



BELGOROD STATE NATIONAL RESEARCH UNIVERSITY  
DEPARTMENT OF FOREIGN LANGUAGES AND PROFESSIONAL COMMUNICATION,  
BELGOROD INSTITUTE OF CROSS-CULTURAL COMMUNICATIONS  
AND INTERNATIONAL RELATIONS

WE MAKE THE FUTURE

Volume III

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Belgorod 2019

BELGOROD STATE NATIONAL RESEARCH UNIVERSITY  
DEPARTMENT OF FOREIGN LANGUAGES AND PROFESSIONAL  
COMMUNICATION,  
INSTITUTE OF CROSS-CULTURAL COMMUNICATION AND  
INTERNATIONAL RELATIONS

WE MAKE THE FUTURE

Volume III

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БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ НАЦИОНАЛЬНЫЙ  
ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ  
КАФЕДРА ИНОСТРАННЫХ ЯЗЫКОВ И ПРОФЕССИОНАЛЬНОЙ  
КОММУНИКАЦИИ  
ИНСТИТУТ МЕЖКУЛЬТУРНОЙ КОММУНИКАЦИИ И  
МЕЖДУНАРОДНЫХ ОТНОШЕНИЙ

МЫ ДЕЛАЕМ БУДУЩЕЕ

Выпуск III

Сборник тезисов научных докладов студентов по итогам работы  
межинститутского круглого стола „WE MAKE THE FUTURE“  
(апрель-май 2019 г.)

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Сборник тезисов научных докладов охватывает широкий спектр актуальных проблем современной науки, отражает результаты теоретических и научно-практических исследований студентов и магистрантов очной формы обучения разных специальностей.

Ответственность за содержание докладов полностью несут авторы публикаций.

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## SECTION 1. NATURAL AND HUMANITARIAN SCIENCES

### ASSESSMENT OF RADIAL GROWTH OF QUERCUS ROBUR L. WOOD IN PROTECTIVE FOREST-EXTENDING ON THE TERRITORY OF BELGOROD

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The study is devoted to the assessment of radial growth of *Quercus robur* L. wood in protective forest-extending on the territory of Belgorod.

The dendrochronological method used for this study helps to determine and date the exact age of wood objects and fragments of tree trunks, as well as wood products, if they have retained a sufficiently large number of annual rings from the original material.

The areas of application of dendrochronological information are most often archeology and paleoclimatology, as well as forensic science and ecology.

The principle of the dating method itself is quite simple: for a dated object, a thickness chart is plotted for the layers that are preserved in it, this chart is compared to the dendrochronological scale of the corresponding tree species from the area where the item originates from, and if the scale contains a comparable sequence of annual rings thickness, we can conclude that the object under study was made in the corresponding period of time.

The cores were obtained in October 2018 from the trunks of living trees with the help of the incremental drill Pressler (Haglöf 400 mm). Through drilling live wood was taken perpendicular to the longitudinal axis of the tree trunk at a height of 1.3 m. on the western side of the trunk in healthy trees.

The trees chosen for this task had to meet the following requirements: no signs of damage and oppression, a dense crown and intact foliage (category of life status 1-2).

Each sample was assigned an individual number. Measurement of the width of the annual rings was carried out in accordance with the generally accepted method on a high-precision device for measuring annual rings LINTAB-6 operating on the software platform TSAP-Win (Professional 4.0).

The English oak was chosen an object of the dendrochronological research since it is considered the main tree-forming species of Belgorod and is of scientific value.

The data obtained from the results of the study will be one of the elements that form the base of dendrochronological information in the Belgorod Region.

The territory of the city on which this variety of oaks grows is very limited, that is why a 4-row roadside protective strip was chosen for sampling the study, containing the following tree species: pedunculate oak, green ash, and common maple.

With the help of TSAP-Win™ Professional, the resulting average chronology of Half-chrono was constructed according to individual chronologies for each research area. To control the accuracy of the measurements, a cross-dating procedure with Half-chrono was used.

The result of cross-dating are indicators of the compatibility of individual chronologies. Thus, the resulting generalized tree-ring chronology is built on samples 1, 2, 4, 6, 8, 9, 10, 11, 12 with sufficient compatibility indicators. The remaining samples are excluded from further analysis.

Thus, according to the schedule, it is possible to determine that the growth index has a certain dynamic, it highlights the years of minimum: 1960, 1972, 2018, as well as years with high growth rates: 1958, 1963, 1981, 2007, 2012.

