquet"! And that's all so clearly that if added something, then again only in-depth study.

In general, the theorem is as follows: the regular n-gon can be constructed using only a divider and a ruler if and only if $n=2^k \cdot p_1 \cdot p_2 \cdot \dots \cdot p_n$, where $k \in \mathbb{N}$, and p_1, \dots, p_n are different simple numbers of Fermat, that is, simple numbers of the form $p_i=2^{2^i}+1$, where $k \in \mathbb{N}$, as an arbitrary number of the form 2^N+1 , where $N \in \mathbb{N}$ actually can only be among the numbers of the form $2^{2^j}+1$, where $j \in \mathbb{N}$

We have $p^{k-1} \cdot p - 1 = 2^m$

So:

$$\begin{matrix} p^{k-1}=1 & k=1 \\ p-1=2^m & p=2^m+1 \end{matrix}$$

We got two results at once:

- 1) any simple divisor of the number n is greater than 2, it is a prime number of the Fermat;
- 2) any simple divisor of the number n, has the degree of entry in n, equal to one.

So,

Either $n=2^k$, or $n=2^k \cdot p_1 \cdot \dots \cdot p_l$ are different simple numbers of Fermat

As was to be proved.

SUPERVISOR

In this research work, Pavlo Glukhovsky investigates how to build a regular n-gon using not only a divider or a ruler, but with French curve rulers (for drawings parabolas, ellipses and hyperbolas), or using an insertion method. He proved that with the help of these tools it is possible to build a regular n-gon only if all primary divisors of n, except 2 and 3, have the form $2^m 3^k + 01$ and are included in the number n raised to the first power only. This is an exact analogue of the Gauss theorem for this case.

Drozd Yu.A.,

Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Physical and Mathematical Sciences, Professor, Head of the Department of Algebra and Topology of the Institute of Mathematics of the National Academy of Sciences of Ukraine

INDEPENDENT EXPERT

In this research work, Pavlo Glukhovsky demonstrates a good knowledge of field theory and the ability to apply its methods to solve specific problems of algebra and geometry. It is the qualitative research, conducted at the appropriate scientific level and in the pure mathematical language. The results are original.

Nazarenko N.O.,

Candidate of Physical and Mathematical Sciences, Senior Researcher, Associate Professor at the Faculty of Mechanics and Mathematics, Taras Shevchenko Kiev National University

Anna Gusak

The student of grade 11 of a special school #254 in Kyiv, a student of a section "Chemistry" of Department of Chemistry and Biology at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«REMOVING AN ARSENIC COMPOUND FROM WATER MEDIUM USING THE GRANULAR ADSORBENT»

Roars and groans the Dnieper wide.

If our Kobzar wrote these lines today, he would put a completely different meaning in them. After all, how can the biggest water source of Ukraine not moan, when every day, even every minute, those who also use it every day, even every minute use it, - people? ..

If you have not already known this or simply did not think about it, remember now: whenever your washing machine has finished washing, you have contributed to those 75% of phosphates, which is one of the bases of our life, which is polluted by municipal wastewater - our Slavutich. It is difficult to calculate how many living organisms - «inhabitants» of the Dnieper die after each washing, but they die, and this we break under our very and very important branch for us ...

Anna Gusak has already started to

fight with it. To ensure that our Dnieper and other Ukrainian reservoirs soon do not turn into what we pour into them, she has invented a method for measuring the level of water pollution with phosphorus as quickly and efficiently as possible.

Didn't there have been methods for measuring phosphate content in water before Ann's invention?

Of course, they existed. But her method: 1) fast; 2) cheap; 3) accurate. 3 in 1 did not exist!

So, even if you are not a chemist on a specialty, it is not difficult for

you to understand the technology of manufacturing a new indicator of phosphates in water by the method of Anna Gusak:

1. Dissolve and mix 3 components: Silica gel + paint component Arsenazo I + Zirconium salt (the first two components are organic substances).

2. The required substance is required: filter - dry.

If we complete the whole algorithm, we will get a reagent that will help us, even at home, determine what will be the cost of the land that feeds us and the water we

drink, our next washing: because the detergent toxicity can be measured, without leaving the bathroom. And, perhaps next time, each of us will choose the detergent, after which

phosphorus in water is required: it can be produced on existing production lines.

Our Dnieper is worth it...



Idea:

to develop a low-budget reagent for measuring the level of phosphates in water at the enterprises and at home.

you can say to yourself: **«I do not poison the world in which I live».**

But, of course, the meaning of Ann's opening goes far beyond the bathroom.

This technology can be used in wastewater treatment plants: before you can «open the gateways» to municipal wastewater for entering the Dnieper, such a readily and cheaply produced reagent can measure the level of phosphates in them. And if the analysis shows that we are destroying the world around us, it is necessary to send water to recycle and to clean again.

No new equipment for the production of a new indicator of

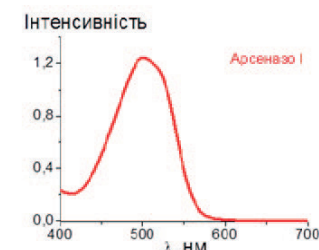


Fig. 1. Spectrum of aqueous solution of Arsenazo I.

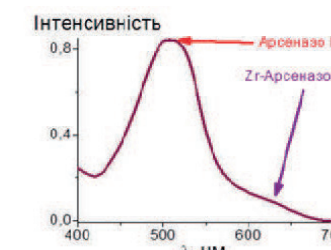


Fig. 2. Spectrum of aqueous solution of Zirconium-Arsenazo I.

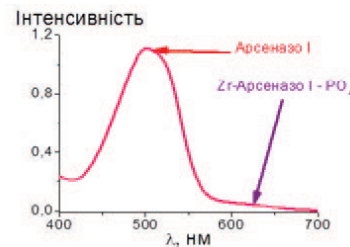


Fig. 3. Spectrum of aqueous solution of Zirconium-Arsenazo I and adding a solution of phosphate to it.

Table 1. Results of photometry of the investigated solutions.

The compound	A500	A575
Arsenazo I.	1,245	0,028
Zirconium-Arsenazo I.	0,843	0,197
Zirconium-Arsenazo I.-phosphate	1,110	0,095

SUPERVISOR

The work of A. Gusak on the task of detecting phosphates began at the Department of Analytical Chemistry of Taras Shevchenko Kiev National University and nowadays, along with the study of adsorption of arsenic compounds, she continues to study at the Department of technology of inorganic substances, water purification and general chemical technology at NTUU Igor Sikorsky Kyiv Polytechnic Institute». This work is promising both in scientific and in practical, it can and should be continued in the aspect of studying the pseudo-negative test of certain substances on phosphates.

Litinska M.I.,

Assistant at the Department of technology of inorganic substances, water purification and general chemical technology at NTUU «Igor Sikorsky Kyiv Polytechnic Institute»

INDEPENDENT EXPERT

The work has the potential in the field of analytical chemistry of phosphates and the prospect of refinement. For example, neutralizing the influence of other cations on the formation of the metal-Arsenazo complex. In general, the work is interesting and relevant for further development.

Kontsevyi S.A.,

PhD in Technical Sciences, Associate Professor of Department of technology of inorganic substances, water purification and general chemical technology at NTUU «Igor Sikorsky Kyiv Polytechnic Institute»

Yana Zhabura

1-st year student of National Technical University of Ukraine (NTUU) Igor Sikorsky Kyiv Polytechnic Institute, the student of the section «Scientific and technical creativity and invention» of the Department of technical sciences at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”



«EXTENDING THE TECHNICAL CAPABILITIES OF THE DELTA - ROBOT»

The using of robots in manufacturing process is a common thing.

Yana Zhabura dedicated her research to endowing even greater possibilities with the existing model of this human assistant.

Do you know what a delta robot is? This is a type of parallel manipulator, that is, a robot, which has several levers that combine a fixed base with an instrument, as opposed to a sequential one, which has one “hand” in common. Just as it is more convenient for a person to pick fruits from a tree with one hand, and pull up on a branch with two hands, so the robots do the same: sequential work is better suited for some types of tasks, parallel for others.

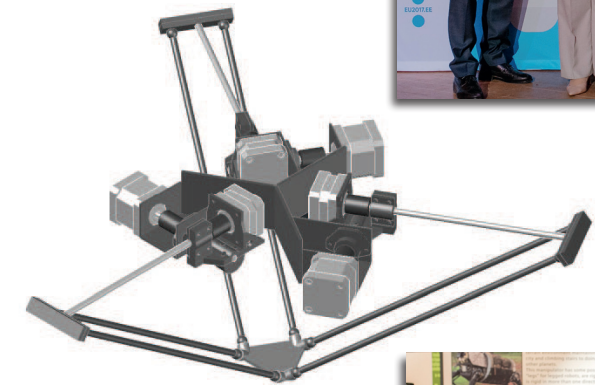
Available models of the parallel robots have many benefits, including ease of working part and high speed, but they are little used in industry, as in some designs the working area is limited, while others do not have a lack of degrees of freedom (that is, they can be performed all the actions which are necessary for many applications). Yana Zhabura decided to fix it: to combine the necessary benefits in one job.

These enhancements greatly expand

the functionality and scope of possible use of delta-robots. If a regular delta-robot only moves objects, then Jana’s model can also return them. The model, which was designed by Yana, differs from other parallel robots by the combination of a large work area and the presence of 6 degrees of freedom, three of which are responsible for moving in three-dimensional space, and the other three are for turning in any direction.

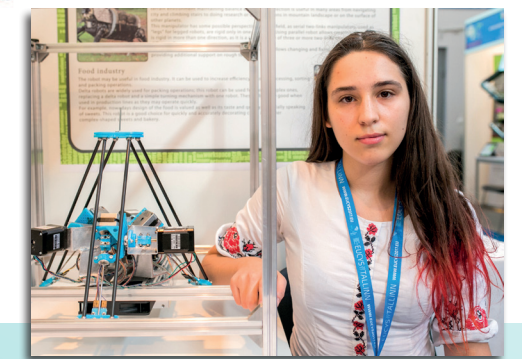
Idea:

the development of a robot model that differs from other parallel robots by combining of a large work area with the availability of 6 degrees of freedom and the creation of its prototype.



Yana extended the functionality of the robot and it will make it possible to use in many various fields, including industry, for packaging, sorting, collecting, processing, controlling, working with electronic components, in the pharmaceutical and medical industries, for creating autonomous robots, etc.

Yana’s victories in international competitions fulfill the hope that Ukrainian robotics will be ahead of the global technology.



SUPERVISOR

In this work, a new type of parallel manipulator has been developed, which allows more use of these robots in the industry. In addition to the description of the development, Yana created a working model of the manipulator, developed the demonstration software and offered ideas for using of this robot. She continues to work on improving the prototype now with the team and after the participating in the competition-defense.

Zhabura A.A.,
Programmer engineer, Luxoft Ukraine

INDEPENDENT EXPERT

Yana Zhabura’s work is distinguished by a high scientific level. The advanced features of a parallel manipulator allow it to be widely used in industry.

Brodin A.M.,
Professor, Doctor of Physical and Mathematical Sciences of the Department of Theoretical and Theoretical Physics at NTUU «Igor Sikorsky Kyiv Polytechnic Institute»

Mykola Ivanchenko

2-nd year student of NTUU Igor Sikorsky Kyiv Polytechnic Institute, a student of a section «Chemistry» of Department Chemistry and Biology at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«OBTAINING AN ADSORBENT FOR OIL AND PETROLEUM PRODUCTS IN WATER MEDIUM AND HIGH HUMIDITY ON THE BASIS OF HYDROPHOBIZED PERLITE»

On April 20, 2010 there was an accident on the drilling rig Deepwater Horizon in the Gulf of Mexico on the Macondo Prospect near the state Louisiana. It is considered to be the largest marine oil spill in the history of the petroleum industry in the USA. Due to the damaged pipes at a depth of 1500 meters in the Gulf of Mexico, the oil flowed for 152 days. The total estimated volume of leaked oil approximated 5 million barrels. The oil slick reached an area of 75,000 km².

And this is just one of a great number of examples of oil spill in the world ocean.

A man of the 21st century knows how to use Nature very well in his interests.

But it is not always possible to respect it ...

Ivanchenko Mykola belongs to the cohort of those who seek not only to take from Nature, but also to preserve it.

It turns out that Nature has taken care in advance to help us in its preservation. Millions of years ago due to the rapid cooling

of the lava the volcanic glass - obsidian was formed during the volcanic eruptions at the edge of the lava flow, in the places of the first contact of igneous melts and the earth's surface. Subsequently, everywhere obsidian penetrated underground water, and formed obsidian hydroxide - perlite.

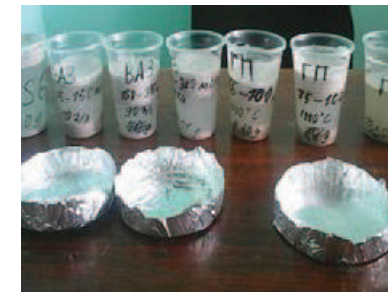
There are various technologies

of hydrophobization of perlite - it's processing, after which it will absorb oil, and repel water. The young Kiev inventor suggested using the most effective substance - **polydimethylsiloxane (PDMS) for this and he developed the technology of treatment!**

Idea:

the using of the functionalized polydimethylsiloxane as the hydrophobizer* of perlite (adsorbent for oil in water medium) and process development of technology of hydrophobizations.

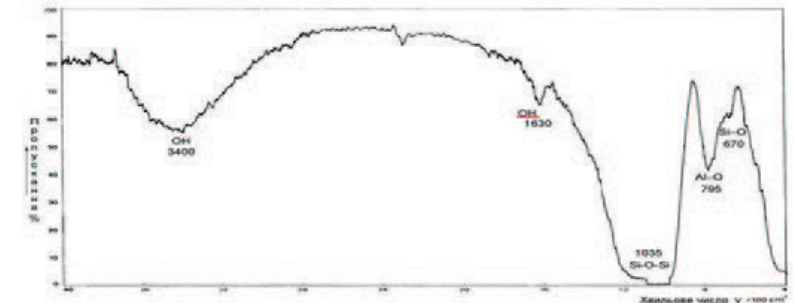
* Hydrofobizer - a substance, after treatment of which, perlite repels water.



It is possible to say without exaggeration that the project of Mykola Ivanchenko has found world recognition - you can see it from the list of his victories in international contests of the highest level.

If this young researcher finds support in Ukraine, our state can get technology that will become one of the best among the existing ones in the world. And we will have one more reason to be proud of Ukraine.

The patent for invention is received!



Perlite	Top, %	Precipitate, %
WSG	81,6	18,3
BA375-150	40,7	59,2
BA3150-300	86,7	13,2
ГП	68,9	31
PERLIT	76,2	23,7

Hydrophobization of perlite with test substances that affect the adsorbing properties of perlite on oil in a wet environment

SUPERVISOR

The use of hydrophobic perlite as an adsorbent is a good technology for solving the ecological problem of cleaning the surface of water surface from any lyophilic contaminants. The raw material for this material is cheap and the product collected can be regenerated. Practical implementation of technology is most appropriate in regions with access to large reservoirs and the infrastructure opportunity for launching raw perlite.

Myronyuk O.V.,

Ph.D. in Engineering Science, Associate professor of the Department of Chemical Technology of Composite Materials at NTUU «Igor Sikorsky Kyiv Polytechnic Institute»

INDEPENDENT EXPERT

The work is characterized by both scientific and practical significance. The hydrophobic silicone oligomer has been successfully sorted out for the surface treatment of perlite. The finished product, on the one hand, is not wetted by water and may be on its surface to absorb contaminants, and on the other - has a significant adsorption capacity. For a real assessment of efficiency, I recommend conducting a material test in real conditions for the elimination of oil spills and further implementation in appropriate environmental safety systems.

Savchenko D.O.,

PhD of Technical Sciences, Senior Researcher, Department No.6, V.Bakul Institute for Superhard Materials of NAS of Ukraine

Anna Kachkovskaya

1st year student of Bogomoletz Medical University of NAS of Ukraine, a student of the section «General Biology» of the department of Chemistry and Biology at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”



«HISTOPHYSIOLOGICAL RESEARCH OF EFFECT IN THE CONDITIONS OF THE INFLUENCE OF KISSPEPTIN AND NANO-SILVER»

It's hard enough to find a person that never says congratulation. But what is the best and popular wish ever? Of course, it's good health.

Modern medicine has mastered the «cloud» technologies of helping a person from heart transplants to identify the loneliness gene 5-HTA1, through which (imagine!) and those who have it, are 20% more likely to be lonely!

Until now today medicine has many questions and cannot find the answers to them.

One of these questions: what is the range of possibilities of nanoparticles in their effects on the human body? Of course, one investigation cannot provide answers to this question. But to know a small part of this unknown is definitely 'yes'.

Be healthy

Anna Kachkovskaya found out how Nano silver affects the pineal gland that prevents a premature puberty. Anna had her own “participants in the experiment” - 30 male rats that were injected into the epiphysis with nano-silver. The young researcher found that the injection of nano-silver into the epiphysis inhibits the action of kisspeptin, a protein that is synthesized in the central nervous system and is the central regulator of the “launching” of puberty and sexual activity.

Anna's work is a prime example of a fundamental discovery that will be useful to representatives of applied industries in science. In particular, the data obtained can be used to adjust the synthesis of sex hormones in the body (correction of premature puberty), in the development of contraceptives, as well as in the development of antitumor agents (since prostate tumors in men and breast cancer in women are hormone-dependent).