To identify the causes of fluctuations in the increment, a correlation analysis of the indices of the radial increment, as well as air temperature, according to the meteorological stations of the city of Belgorod was made.

Based on the correlation analysis of air temperature, it can be concluded that the most significant month for the formation of the growth of the annual ring in these conditions was May, the remaining months were less significant, and statistics indicate this, which is about 30%.

Accordingly, a direct link between climatic conditions and growth indicators has not been identified. Therefore, other climatic indicators need to be analyzed to diagnose the dynamics of climatic conditions. Other factors such as competition, access to groundwater, anthropogenic load, solar activity should also be taken into account.

## LIGNIN - DEPLETING MICROSCOPIC FUNGI AND THEIR USE IN BIOTECHNOLOGY

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The aim of this research is to study the possibility of use of microscopic fungi for lignin depletion. The main role for the implementation of the task is attributed to ligninolytic strains of micromycetes.

Nowadays researchers face the task of finding various methods of forest waste recycle. There is also an active search for technologies for utilization of wood waste that cannot be recycled (branches, bark, etc.). In this aspect lignin causes most problems due to the complexity of its nature and the instability of the polymer.

Lignin is a class of complex organic polymers that form key structural materials in the support tissues of vascular plants and some algae. Lignins are particularly important in the formation of cell walls, especially in wood and bark, because they lend rigidity and do not rot easily.

Chemically, lignins are cross-linked phenolic polymers. They can irreversibly change their properties as a result of chemical and thermal effects. Modified lignin-containing substances, which can be found in production wastes, show considerable chemical and biological activity. Also, recent studies have shown that technical lignins have mutagenic activity. Besides, they can spontaneously combust with the release of nitrogen, sulfur and other harmful compounds.

The ability of micromycetes to destroy lignocellulosic substrates is due to the presence of a ligninolytic complex, the main enzymes of which are laccases, lignin peroxidase and manganese peroxidase.

Laccases are copper-containing glycoproteins that catalyze the oxidation of polyphenols and polyamines, of some inorganic ions in the reduction reaction of molecular oxygen to water.

Manganese peroxidase is a glycoprotein, which contains heme as a cofactor. The enzyme oxidizes  $Mn^{2+}$  ions to  $Mn^{3+}$  in the presence of hydrogen peroxide, which in turn oxidize phenol derivatives, hydroxylate aromatic compounds.

Lignin peroxidase is a heme-containing glycoprotein catalyzing the cleavage of C-C bonds in polymer lignin molecules, the oxidation of benzyl alcohols and methyl groups in benzyl compounds, the opening of the aromatic ring. It has been established that about 112 cultures of microorganisms – probable biodestructors of wood – have been isolated from natural sources.

In the course of this work, we identified and assessed the lignin-destructive ability of the fungi *Trichoderma*, *Ulocladium*, *Fusarium* and *Curvularia*.

Degradation of lignin was carried out in the conditions of deep cultivation of micromycetes on an optimized Czapek medium. Concentration of lignin in the medium was 0.06%, 0.45%, 0.7% and 1% (as a source of lignin the drug Filtrum STI crushed into powder was used). The medium of the same composition without the addition of lignin was used as control. Microorganisms were cultured for 7 days at 24 °C.

On the basis of the obtained results, it can be concluded that the most intensive growth on optimized Czapek medium with the addition of lignin is observed for *Fusarium* and *Ulocladium*. For the fungus *Fusarium* the greatest growth is observed for a lignin concentration of 0.7%, and 0.06% for *Ulocladium* accordingly.

The results of the experiments prove the ligninolytic enzyme activity of micromycetes as their morphology alters in the optimized Czapek medium with the addition of lignin. Therefore, lignin-depleting microscopic fungi can be considered a perfect solution for lignin destruction and can be used, for example, for wood waste utilization.

## NATURAL AND SYNTHETIC DIAMONDS

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Increasing the processes of globalizing is the basic characteristic of the modern international economic system, that is why possibilities and perspectives of the development of diamond industry are gaining more and more importance. It is widely accepted that when the word “diamond” is used everybody imagines a

beautiful and shining gemstone that one can see in the engagement rings, royal treasures, queen`s tiaras, and museums. But it should be noted that not more than 30% of diamonds are used in jewelry. All the rest are called industrial diamonds and applied in different industrial spheres. That is because diamond is the hardest substance on the earth characterized by the highest thermal conductivity, and these qualities allow using it for different industrial goals. For instance, applying diamonds more current can be transferred than by silicon used in semiconductors nowadays, and surprisingly twice the heat load is handled with the help of diamonds. Among the other applications of diamonds the most common are: wear- and corrosion-resistant coatings, special lenses, wire drawing, polishing and computer disk drives.