SUPERVISOR

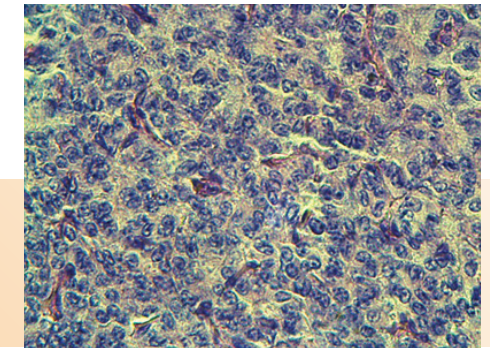
Anna Kachkovskaya's research is very interesting and relevant for the modern medicine and nanotechnology. The study is devoted to the effect of kisspeptin and its blocker in combination with the silver nanoparticles on the functional activity of epiphysis cells. Nowadays, there is a lack of information about kisspeptin in science to provide a complete picture of its cytophysiological effects. The data obtained in this work enhance the scientists' ideas about the epiphysis and the silver nanoparticles and can be used in medicine, especially in the prevention and treatment of pathologies of the development of the reproductive system.

Kozytskaya T.V.,

Ph.D. in Biology, Assistant of the Department of Histology and Embryology of Bogomolets National Medical University

Idea:

the silver nanoparticles inhibit the action of the protein to kisspeptin, which is a regulator of the start of puberty and sexual activity



Microphotography of an epiphysis of 1-month-old rats, that received nano-silver. Coloring with hematoxylin and eosin. About. 40, approx. 15

№	Series of experiments	Area of intersection of cellnuclei of pinealocytes, μm^2
1	Control with the introduction of the physiological solution	31,13 \pm 0,59
2	Kisspeptin	38,20 \pm 0,67*
3	Blocker of retiners of kisspeptin	34,77 \pm 0,59*
4	Nanosilver	35,30 \pm 0,56*
5	Nanosilver with kisspeptin	31,62 \pm 0,478
6	Nanosilver with blocker of retiners of kisspeptin	33,35 \pm 0,518*

Note. * - the difference from the corresponding parameter in the control group is probable at $P < 0.05$.

Morphometric indices of pinealocytes of epiphysis in different series of experiments



Changes in the size of the epinephrine pyelocyte nucleus in 1-month-old rats in different experimental series. * - the difference from the corresponding parameters in the control group is probable at $P < 0.05$.

INDEPENDENT EXPERT

The scientific interest in kisspeptin is based on the fact that it is actively being introduced into practice for correcting disorders of puberty and changes in the functional state of the hypothalamic-pituitary-gonadal system. In her research, Anna proved that the injection of kisspeptin led to the activation of the pinealocytes, but the injection of the silver nanoparticles did not lead to significant changes in a secretory activity. Thus, the data can serve as a basis for the development of new drugs, the effect of which will be aimed to prevent premature puberty, contraceptives, anticancer drugs, and others.

Tchaikovsky Yu.B.,

Doctor of Medicine, Professor, Head of the Department of Histology and Embryology of Bogomolets National Medical University, Corresponding Member of the National Academy of Medical Sciences of Ukraine

Dmytro Kyrychenko

1-st year student of the Institute of International Relations of Kyiv National Taras Shevchenko University, a student of the Section "Literary Creativity" at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



COLLECTION OF POETRY «ORA ET LABORA»

Usually, invention is considered to be as the creation of something (devices or technologies) that will facilitate the physical existence of the person as a result of the introduction. Art can also be called invention, but the invention will have a different nature and fulfill another mission here: it is an artistic image that satisfies the needs of the soul. "Spiritual thirst" is exactly what distinguishes man from other living organisms on Earth. Can you imagine your life without music, books, cinema, painting, theater? That is the same.

Dmytro Kyrychenko created a unique collection of poetry «Ora et Labora!», which combines the modern aesthetics with urbanism in Kiev. His works give a fresh view of the main Kyiv locations, reproduce the modern toponymic of the city, and poeticize the everyday phenomena of this space - metro stations, concrete buildings, parks. The collection of a young author undoubtedly opens a new view of Kiev, which has never been before.

But ... If technical inventions are to be described in order to reveal their essence, poetry works can simply be printed - the rest of the words will be superfluous.

SUPERVISOR

The collection «Ora et Labora» seems to me rather integral and conceptual. Poetry Kyrychenko Dmytro is interesting, metaphorical, spectacular. «Pray and do!» - he says, firstly, to himself, and then to those who are on the other side of his poetic text.

Astapenko I.A.,
Member of the National Union of Writers of Ukraine,
Candidate of Philology

Dmytro Kyrychenko «Matter». Enjoy ...

<i>Матеріальний світ метаматеріально- му мені</i>	<i>Запросити на каву і цигарку</i>
<i>Якщо соліпсизм має рацію</i>	<i>Але ти не палиш</i>
<i>То решта всесвіту – ні</i>	<i>А я не палю й зранку бачу тільки дим</i>
<i>Якщо соліпсизм – фіктивний</i>	<i>хлібзаводу й</i>
<i>То не маю рації й</i>	<i>Старий Фуршет</i>
<i>Мені хотілось би тобі сказати</i>	<i>Я маю вдосталь дорожніх речей:</i>
<i>Що я прокидаюсь у вітражного вікна</i>	<i>Звуки</i>
<i>І бачу щоранку урбанпейзаж новопечер- ських липок</i>	<i>Літери</i>
	<i>Слова</i>
	<i>Старі книги</i>
	<i>Тебе.</i>

*Вони мають удосталь дешевого
дріб'язку:
Гроші
Великі будинки
Просторі квартири*

*І сміятимемося
Мружитимемо сприйняття від сміху
Бо в нас не буде очей
Глузуватимемо з обтяжених золотом
багатіїв*

*Нехай їжа не принесе задоволення
А сон стане умовністю
Стань зі мною метаматеріальною
І ти будеш моєю повністю.*

Idea:

History of meta-love

**Нехай їжа не принесе задоволення
А сон стане умовністю
Стань зі мною метаматеріальною
І ти будеш моєю повністю.**

*Швидкі автомобілі
Каміння ціною
Великих будинків
Просторих квартир
Швидких автомобілів
Мрамурові розетки на стелях
Власний ліфт до вітальні
Дорогі видання книг.*

*Будь зі мною метаматеріальною
Будь
Зі
Мною
Звуками*

*Станьмо шурхотом сакур у парку «Кіото»
На вулиці Кіото
Біля станції метро «Лісова»
Й полетимо вище Липок
На вулиці Драгомирова
Біля станції метро «Дружби народів»*

*З дерев ув'язнених у власні стовбури
З клімату
З клімаксу*

*- А де наші тіла?
Ти запитаєш у мене засмучено*

*Я відповім, що віддав їх двом біднякам
Що бачили проблему не в матерії
А в її якості*

*2
Лиса гора
- Дивись наша полянка пам'ятаєш як ти
ледь чула на ліве вухо?
Стань зі мною метаматеріальною
Я віддам тобі всього себе
Цього разу буквально
Бо це нарешті стане можливо*

У нас буде метакохання

*- У тебе завжди є рима
- Це дивно я її не планую*

*3
Давай полетимо до Китаю
І будемо існувати над провінцією Шань-
дун*

*Я буду саджати рис
А ти розводити рибу*

*- Але в нас немає рук?
- Проте ми маємо час*

*Кінцівки досить умовні
І потрібні лише номінально*

*Шкода правда твого манікюру
Нігті справді були розкішні*

INDEPENDENT EXPERT

Dmitri Kyrychenko's collection "Ora et Labora" is a sample of high-quality, modern, lively poetry. In its strengths, one has to somehow include a harmonious rhythm, the presence of a large number of author's neologisms, outstanding imagery, textual pointe shoes - in short, everything that makes the text really valuable for literature.

Godik K.O.,
Candidate of Philology, the youngest scientific scholar of the Department of the theory of literature and comparative research at the Institute of Literature of Kyiv National Taras Shevchenko University

Danylo Kovalenko

The student of grade 11 of Polytechnic Lyceum NTUU "KPI" in Kiev, a student of a section «Technological processes and perspective technologies» at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«UTILIZATION OF RECYCLED BARS BY CRYOACCUSMAL METHOD»

Did you have to change the «shoes» of your car? If yes, then know that those tires that "have served their own" have become a small fraction of the 1st billion (!!!) used tires that annually (!!!) become ballast in the ecosystem of our planet.

how to preserve the environment for future generation

His cryoacoustic method for recycling waste tires involves the following steps:

1. It is necessary to cool the tires with liquid nitrogen to a fragile state. And that's all!
2. Grind them with ultrasound.

As a result, we get rubber crumb and metal chord.

The rubber crumb can be used:

- for laying asphalt;
- in the oil refining industry;

- to cover tennis courts;
- for the production of a sports enthusiast.

Danylo's method is 100% environmentally friendly, because this technology eliminates thermal and chemical emissions into the atmosphere!

Economic factor:

The young inventor has calculated that one production complex, which will process 125 tires in 1 hour, is \$ 1.5 million per year!

16 times more profitable!

SUPERVISOR

At present, the relevance of this work is the complete absence of an ecological, economical and efficient method of utilization of waste tires in the world. The author of the study suggested this method.

Kozlenko O.V.,
Candidate of Science (Tech.), Head of UNLCT FMF NTUU «Igor Sikorsky Kyiv Polytechnic Institute»

The patent for invention is received!



Idea:

using liquid nitrogen, ultrasonic radiation and magnetic field, it is possible to completely utilize exhaust-gas tires, ecologically safe, receiving rubber crumb, which can be used in the production of asphalt, roof coverings, sports and playgrounds, and much more.



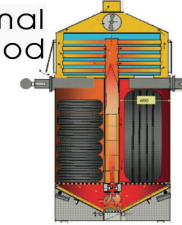
Available techniques

1 Burning



- Extremely harmful impact on the state of ecology
- Loss of recycled materials (rubber and metal)

2 Thermal method



- Time consuming
- Harmful impact on environmental conditions

3 Mechanical method



- Lost time and power consumption

Proposed method



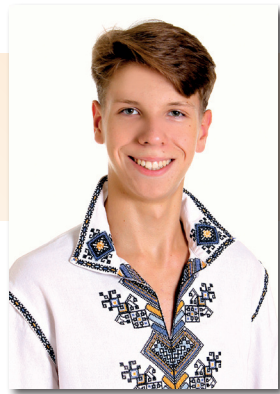
INDEPENDENT EXPERT

The problem of recycling used tires is not new. At present, utilization is carried out in different ways. The most popular are combustion, thermal decomposition, mechanical shredding. Each of the existing methods has one important drawback - pollution of the environment. The work of Kovalenko Danylo is devoted to this actual task, the solution of which will provide an opportunity to save natural resources while preserving the purity of the environment.

Kotovsky V.Ye.
Doctor of Technical Sciences, Professor, Head of the Department of General Physics and Solid State Physics, Faculty of Physics and Mathematics, NTUU «KPI named after Igor Sikorsky»

Mykhailo Komashnia

The student of grade 11 of Polytechnic Lyceum NTUU "KPI" in Kiev, a student of a section «Technical Sciences and Biology» at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«IMPROVING THE PROTECTIVE FUNCTION OF MODERN BODY ARMOUR»

As long as a weapon exists in this world, the question of how to escape from it will be relevant.

The project of Mykhailo helps to preserve the life and health of a person who came under the scope of a firearm.

Mykhailo analyzed the protective effect of modern body armor and came to the conclusion that even the most high-tech of them, developed by American engineers from organizations such as Army's Natick Soldier Research and Navy's Clothing and Textile Reserch Facility, are not very effective against the bullet's action. After all, these body armors can well save the body from getting a bullet into it, but they absolutely do not protect from the action of insane pressure, which

appears as a result of a bullet hit (which can produce velocity up to 1300 m/s) on an armor plate. This case is no less dangerous than a penetrating wound, because the bullet completely transfers all its energy to the armored plate, and since this impulse is transmitted from the armored plate to the body, as a result of fractures that occur, bone fragments can injure the soft tissues and internal organs of the person (this is called the bullet action). The same impulse can lead to ruptures of internal organs. It is also essential that a bullet, hitting the

armored plate and not piercing it, can break up into many small pieces that can rebound and injure the unprotected parts of the body.

Everything genial is simple.

Michael proposes to use not only armor, but also liquid for the protection of the human body, because it distributes the pressure from the ball to the entire area it occupies, this pressure is concentrated on the area of damage (the area of the armored plate is $\approx 7,5 \text{ dm}^2$).

The patent for invention is received!

Idea:

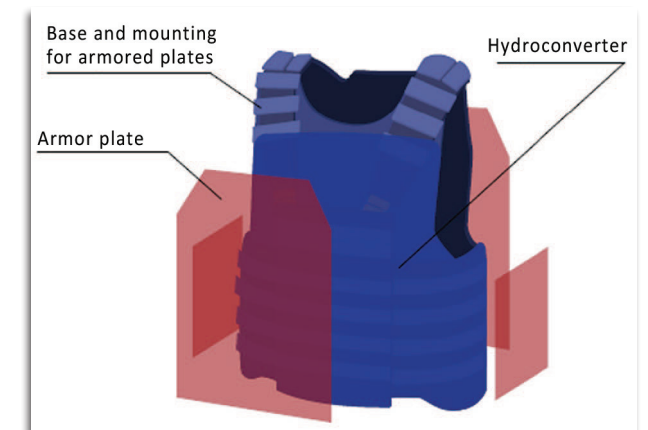
creating a body armor that will contain a layer of fluid between the armor plates and the body of a person. Such protection can reduce the unimpeded movement of the bullet in 8 times.



Water is the most common and cheapest liquid in the world. It can be compressed by a maximum of 7-8%. For effective protection of the human body a layer of water will need a maximum thickness of 2 cm, which is 4 additional kg. The total weight of the body armor will be 12 kg.

And now the main thing: the successful simulation of the experiment showed that this water layer reduces the unobstructed effect of the ball 8 times!

In addition, alcohol can be added to the water. After that, it will not freeze in the cold, and in the case of breaking the body armor, the wound will already be disinfected, which is also very important in the battle.



SUPERVISOR

The work analyzes the advantages and disadvantages of existing modern models of individual protection, suggests ways to increase the protective function of body armor by creating the necessary distribution of pressure over the surface of the human body, which would provide its protection when the bullet hits the body armor. The simulation of the experiment was carried out successfully.

Kozlenko O.V.,
Candidate of Science (Tech.), Head of UNLCT Faculty of Physics and Mathematics at NTUU Igor Sikorsky Kyiv Polytechnic Institute

INDEPENDENT EXPERT

The scientific work of Komashniy Mykhailo Yevgenovich is a meaningful and comprehensive scientific research devoted to the actual theme of the protection of military personnel, in particular, by increasing the effectiveness of modern body armor. The author obtained a patent, due to the possibility of using his proposed method to increase the protective function of body armor.

Vanin V.V.,
Dean of the Faculty of Physics and Mathematics NTUU Igor Sikorsky Kyiv Polytechnic Institute «, Doctor of Technical Sciences, Professor, Honored employee of the public education of Ukraine

Sergey Lysin



The student of grade 11 of Polytechnic Lyceum NTUU "KPI" in Kiev, a student of a section «Mechanical Engineering and Robotics » of Technical Sciences Department at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"

«ROBOT-FIRE WITH HOMING SYSTEM GUIDANCE BASED ON COMPUTER VISION»

One of the characteristics of the modern world is that, despite the incredible technical inventions and even the creation of artificial intelligence, sometimes people die for the same reasons as millions of years ago. One of these causes is a fire.

The project of Sergey Lysin aims, if not to put an end to this, then at least to substantially minimize the risk of death during a fire.

The young inventor has created a model of robot that can extinguish a fire and can perform some more important functions.

So, the robot itself is a device with infrared sensors, which «react» to the 250 C (start of fires).

Once the sensor «caught» this signal, the robot simultaneously:

1. Begins to move to the place of fire.

2. Releases a fluid to extinguish the flame.
3. Transmits a signal to the rescue services and the owner of the premises that the fire started.

This device is able to turn off electricity to prevent a «chain» reaction and open the entrance locks in the houses, in order to save time for the rescuers who arrive at the incident.

The main feature of this robot from in comparison with the existing

fire protection systems is that it can "reasonably" extinguish the flame: if the system floods the whole place with foam, the robot directs the anti-anger substance exclusively to the fire in the place where the flame originated.

But the most important «merit» of this automatic firefighter is that it is able to regulate the level of oxygen in the room. If a fire occurs, the robot reduces the level of oxygen to the parameters at which the fire itself extinguishes.

Idea:

it was created a prototype of a fire-robot, which, if there is a fire, can drive the trunk at the right angle and extinguish the flame, which will greatly facilitate the work of fire fighters.

The production of this robot, like the production of any modern automated device, is not cheap. But the damage from the fires is much larger.

And most importantly - there is a chance to save human life.



Comparative analysis of the capabilities of a fire-fighter and a firefighter (compiled by the authors)

Parameters	Firefighter-mam	Firefighter-robot
Safety for human life and health	no	yes
Lack of time and money for training personnel	no	yes
Ability to work continuously for a long time	no	yes
Ability to work in the most dangerous and remote locations	no	yes
Efficiency and accuracy	yes	yes



SUPERVISOR

The work of Sergey Sergeevich Lysin is dedicated to the creation of algorithms for the management of rescue-robots during fires, which will allow preserving human lives and reducing the negative consequences for the environment, control fire on initial stage. The author of the study proposed methods and means that increase the effectiveness of fire fighting using robots with a homing guidance system, which will allow to prevent the occurrence of fires in advance.

Sergey Kravtsov,
Managing Director of company Evergreen

INDEPENDENT EXPERT

Sergey Lysin developed a computer program to search for a source of combustion (open fire); written software codes for robot movements - raising jet-propeller and additional crawler units; it has been carried out the calculation of the power supply parameters necessary for reliable operation; it was created a prototype of a fire-robot and its testing under conditions as close as possible to real ones. The results of the study can be used for the development of fire extinguishing facilities at large tank farms or other objects.