The other thing worth mentioning is the fact that only 3% of mined diamonds are used in industry. The rest 97% are synthetic ones produced in large quantities with the help of technologies of high pressure and high temperature (HPHT) or by Chemical Vapor Deposition (CVD). The HPHT method is similar to the natural geologic factors influencing the formation of diamonds and CVD method uses low temperature and pressure.

Based on the research of the Gemological Institute of America (GIA) a lot of synthetic diamond producers are using the CVD process as it is cheaper. Besides, this method helps to produce colorless diamonds that look like natural stones and one cannot tell the difference between synthetic or natural diamonds.

Industrial enterprises have manufactured synthetic diamonds for many years, and now the level of production has reached amazing 1500 tons per year. It goes without saying that industrial quality diamonds will play a significant role in the development of new, smart, more-powerful electronic devices.

In conclusion it should be noted, however, that synthetics are still no match for natural diamonds which are the result of open pit or underground mining. Striking 90% of diamond engagement rings in the world are made with naturally mined diamonds which present the superb reflection of the uppermost human feelings and can last for many long years.

## **GENETIC ANALYSIS OF MUTATIONS**

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This study is aimed at considering the existing methods of genetic analysis. The genetic analysis is a separate fast-growing field of genetical science which studies mechanisms of genetic determination of various species.

It is commonly accepted that the genetic analysis originated in prehistoric times. Early people used selective breeding and cross breeding to improve grain crops and livestock. Of course, it was an intuitive way of breeding aimed at receiving more food when poor crops meant starvation and death. Early people also identified the inherited lines at people.

The modern genetic analysis began with the research conducted by Gregor Mendel, who is known as “the father of modern genetics”. Between 1856 and 1863, he grew up and analyzed about 29,000 bushes of peas.

His researches showed that one of four bushes of peas had thoroughbred recessive alleles, two of four were hybrids, and one of four had purely prepotent alleles. Mendel’s experiments resulted in two generalizations: the *Law of Segregation* and the *Law of Independent Assortment*, further known as *Mendelian inheritance*.

Mendel observed various organisms and used the genetic analysis to find that the lines inherited from parents, could change between children. Later he discovered that in each cell there are genes responsible for these lines.

Now there are various types and methods of the genetic analysis: DNA sequencing, Karyotyping, Hybridological method, Cytogenetic, Biochemical, Molecular, Mathematical and Statistical and other methods. We will discuss some of them.

*DNA sequencing* was first discovered during the 1970s. This process is used to determine the order of nucleotide bases. Each molecule of DNA is made from adenine, guanine, cytosine and thymine, which determine what function the genes will have.

*Cytogenetics* studies chromosomes and their function within cells in order to identify abnormalities. Abnormalities in chromosomes cause several genetic disorders leading to developmental delay, congenital malformations, mental retardation, and infertility. Cytogenetic analysis is very crucial in the diagnosis of oncologic and hematologic disorders. It helps in the diagnosis and classification of disease as well as in planning treatment regimens and monitoring the status of disease.

*Karyotyping* is one of the many techniques that enables scientists study the human genes for genetic disorders. Karyotyping comes from the word “karyotype”. “Karyotype is a complete profile of an individual’s chromosomal set up”. Any changes in the arrangement of a karyotype point to possible genetic disorders. In other words, karyotyping is based on using a system of studying chromosomes to identify genetic abnormalities and evolutionary changes in the past.

*Polymerase chain reaction* studies the amplification of DNA. It helps researchers to get the large quantities of DNA for various procedures and



experiments in molecular biology, evolutionary biology, medical diagnostics or forensic analysis.

Due to these and many other methods new types of sciences have emerged that use the foundations of genetic analysis.

*Reverse genetics*, for example, uses the methods to determine what is missing in a genetic code or what can be added to change that code.

*Genetic linkage studies* analyze the spatial arrangements of genes and chromosomes.

In conclusion it should be said that various methods and techniques used for genetic analysis revolutionized not only medicine, but many other fields of science and. They are widely used in biology, agriculture, forensic science and even in family genealogical studies for search and identification of possible relatives.

## **COGNITIVE GEOGRAPHY. WHAT IS IT LIKE?**

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Cognitive geography is the science studying cognition, primarily human cognition, space, place, and environment. Cognition means knowledge and is specific for sentient entities, including humans, nonhuman animals, and artificially intelligent machines. Cognitive geography touches some aspects of geographical cognition which are of only marginal relevance to geographical information science. Humans are able to manipulate, interpret, and store information about changing environments and these skills are very important for critical human survival activities. It is necessary to understand temporal and spatial changes in spaces or maps, to manipulate temporal geographical data, and navigate through changing spaces through the models of the cognitive aspects of dynamic spatial representations. Moreover, using representational information people can deeply understand the context of the problem, and it can result in the adoption of different spatial metaphors to reason and understand.

Geographers, psychologists and other scientists, studying cognition (Dmitri Nikolayevich Zamyatin, Leonid Viktorovich Smirnyagin, Ivan Igorevich Mitin), found out that mind depends as on the brain as on the nervous system. Russian

geographer Nadezhda Zamyatina was the first Russian geographer devoted her scientific research to specific problems of cognitive geography.

The findings of other cognitive scientists, cognitive geographers in the beginning of the twenty first century allowed seeing a great interest in cognitive neuroscience – the scientific discipline, studying mind – brain relations. Much recent interest in cognitive neuroscience on the part of geographers and others concerns new technologies of brain scanning, especially functional magnetic resonance imaging. Interestingly, cognitive geographers do not consider mind to be relevant to brain; they are sure mind does not emerge from brain, but it also emerges from the human body, existing in a social and physical world.

The fact is, cognitive geography originated as a component of the behavioral approach in human geography and shares much of the philosophical character of behavioral geography. The behavioral approach in human geography can be understood by studying it at the disaggregate level of analysis, that is, at the level of an individual. Behavioral geographers are involved into examining the individuals' behavior that allows seeing that individuals vary from one another because of such factors as their intellectual abilities, gender, education, and culture. Behavioral geographers admit that models of human activity and interaction can be improved by incorporating into them more realistic assumptions about human behavior. As a case point, the assumption of economic rationality holds that economic agents are motivated solely to maximize profit, and have complete and accurate knowledge of profit relevant information. This assumption is usually considered quite unrealistic, especially when studying individuals as economic agents.

It is interesting to mention; behavioral geographers argue that assumptions about human psychology like that of economic rationality can be replaced with assumptions that are more realistic. Gravity models prove that spatial interaction declines as a function of increasing distance, raised to the power of some exponent. Behavioral geographers assert that the distance term should properly refer to cognitive distance rather than actual physical one or cognitive travel time rather than actual travel time, and etc.

Thus, studying cognitive geography allows learning the field of geography, touching the aspects of spatial representations and mechanisms of their formation in various aspects of human activity. In the future it would be necessary to study this issue in details.

## **SOME FACTS ABOUT THE MYSTERY OF BLACK HOLES**

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Black holes are of great interest not only for astronomers but for ordinary people as well. There is little information about black holes and people are scared of them. That's why we'd like to present some scientific facts about them.

Interestingly, a black hole isn't truly a hole. It's quite the opposite. A black hole is a place in space containing a lot of stuff packed very closely together. And it can grow in mass. These objects are rich in mass and therefore in gravity and nothing can escape them, and even light. That makes them the most extreme objects in the Universe.

And black holes aren't only massive, but also dense. Density is a measure which shows how tightly mass is packed in the space. Try to imagine a black hole in the size of New York City. Such hole could have as much mass and gravity as the Sun has.

The majority of black holes are formed as the result of a giant star functioning. One star is at least 10 times more massive than the Sun, and runs out of fuel and collapses. The star shrinks and shrinks. Eventually, it forms a tiny dark point known as a stellar-mass black hole. This black hole, which is much smaller than the star that made it, has the same mass and gravity.

The Milky Way contains at least 100 million black holes. Astronomers estimate that a new one is formed every second. It's important to mention that small- and medium-sized stars, one of which is the Sun, cannot form black holes. In the case they run out of fuel, they just become small planet-sized objects called white dwarfs.

People worry if a Black Hole Could Destroy the Earth. Black holes do not move in space capturing stars, moons and planets. The Earth will not be captured by a black hole because no black hole is close enough to the objects of solar system.

Even if a black hole, of the same mass as the Sun is, will replace the Sun then it will not disappear in the black hole. The black hole would have the same gravity as the sun. The Earth and the other planets would go round the black hole

as they revolve round the sun. The sun will never become a black hole. Being the star the Sun is not big enough to make a black hole.