Mikulenok I.A.,
Professor of Chemical, Polymer and Silicate Engineering at National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute» Dr. Tech. Sciences, Prof., Art. Senior Scientist, honored inventor of Ukraine

Natalia Monina

1-st year student at NTUU "Igor Sikorsky Kyiv Polytechnic Institute», student of a section "Environmentally friendly technology and resource saving" of Technical Sciences Department at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«RECEIVING ELECTRIC ENERGY ON THE RAILS OF RAILWAY TRACKS BY PHOTOELECTRIC AND INDUCTION METHOD»

New energy sources have become the subject of search for scientists around the world. This is understandable: traditional raw materials for the power plant are exhausted; their energy has a high cost. There is, however, as never before, a need for alternative solution.

Solar cells are becoming increasingly popular as an energy source. Everyone knows their advantages: environmental friendliness, low weight and size, simplicity of construction and long service life, accessibility, possibility of use in hard-to-reach areas.

Do the advantages outweigh the disadvantages? Judge for yourself: the land on which these solar panels are located becomes "dead": the sunlight stops falling on it, and the plants stop growing. And also the soil erosion begins. In 2012, Perovo was the most solar power plant in the

world - a photovoltaic solar power plant in the Crimea. It occupied an area of over 200 hectares of land. Destroying the land, which has always been a breadwinner, is an act that descendants can not forgive.

And, as it turned out, even the Sahara desert will not help here. Scientists have figured out: if you place a solar-powered power station in it, it will increase several times so that it reaches Europe, and the whole microflora and fauna will simply die due to excessive drought and a "hole" in the life chains.

Natalia Monina found the area of the Ukrainian land, which is not used at all, but is "looked after", which requires expenditures from the state budget - this is a rail track. The total length of all railways in Ukraine is 22050 km. Natalia calculated that if solar panels were placed along the length of the railway between the rails, then this area would fit 145 solar power plants, with a total area of 15 hectares each and with a capacity of 7.5 MW. The total area that will be used for these power plants is 2,175 hectares.

SUPERVISOR

Natalia Monina devoted his scientific research to low-researched questions about the alternative placing of solar panels. In the process of work, a model of the installation was created and a series of experiments were conducted that confirmed the effectiveness of the proposed method. Applications for patenting technology are filed.

Kozlenko O.V.,
Candidate of Science (Tech.), Head of UNLCT Faculty of Physics and Mathematics at NTUU Igor Sikorsky Kyiv Polytechnic Institute

The patent for invention is received!

Idea:

the scheme of placing solar panels between the railways is developed, as well as the method of improving each unit of batteries with the help of electric generators.

And this is about 10 power plants Perovo! Source energy will reach about 2% of the total electricity generation in Ukraine.

In addition, Natalia proposes to get rid of the negative influence of vibration, which arises during the movement of train on rail rails. (These vibrations cause consolidation of the soil, which complicates the water exchange - and this, in turn, is another environmental problem.) She proposes to improve the batteries by magnetic levitation electric generators, which, firstly, introduces an additional generation of electricity at that time when the train passes and the

batteries can not absorb sunshine, and secondly, it acts as a shock absorber, which prevents the negative effects of vibration on the solar panel.

The invention of Natalia Monina helps in solving two major problems of our state: energy and ecology.

When Jules Verne invented a submarine in his work, nobody even thought that once this vessel would become an integral part of the navy of those countries in which this fleet is.

Natalia is convinced: her invention is the future. The thing is only in time.



INDEPENDENT EXPERT

Natalia Monina's work is devoted to the problem of solar energy development in modern conditions. The urgency of the research and its practical significance are derived from the urgent needs of the time - the need to find the new one, environmentally friendly and cost-effective ways of power generation.

Loktev V.M.,
Academician of NAS of Ukraine, laureate of two State Prizes of Ukraine in the field of Science and Technology, Honored Worker of Science and Technology, Head of the Department of General and Theoretical Physics of NTUU Igor Sikorsky Kyiv Polytechnic Institute

Timofey Nagorny

4-th year student of Kyiv National Taras Shevchenko University, the student of section «Geography and Landscape Science» Department of Earth Sciences at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”



«TERRITORIAL ORGANIZATION OF THE CITY COMMUNITY PUBLIC PASSENGER TRANSPORT OF A GREAT CITY (IN THE EXAMPLE OF KYIV)»

THE FACT THAT THE BEST IS SEEN IN THE COMPREHENSION. ONLY CONSIDER:

In 2013, passengers were transported three times more by public transport of Kiev, in comparison with the volume of passenger transportation by “Ukrzaliznytsya”. (Укрзалізниця)

So, setting up the work of such a powerful organization as Kyivpastrans (Київпастрас) is not something that is not easy, but without exaggeration it is a virtuosity. And this virtuosity is realized in the principles of rationality and reasonable planning of Timofey Nagorny, after all, after analyzing the draft master plan for development of Kyiv until 2025, he came to the conclusion that the implementation of this plan in practice will not make public transport

convenient for Kiev. So residents of many arrays of new buildings will have to independently solve the problem of how to get to work, because the branches of the public transport network in these arrays are not provided.

Timofey mapped the public transport network in Kiev on his own. He justified the principle of the location of public transport stops. According to this concept and in accordance with this map it becomes clear where there is not enough public transport

network and its stops.

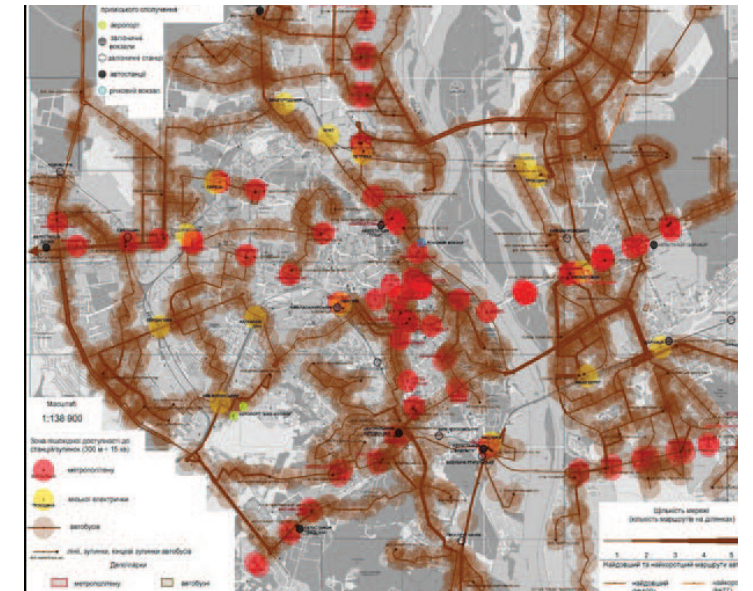
We bring to your attention these maps. And if the idea and the development will find support and will be successfully implemented by the relevant structural units, it will be hoped that by joint efforts we will be able to correct the public transport network of the city of Kiev and many people of Kiev will definitely be easier to get to the planned places.

Idea:

the creation of maps of all routes and stops of urban public transport, which clearly demonstrate that it is necessary to change to improve transport accessibility in Kyiv.

Years	Means of transport			
	Bus	Trolleybus	Tram	Subway
1960		287	466	24
1965		540	581	67
1970		739	680	142
1975		868	811	257
1980	data is not published by the Main Department of Statistics in Kyiv	1014	901	344
1985		1301	1117	414
1990		1125	904	496
1995		713	727	537
2000		583	582	572
2005		514	509	627
2010		494	446	753
2012		461	413	770
2013		490	403	794

The number of rolling stock of urban public utility transport of Kyiv in 1960-2013



The density of the bus network and the pedestrian accessibility of bus stops in Kyiv and their role in providing the passenger traffic of the subway and the city train (as at 01.01.2015)

SUPERVISOR

The work of Timofey Nagorny shows how the theoretical work of geography should be introduced into the practice of city management. For the first time in Ukraine, the maps of all routes and stops of municipal communal public transport show that it is necessary to change the transport accessibility in the capital of Ukraine for improving.

Savchuk I.G.,

Candidate of Geographical Sciences, Senior Researcher at the Institute of Geography of the National Academy of Sciences of Ukraine

INDEPENDENT EXPERT

The study is of great practical importance, because, executed at a high scientific level, it solves one of the most significant problems of the capital of Ukraine - transport. Timothy enriched his study of the development of the transport network of public transport in the province of Saskatchewan in Canada. The application of the developments of Timothy will make urban public transport much more efficient.

Mezentsev K.V.,

Head of the Department of Economics and Social Geography of the Faculty of Geophysical Sciences of Kyiv National Taras Shevchenko University, Doctor of Sciences in Geography, Professor

Maxim Ryabokon

1-st year student of Kyiv National Taras Shevchenko University, the student of section "Astronomy and astrophysics"



«PHOTOMETRIC STUDY OF COMETS ON THE BASIS OF AZT-8 TELESCOPE WITH THE USE OF JOHNSON SYSTEM FILTERS»

The Hero of Ukraine, the first astronaut Leonid Kadenyuk said that being in space gives a completely new understanding of the human mission on Earth: "During a space flight you realize how wrong a person lives on his planet. On a beautiful planet there should be a beautiful life. Therefore, it is necessary to change the concept of existence on the planet - to change the attitude to nature, the relationship between people and states."