Stellar-mass black holes may be ordinary ones, but they are also considered shrimps. At the other edge of the spectrum there are giants called super massive black holes, which may be in mass as a million or even a billion stars are. Stellar-mass black holes are the most powerful objects in the Universe. And due to their gravity they hold millions or even billions stars forming a galaxy. In fact, a super massive black hole called Sagittarius A\* which was discovered more than 40 years ago holds the galaxy.

Nothing can escape a black hole – neither non-visible light, X-rays, infrared light, microwaves or any other form of radiation. So black holes are invisible. Astronomers have had to “observe” them by studying how they affect their surroundings.

It is important to mention, black holes often form powerful bright jets of gas and radiation that are visible only through telescopes. Physicists can estimate the size of the black hole according to the size of its gas jet.

Jonelle Walsh – an astronomer at Texas University – among other astronomers continues to find and observe more black holes. Several years ago Walsh J. told that such observations can help untangle the complicated relationships of black holes and stars, galaxies and clusters of galaxies. Walsh J. believes that one day the research “will make people understand how everything [in the universe] works, forms and grows”.

Summing up, it should be said that the concept of the nature of black holes is still only at the first step of its future development and probably black holes will have to play a prominent role. They are too far from the Earth therefore we cannot speak with a high accuracy of their properties and the effects they make. The theory of relativity allows predicting some properties of these amazing objects associated with space-time. Evidently, we’ll learn in the future how true the predictions can be.

## **ORGANISCHE CHEMIE**

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Die Organische Chemie beschäftigt sich fast ausschließlich mit Kohlenstoffverbindungen, die in extrem vielfältigen Formen auf der Erde vorkommen und die Grundlage des Lebens bilden. Durch seine vier Valenzelektronen kann Kohlenstoff vier Bindungen eingehen, was komplexe Moleküle möglich macht. Zusätzlich spielen aber auch Wasserstoff, Sauerstoff, Stickstoff, Schwefel und Phosphor eine große Rolle, da sie ebenfalls zentrale Stellen in der Chemie des Lebens besetzen. Aufgrund der hohen Komplexität und Vielfältigkeit ist es kaum möglich, die Organische Chemie auf wenige Bereiche oder Prinzipien zu reduzieren. Daher kann hier nur ein kleiner Teil erwähnt werden.

Die Eigenschaften des Kohlenstoffs machen ihn zu einem Element mit zentraler Rolle in der Organischen Chemie. Durch seine vier Valenzelektronen kann Kohlenstoff auf komplexe Weise Bindungen zu vielen verschiedenen Stoffen herstellen, die oftmals sehr stabil und beständig sein können. Zudem kann Kohlenstoff Mehrfachbindungen zu anderen Kohlenstoffen oder Atomen herstellen, bei denen mehrere Valenzelektronen gleichzeitig an der Bindungsbildung beteiligt sind. So können Doppel- oder Dreifach-Bindungen entstehen, dem ihrerseits besonderen Reaktionsverhalten zeigen.

Zudem können sich mindestens drei Kohlenstoffatome zu zyklischen Systemen verbinden, welche energetisch häufig sehr günstig sind. Unter den zyklischen Verbindungen kann man ebenfalls noch heterozyklische Verbindungen (mindestens ein Nicht-Kohlenstoffatom an der Ringbildung beteiligt) oder aromatische Verbindungen unterscheiden. Letztere unterscheiden sich in ihren chemischen Eigenschaften ziemlich von anderen zyklischen Kohlenstoffverbindungen. Sie besitzen ein besonderes Elektronensystem, bei dem die bindenden Pi-Elektronen über den gesamten Ring delokalisiert sind. Dies ist ein energetisch sehr günstiger Zustand und sorgt für eine hohe Stabilität und eigene Reaktionstypen.

Die Organische Chemie bietet eine Vielzahl an Stoffklassen und eine umfangreiche Nomenklatur. Aufgrund der unüberschaubaren Vielfalt wird ein System benötigt, um auch neue Stoffe nachvollziehbar, systematisch und rational zu benennen. Diese Aufgabe übernimmt die International Union of Pure and Applied Chemistry (IUPAC), welche verbindliche Nomenklaturregeln für Stoffe aufgestellt hat. Diesen zufolge kann und muss der IUPAC-Name eindeutig sein und auf das Molekül geschlossen werden.