Space alters the way one saw the world. Just for that you need to study it. Maxim Ryabokon also writes that: "The study of comets is an essential factor in the development of science, and there are several reasons for this. First, the long-period comets that come to us from the «periphery» of the solar system, were located far enough away from the Sun in order to experience its evolutionary influence, such as planets, and therefore retained their original chemical

composition - literally having a solar system at an early stage of its formation, about 4,6 billion years ago. Exploring such objects, we get new knowledge about our past - the past of the solar system. Secondly, extreme spans near the Sun itself, under the influence of various factors, launch powerful chemical reactions and physical processes on Sungrazing comets (those that come close to the Sun) that cannot always be reproduced on Earth. Thirdly,

comets can really affect our life by entering into direct contact with the Earth. To prevent this, the international organizations of comet and asteroid safety were created." The physicochemical analysis of the coma and the nucleus of comet indicate probability that comets could have a decisive influence on the origin and development of life on our planet.

SUPERVISOR

There is an exciting result of building changes in the relative redness of the cometary coma with a decrease in the heliocentric distance and the resulting distribution of redness over the coma. There are relatively few works on this subject even at a high scientific level, and also emphasizes the importance of the result obtained. The research of Maxim Ryabokon is an important contribution to understanding of the process, which goes in the comete's coma.

Ponomarenko V.O.,
Ph.D. Phys.-Mat. Sciences, junior researcher Sector AMTSC Astronomical Observatory of the Taras Shevchenko National University of Kyiv

Do you imagine how much can comet tell us? And most importantly - knowledge about comets will allow humanity to protect themselves from them.

yet have their own classification. The successes of spacecraft in the study of comets and every other work bring closer the time when a complete physical model

Idea:

comparison of some physical characteristics of long and short-period comets (based on the results of photometric observations).

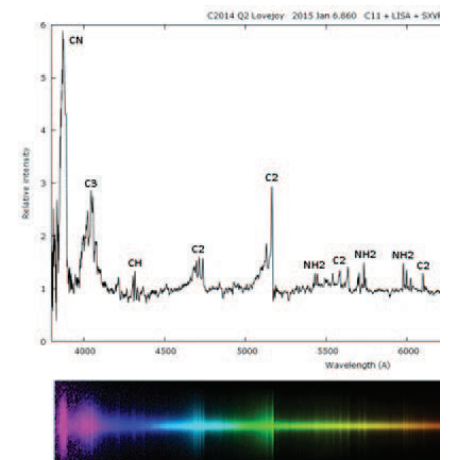
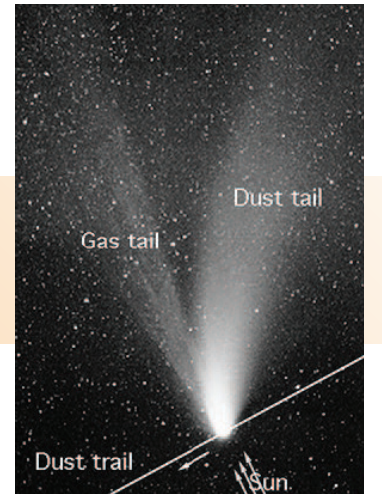
Maxim Ryabokon's scientific research is also used to develop new knowledge. Using the photometric studies of the comets' coma, which were undertaken by the scientists of Astronomical Observatory of Taras Shevchenko Kyiv National University, he studied three comets: 41P / Tuttle Giacobini - Kresak, 51P/ Harrington and C/2017 O1 (ASSASN1). Maxim was able to investigate and explain the change in the color (reddening) of the comet atmosphere with the comet approaching to the Sun; color distribution within the comet atmosphere. Also Ryabokon MS discovered the differences in the comas of long and short-lived comets, which explained the amount and the ratio of gas and dust in a cometary atmosphere.

To date, however the comets do not

of the cometary nucleus and the classification of comets according to physical parameters will be created.

We can assume that Maxim proposed a method for evaluating some physical parameters of these «inhabitants of the solar system»!

It is well-known that fundamental science does not yield immediate results. But in future, when, perhaps, comets will become the source of the extraction of some useful substances for humans, Maxim Ryabokon will merit this.



INDEPENDENT EXPERT

The photometry of cometes is rather complicated sphere of practical astronomy, which allows to obtain the important physical parameters of the atmosphere of comets, and we have to admire Maxim's. The results of his work, of course, enrich the world science with very valuable data.

Baransky A.R.,
Ph.D in Biology, Senior Researcher of the Department of Natural Flora of the M. M. Hryshko National Botanical Garden of the NAS of Ukraine

Nikita Sazonov



The student of grade 11 of Liceum #241 "Goloseevsky" in Kiev, a student of section «Internet technologies and WEB design», Department of Computer Sciences at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"

«INTEGRATION OF SPEED-READING INTO A WEB APPLICATION»

Today, every person whose professional activity is related to the perception and processing of information of any content faces a problem: the amount of this information is so great that many (if not most) do not have enough time to study this information flow.

Nikita Sazonov has developed a program that can significantly save you time to get new information. In this case, you will not need to learn new methods of speed reading, go to courses or trainings. You just need to go to a website from PC or mobile device and that's it - you are ready for speed reading! For example, if the speed of your reading is 180 words per minute, then working with the application, created by Nikita, you can read up to 1000 words per minute, that is, 5 times more! Can you imagine how many useful you can do in the time saved?

Nikita's program is based on a method of reading words that are changing rapidly. This method was developed by American students and teachers and presented in February 2014 at the **World Mobile Devices Congress** in Barcelona. But this program did not work on the phones, and Nikita created his own version, adapted to work specifically on mobile devices.

What is text reading where the words change? This method is based on the fact that the reader does not need to move his eyes over the text, because the words follow each other. Since the screen does not need to place all the text, but only

one word, you can increase the size of its font. Thus, this word will require less concentration of attention, and the reader will not have to strain (if the reading speed is convenient for him).

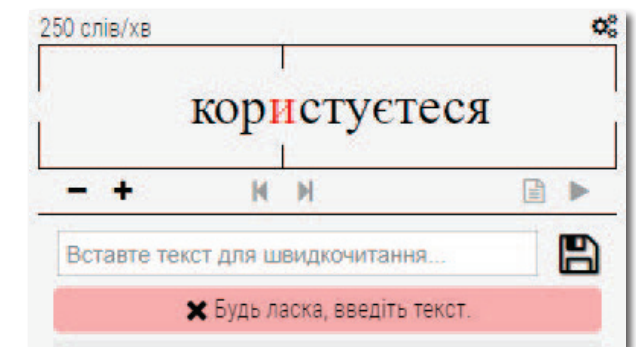
Besides, Nikita developed his WEB-application; he significantly changed the interface of the existing program: he increased the size of all buttons in 4 times to make it easier for the user to click on them. Also, the student added the ability to change the text view - size, font and color. That is, everyone can customize the program for themselves.

Idea:

a web application was created that allows reading up to 1000 words per minute (4-5 times more than the average) when reading.

But we can say with certainty that teachers of Ukrainian and foreign literature will be thankful for Nikita, because modern schoolchildren often do not have time to read all the program texts, and with the help of this application it will be much easier for students.

Read faster - and you will do much more!



Interface program for PC

SUPERVISOR

From the point of view of modeling and programming, the work is rather complicated, but it was done independently and professionally. One great advantage of the project is the structure and mechanism of using the components of the software complex, the uniqueness of idea of the subsequent use of the project in the educational process.

Katerinich L.O.,

Teacher of computer science at Lyceum No. 241 "Goloseevsky", Ph.D. of Science

INDEPENDENT EXPERT

The scientific work of Sazonov Nikita solves an urgent problem regarding the means of accelerating the information perception. The author proposed his own concept, designed and implemented a web application based on it. The work uses the principles and capabilities of modern object-oriented programming, the result of the study was the final software product.

Galkin O.V.,

Ph.D. Sc., Associate Professor, Department of Information Systems, Faculty of Computer Science and Cybernetics, Taras Shevchenko National University of Kyiv

Maria Sokulska



1-st year student of Taras Shevchenko National University of Kyiv, the student of section «Botany and Zoology» Department of Chemistry» at Municipal extracurricular educational institution “Kyiv Minor Academy of Sciences for Youth”

«NEW ASPECTS OF THE USE OF AMBROSIA ARTEMISIIFOLIA AS A MEDICAL PLANT»

A person skilled in medicine knows that 1928 is the beginning of the antibiotic revolution and the new era in the treatment of people. This year is the date of the discovery of penicillin that helped radically to enhance the human ability to fight the diseases. The mold, which had previously been the object of destruction wherever it appeared, turned out to be a super-powerful weapon against bacteria that caused the death of million people.