Auch das systematische Zusammenfassen von Molekülen mit iterativem Aufbau und gleicher funktioneller Gruppe wird vorgenommen. So unterscheidet man in der Organischen Chemie etwa 15 grundlegende Stoffklassen, von denen einige als homologe Reihe vorliegen. Eine homologe Reihe zeichnet sich durch eine gleiche Grundstruktur aus, die mit jedem Glied der Reihe um eine weitere Kohlenstoff-Einheit erweitert wird und somit systematisch benannt werden kann. Als einfaches Beispiel sei die homologe Reihe der Alkane genannt, angefangen bei

Methan ( $C_1H_4$ ), Ethan ( $C_2H_6$ ), Propan ( $C_3H_8$ ) usw. und die nach der Summenformel  $C_nH_{2n+2}$  beliebig fortgesetzt werden kann.

Die große Vielfalt an Stoffen und möglichen Reaktionen entsteht nicht zuletzt durch die Vielzahl an funktionellen Gruppen, die an das Kohlenstoffatom gebunden sein können und jeweils bestimmte Reaktionsverhalten zeigen. So bietet alleine die Verbindung zu Sauerstoff mindestens sechs grundlegende, verschiedene funktionelle Gruppen, je nach Oxidationszustand des Kohlenstoffatoms. Die einfachste Gruppe stellen zunächst die Alkohole dar, bei denen ein Wasserstoffatom am Kohlenstoff durch eine Hydroxy-Gruppe substituiert ist ( $-OH$ ). Liegt das Sauerstoffatom hingegen mit einer Doppelbindung zum Kohlenstoff vor, erhält man eine Carbonylgruppe ( $-CO$ ), die je nach Lage im Molekül als Aldehyd (endständig,  $C-CO-H$ ) oder Keton (innerhalb des Moleküls,  $C-CO-C$ ) auftreten kann.

Auf ähnliche Weise können neben Sauerstoff auch andere Elemente wie Stickstoff oder auch Schwefel an den Kohlenstoff gebunden sein.

Aus der Vielfalt an Stoffklassen und funktionellen Gruppen ergeben sich entsprechend viele Reaktionsmöglichkeiten und Reaktionstypen. Jedoch lassen sich trotz der Beteiligung unterschiedlicher Moleküle oder Gruppen teilweise bestimmte Grundprinzipien feststellen, die in abgewandelter Form immer wieder vorkommen.

So treten immer wieder Substitutionen auf, bei denen eine funktionelle Gruppe durch eine andere ausgetauscht wird. Dies kann zum Beispiel mittels Radikalen geschehen (radikalische Substitution), durch Nucleophile (nucleophile Substitution) oder vor allem an Aromaten mittels Elektrophilen (elektrophile Substitution). Als Nucleophil bezeichnet man Atome in Molekülen, die mit einem freien Elektronenpaar (also einer negativen Polarisierung oder negativen Ladung) eine neue kovalente Bindung zu einem positiv polarisierten Atom ausbilden können. Des Weiteren kommen Eliminierungs-Reaktionen vor, in denen Atome oder Molekülteile aus einem Molekül während der Reaktion entfernt werden. Dies führt in vielen Fällen zur Bildung von Mehrfachbindungen am zurückbleibenden Molekül.

Wie so oft gibt es auch unter den verschiedenen Reaktionstypen viele Ausnahmen und Sonderfälle, weshalb häufig eine genaue Betrachtung der Problemstellung notwendig ist.

## WHY BLACK HOLE INTERIORS GROW ALMOST FOREVER

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Leonard Susskind, a pioneer of string theory, the holographic principle and other big physics ideas spanning the past half-century, has proposed a solution to an important puzzle about black holes. The problem is that even though these mysterious, invisible spheres appear to stay a constant size as viewed from the outside, their interiors keep growing in volume essentially forever. How is this possible?

In a series of recent papers and talks, the 78-year-old Stanford University professor and his collaborators conjecture that black holes grow in volume because they are steadily increasing in complexity – an idea that, while unproven, is fueling new thinking about the quantum nature of gravity inside black holes.

Black holes are spherical regions of such extreme gravity that not even light can escape. First discovered a century ago as shocking solutions to the equations of Albert Einstein's general theory of relativity, they've since been detected throughout the universe. They typically form from the inward gravitational collapse of dead stars. Einstein's theory equates the force of gravity with curves in space-time, the four-dimensional fabric of the universe, but gravity becomes so strong in black holes that the space-time fabric bends toward its breaking point – the infinitely dense “singularity” at the black hole's center.