After the discovery of penicillin, bacteria began to die.

The scale of the discovery made by Maria Sokulska, of course, is more modest. But the vector of her scientific search and search of Alexander Fleming (Scottish scientist and Nobel Prize Laureate who discovered the «miraculous» properties of the mold) coincides: how to make a useful thing out of what is prejudicially harmful.

The modern agricultural «mold» is Ambrosia Artemisiifolia. In her study, Maria presents very interesting statistics on the economic losses that our state

incurs through this plant. So, for example, in 2009, the country’s farms lost due to a decline in agricultural yields littered with ambrosia, amounting to UAH 6963,9 mln. For 10 years, this weed can seize the land of one area.

But this grass can bring not only losses - this is what Maria Sokulska proves. Experimentally, the young inventor has found that an aqueous extract of Ambrosia Artemisiifolia effectively inhibits the development of Escherichia coli and Staphylococcus aureus. This means that

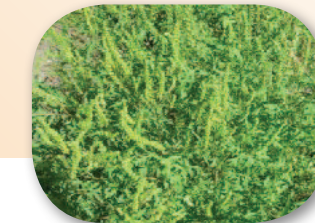
Ambrosia is able to treat some infectious diseases. Please note that almost 100 years ago, antibiotics were invented to combat these diseases. But time has proved: this treatment is not without alternative and, perhaps, Maria’s method will become this alternative.

In the course of studying the possibilities of Ambrosia Artemisiifolia, Maria Sokulska found that this plant has a Lytic action - that is, it is capable of dissolving kidney stones.

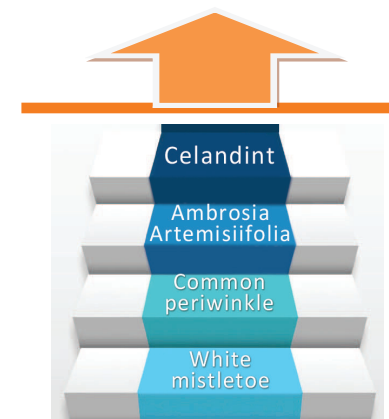
AND MOST IMPORTANTLY – IT WAS PROVED THE ANTICANCER EFFECT OF AMBROSIA.

Experimentally, by research, it was found that Ambrosia Artemisiifolia is close to the cytostatic effect of the celandine. In the European Union today, it is the norm to add celandine leaves to tea for cancer prevention. Maria Sokulska today is working to add ambrosia to the spectrum of anticancer plants.

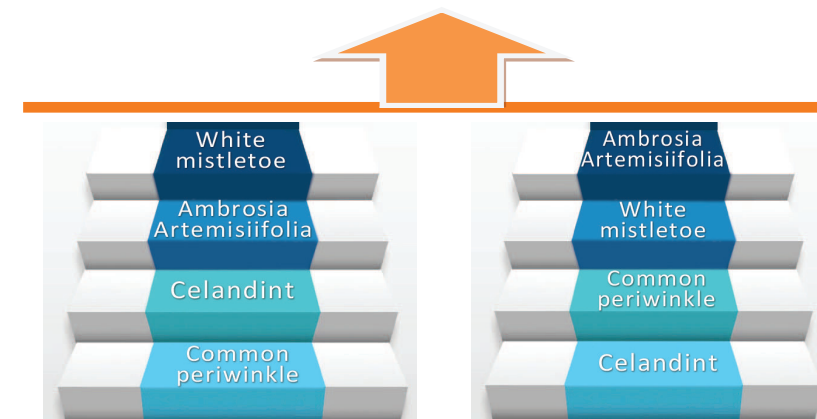
Idea: ambrosia can be used as a medicine (anticancer and antibacterial)



Scheme of cytostatic activity of water extracts of investigated medicinal plants



A number of antibacterial activity of investigated medicinal plants in relation to some pathogens



Staphylococcus aureus

Proteus vulgaris

SUPEVISOR

The work is done to the highest scientific standard, the conclusions are logically drawn from the experiment. The research has a scientific novelty: in addition to the results on the Ambrosia Artemisiifolia, the author has suggested using the tangent of the trend angle to the abscissa axis as an indicator of proliferation inhibition; The results are of practical importance.

Megalinska A.P.,

Associate Professor of the Department of Botany, National Pedagogical Dragomanov University, Candidate of Biological Sciences

INDEPENDENT EXPERT

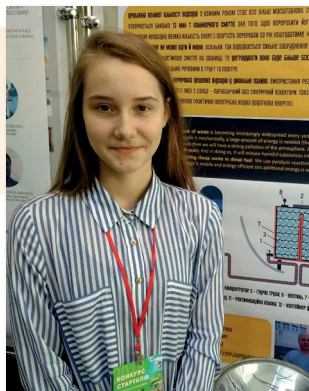
The topic of the research is relevant. On the one hand, the search for new herbal preparations with cytostatic and antibacterial properties is topical, and on the other hand, ambrosia is an adventitious, weedy plant that is rapidly spreading throughout the world. The transformation of a dangerous synanthropus in a medicinal plant can solve two problems - the regulation of the number of the species of Ambrosia Artemisiifolia in the phytocenoses and the use of new medicinal raw materials.

Dziuba A.I.,

Ph.D. in Biology, Senior Researcher, National Botanical Garden N. N. Grishko NAS of Ukraine, Scientific Secretary of the Department of Chemistry, NAS of Ukraine

Elizaveta Stolyarchuk

The student of grade 11 of Polytechnic Lyceum NTUU "Igor Sikorsky Kyiv Polytechnic Institute», student of a section "Environmentally friendly technology and resource saving" of Technical Sciences Department at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«PROCESSING ORGANIC AND INORGANIC WASTE WITH THE USE OF SOLAR ENERGY»

"Humanity will not die in the atomic nightmare - it will suffocate in its own waste," this phrase by Niels Bohr defines one of the most pressing problems of our time.

This question did not leave Elizaveta Stolyarchuk indifferent, who realized that it is no longer a fantasy to make our planet the biggest garbage dump.

Elizaveta learnt about the existing methods of recycling and came to the conclusion that in order to eliminate garbage more effectively, it is necessary to invent the best way to do this. After analyzing the advantages and disadvantages of these methods, the young researcher identified the best - pyrolysis, because it is suitable for any kind of polymers, does not require sorting and it is quite environmentally friendly. But this method has a significant drawback - when plastic waste is heated

in a hydrolysis furnace, the combustion process takes place, as there is oxygen in this tank. That's why, during this process, up to 20% of the useful products of waste recycling are destroyed (the pyrolysis reaction product is pyrolysis fuel (the diesel fuel has density 0.9 g/cm³), oily substances, pyrolysis gas (hydrodynamic gas is almost the same as natural gas) and the black carbon atoms). In order to prevent the combustion products from entering the atmosphere, we should use the special filters, but their cost is very

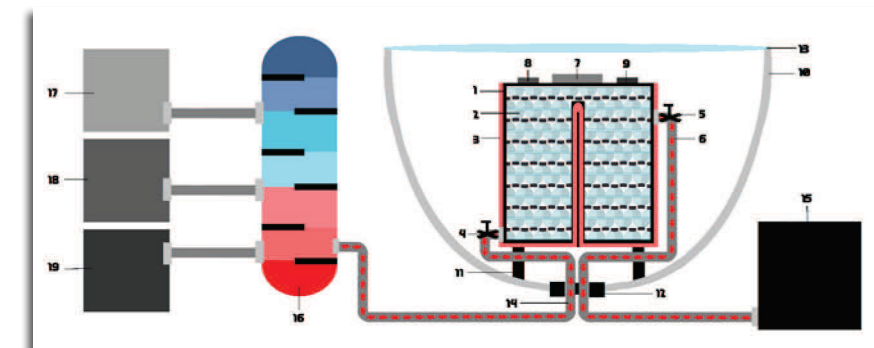
high.

Liza suggests the following: it is necessary to add liquid nitrogen to the hydrolysis oven, which when heated increases 600 times. On the 10-liter capacity, you need only 100 grams of nitrogen!

But her inventions do not end there. She considers it appropriate to increase the temperature of the pyrolysis process with the help of solar energy in order not to waste electricity. Solar concentrators will be attached to transform the energy of the Sun into heat.

Idea:

the creating an efficient and environmentally friendly way of recycling of organic and polymeric wastes, by improving the existing pyrolysis method using solar energy and liquid nitrogen.



The inventive technics:

- 1 - pyrolysis camera; 2 - waste; 3 - copper shirt; 4 and 5 - valves; 6 and 14 - flexible pipes; 7 - cover; 8 - temperature sensor; 9 - pressure sensor; 10 - spherical solar concentrator; 11 - foundations; 12 - hermetic fastening; 13 - Fresnel lens; 15 - gas collection container; 16 - Rectification column; 17 - water container; 18 - fuel container; 19 - container for oily substance

Elizaveta Stolyarchuk begins her research with sad statistics regarding the situation with recycling in Ukraine and in the world. Just think: only 2.3% of the total amount of household garbage is recycled in Ukraine and 96% is in Sweden. Sweden is so good at recycling that, for more than 10 years, it has imported rubbish from other countries to keep its recycling plants going.