According to general relativity, the inward gravitational collapse never stops. Even though, from the outside, the black hole appears to stay a constant size, expanding slightly only when new things fall into it, its interior volume grows bigger and bigger all the time as space stretches toward the center point. For a simplified picture of this eternal growth, imagine a black hole as a funnel extending downward from a two-dimensional sheet representing the fabric of space-time. The funnel gets deeper and deeper, so that infalling things never quite reach the mysterious singularity at the bottom. In reality, a black hole is a funnel that stretches inward from all three spatial directions. A spherical boundary surrounds it called the “event horizon,” marking the point of no return.

Since at least the 1970s, physicists have recognized that black holes must really be quantum systems of some kind – just like everything else in the universe.

What Einstein's theory describes as warped space-time in the interior is presumably really a collective state of vast numbers of gravity particles called "gravitons", described by the true quantum theory of gravity. In that case, all the known properties of a black hole should trace to properties of this quantum system.

Indeed, in 1972, the Israeli physicist Jacob Bekenstein figured out that the area of the spherical event horizon of a black hole corresponds to its "entropy." This is the number of different possible microscopic arrangements of all the particles inside the black hole, or, as modern theorists would describe it, the black hole's storage capacity for information.

Bekenstein's insight led Stephen Hawking to realize two years later that black holes have temperatures, and that they therefore radiate heat. This radiation causes black holes to slowly evaporate away, giving rise to the much-discussed "black hole information paradox," which asks what happens to information that falls into black holes. Quantum mechanics says the universe preserves all information about the past. But how does information about infalling stuff, which seems to slide forever toward the central singularity, also evaporate out?

The relationship between a black hole's surface area and its information content has kept quantum gravity researchers busy for decades. But one might also ask: What does the growing volume of its interior correspond to, in quantum terms? "For whatever reason, nobody, including myself for a number of years, really thought very much about what that means", said Susskind. "What is the thing which is growing? That should have been one of the leading puzzles of black hole physics".

In recent years, with the rise of quantum computing, physicists have been gaining new insights about physical systems like black holes by studying their information-processing abilities – as if they were quantum computers. This angle led Susskind and his collaborators to identify a candidate for the evolving quantum property of black holes that underlies their growing volume. What's changing, the theorists say, is the "complexity" of the black hole – roughly a measure of the number of computations that would be needed to recover the black hole's initial quantum state, at the moment it formed. After its formation, as particles inside the black hole interact with one another, the information about their initial state becomes ever more scrambled. Consequently, their complexity continuously grows.

Using toy models that represent black holes as holograms, Susskind and his collaborators have shown that the complexity and volume of black holes both grow at the same rate, supporting the idea that the one might underlie the other. And, whereas Bekenstein calculated that black holes store the maximum possible amount of information given their surface area, Susskind's findings suggest that they also grow in complexity at the fastest possible rate allowed by physical laws.

John Preskill, a theoretical physicist at the California Institute of Technology who also studies black holes using quantum information theory, finds Susskind's idea very interesting. "That's really cool that this notion of computational complexity, which is very much something that a computer scientist might think of



and is not part of the usual physicist's bag of tricks", Preskill said, "could correspond to something which is very natural for someone who knows general relativity to think about", namely the growth of black hole interiors.

Researchers are still puzzling over the implications of Susskind's thesis. Aron Wall, a theorist at Stanford (soon moving to the University of Cambridge), said, "The proposal, while exciting, is still rather speculative and may not be correct". One challenge is defining complexity in the context of black holes, Wall said, in order to clarify how the complexity of quantum interactions might give rise to spatial volume.

A potential lesson, according to Douglas Stanford, a black hole specialist at the Institute for Advanced Study in Princeton, New Jersey, "is that black holes have a type of internal clock that keeps time for a very long time. For an ordinary quantum system", he said, "this is the complexity of the state. For a black hole, it is the size of the region behind the horizon".

If complexity does underlie spatial volume in black holes, Susskind envisions consequences for our understanding of cosmology in general. "It's not only black hole interiors that grow with time. The space of cosmology grows with time", he said. "I think it's a very, very interesting question whether the cosmological growth of space is connected to the growth of some kind of complexity. And whether the cosmic clock, the evolution of the universe, is connected with the evolution of complexity. There, I don't know the answer".

## **THE STUDY OF THE EFFECT OF CERTAIN BIOLOGICAL DRUGS ON POTATO DISEASES IN THE CONDITIONS OF THE BELGOROD DISTRICT**

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Currently, the main ways to protect potatoes from disease is a chemical method. However, this method has several significant drawbacks, including the deterioration of the phytosanitary and ecological status of agroecosystems. Therefore, the urgent issue is the alternative replacement of chemical pesticides with more environmentally friendly biological products.