The mind of our children is definitely not worse than Swedish. And the rest?

SUPERVISOR

The work of Elizaveta Aleksandrovna Stolyarchuk is devoted to an important problem of our time, which is the need for a detailed study of the utilization and recycling of polymeric and organic waste effectively and environmentally friendly. The researcher proposed a technologically not complicated, but very environmentally and energy efficient method of pyrolysis.

Kozlenko O.V.,
Candidate of Science (Tech.), Head of UNLCT Faculty of Physics and Mathematics at NTUU Igor Sikorsky Kyiv Polytechnic Institute

INDEPENDENT EXPERT

The relevance of the work and its practical importance relates to the search for suitable methods of recycling and their new use, which is aimed to the preservation of the ecology of the planet.

Brodin A. M.,
Professor, Doctor of Physical and Mathematical Sciences of the Department of General and Theoretical Physics of Igor Sikorsky Kyiv Polytechnic Institute (NTUU KPI)

Anastasia Tsilyk

1-st year student Taras Shevchenko National University of Kyiv the student of section "Climatology and Meteorology" of Department of Earth Sciences at Municipal extracurricular educational institution "Kyiv Minor Academy of Sciences for Youth"



«THE IMPACT OF CLIMATE CHANGE ON THE HEATING PERIOD (ON THE EXAMPLE OF KIEV)»

The problems in the energy sector of the country are most acute in October - before the heating season.

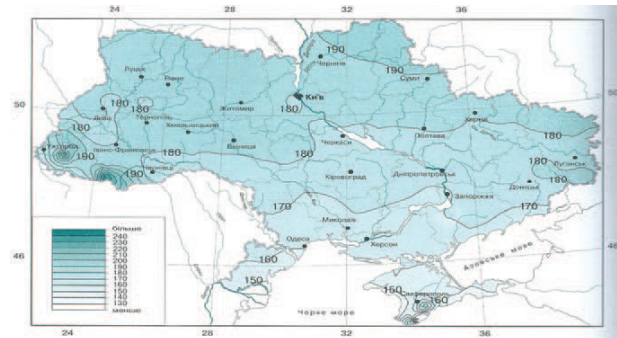
Anastasiya Tsilyk calculated how the duration of the heating period will be reduced under the influence of global warming.

Analyzing the data of the Sectoral State Archive of the Central Geophysical Observatory of the State Emergency Service of Ukraine over the past 100 years, Anastasia found that the heating period over the past 100 years has decreased by about 7 days, and over the past 20 years - by about 2 days. The fact that 2 days falls on the last 20 years indicates the intensity of climate change.

Anastasia argues that the current normative documents need to adjust the amount of fuel and energy resources for

the heating period, since the intensity of global warming allows these volumes to be reduced.

And the money saved can and should be used for the development of children ...



Average duration of the heating period in Ukraine, in days

Idea:

to show how to change the regulatory documents for the heating season due to climate change.

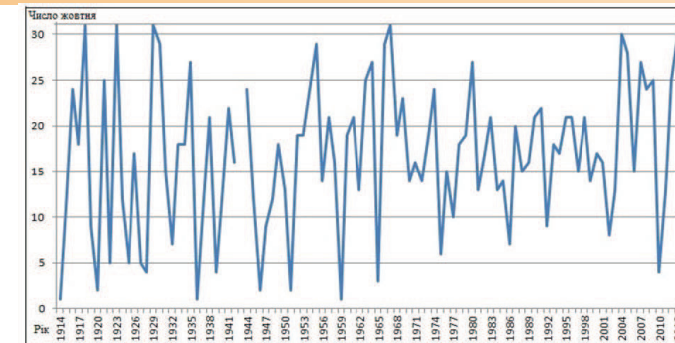


Fig. 1. Changes in the dates of the beginning of the heating period in Kiev.

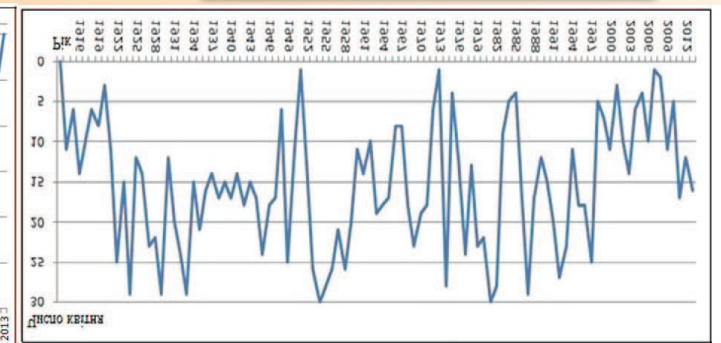


Fig. 2. Changes in the dates of completion of the heating period in Kiev.

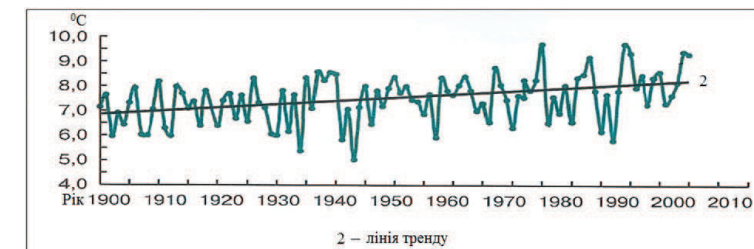


Fig. 3. Changes in average annual air temperature in Kiev. For the period from 1990 to 2010

SUPERVISOR

The work is very relevant and important for the state economy. The author carried out a fundamental research, the results of which allow to optimize the process of adaptation of heat supply systems to new climatic conditions. This issue is especially important in large cities, where the original «islands of heat» are formed. The research is conducted on its own, based on the primary observations of the State Hydrometeorological Service and is new in this area.

Lipinsky V.M.,
Honored Environmental Guard of Ukraine

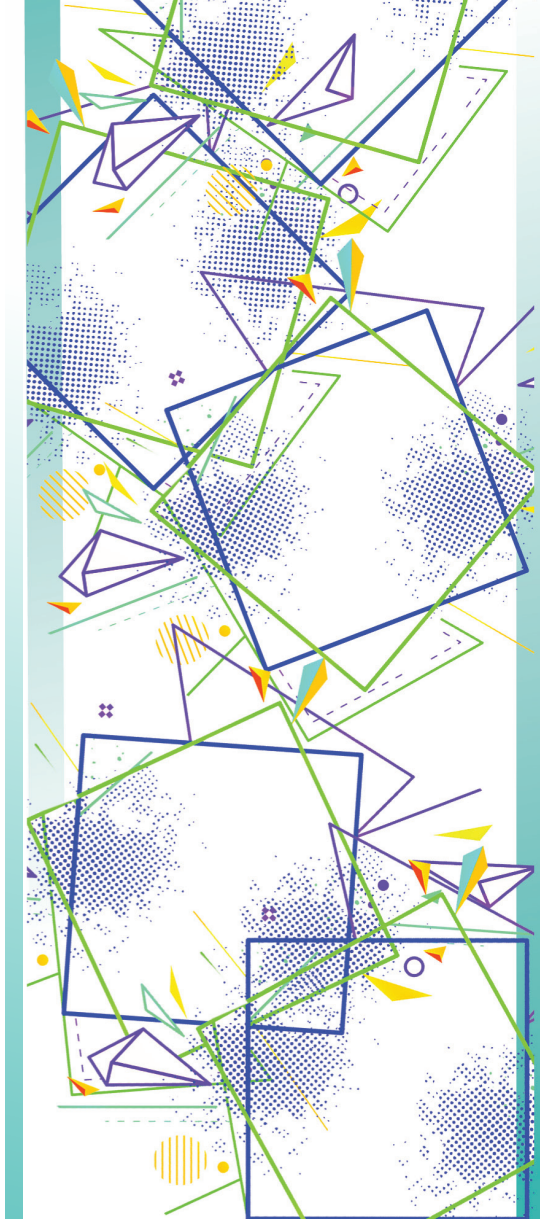
INDEPENDENT EXPERT

The study provides a clear idea of how climate change affects everyday life. Reducing the duration of the heating period is one of the important consequences of this global phenomenon, which can and must be taken into account. After all, rational use of energy resources is an obligatory point for all countries in the 21st century. Therefore, the analysis is extremely relevant.

Snizhko S.I.,
Doctor of Geography, Professor, Head of Meteorology Department and Climatology Department of Taras Shevchenko National University of Kyiv, Honored Scientist of Ukraine

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Information publication

Top-20 ideas
Of students
of Kyiv Minor Academy of Sciences
2018

Responsible for the issue Polishchuk.I.A.

Compiler Zemlyak N.Ya.

Literary editor Suhomlin O.Ju.

Design, layout Kovtun M.Ja.

Corrector Bratashchuk I.V.

Translator Fedoseyeva I.A.

Printing Lopushenko V.M.

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