The aim of our study was to evaluate the effectiveness of the use of biological and bio-organic drugs to protect potatoes from the dominant types of diseases.

The object of the study was potato diseases caused by phytopathogenic fungus.

The subject of the research is the effect of biological drugs *Phytop* 8.67, *Trichodermin* and *Phyto-Sport* on potato fungal diseases.

The following objectives of the study were set:

- 1) to identify the dominant types of potato diseases in the Belgorod district;
- 2) to assess the effect of pre-sowing treatment of potato seeds with biological drugs *Trichodermin*, *Phytop* 8.67 and organomineral drug *Phyto-Sport* on the development and prevalence of fungal diseases;
- 3) to evaluate the economic efficiency of biological drugs *Trichodermin*, *Phytop* 8.67 and *Phyto-Sport* during potato cultivation;
- 4) to study the effect of drugs *Trichodermin*, *Phytop* 8.67 and organomineral drug *Phyto-Sport* on the development of potato plants.

The study was carried out on the potato planting in the Belgorod district. Experiment foundation, observations and recordings were carried out according to the standard methods. The experiment was repeated four times. Untreated potato tubers were used as a control variant. Preparations were made by the way of preplant treatment of potato tubers.

The following biological drugs were used for the experiment.

*Phytop* 8.67 is based on saprotrophic bacteria: *Bacillus subtilis* and *Bacillus Amyloliquefaciens*.

*Trichodermin* is a drug made on the basis of the soil antagonist fungus *Trichoderma lignorum*.

*Phyto-Sport* is an organic mineral fertilizer based on nitric and fulvic acids.

During the study, the following results were obtained. The potatoes in the test plot where the study was conducted were infected by fungal diseases such as *Phytophthoros* and *Alternaria*.

It should be mentioned that the highest protective effect against the incidence of *Phytophthoros* was shown by *Trichodermin* and *Phyto-Sport*. The biological efficiency of these drugs was 80% and 81%, respectively. Treatment of tubers with *Phytop* 8.67 was less effective. The biological efficiency of the drug was 15%.

*Phyto-Sport* was the most effective against *Alternaria*. The signs of the disease on the plants treated with this drug were not noted. The biological efficiency of *Trichodermin* was not above 60%. The biological efficiency of *Phytop* 8.67 was 5%.

The assessment of economic efficiency showed that the greatest safety of the crop (53 and 51%) from diseases was provided by the use of *Phyto-Sport* and *Trichodermin*. The economic efficiency of the bacterial drug *Phytop* 8.67 was significantly lower and amounted to 17%. The increase in yield in the experiment

was provided by increasing the elements of its structure, such as the number of tubers and their mass.

We can conclude that the effect of drugs is reliable and can be recommended for use in the district.

## **DIE WINDENERGIE - SO FUNKTIONIERT ES**

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Der vorliegende Vortrag beschäftigt sich mit dem Thema „Die Windenergie und Stromerzeugung“. Die Windenergie ist eine tragende Säule der Energiewende. Sie hat sich in den vergangenen Jahren rasant entwickelt und leistet heute einen bedeutenden Beitrag zur Stromversorgung in der ganzen Welt. Die Windenergie bietet das wirtschaftlichste Ausbaupotenzial unter den erneuerbaren Energien.

Am Anfang betrachten wir die Nutzung des Windes mit Hilfe des Rückblicks in die Geschichte. Die erste Windkraftnutzung erfolgte mit Windrädern mit vertikaler Achse. Nach Meinung von Historikern nutzte man die Kraft des Windes schon 1700 v. Chr. im Orient. Man benutzte diese Windkraft zur Bewässerung der Ebenen Mesopotamiens.

Durch gebliebene Schriften ist auch belegt, dass es in Afghanistan im 7. Jahrhundert n. Chr. schon viele Mühlenbauer gegeben hat. Noch heute gibt es in Afghanistan und im Iran Ruinen von Windrädern, die ältesten mit vertikaler Achse. Das erste Windrad mit horizontaler Achse war die Bockwindmühle. Während der ersten Jahrzehnte des 20. Jahrhunderts verloren die Windmühlen mehr und mehr an Bedeutung, bis sie im dritten Jahrzehnt nicht mehr wirtschaftlich genutzt wurden.

Die heutigen Arten von Windkraftanlagen werden in solche mit horizontaler und vertikaler Drehachse unterteilt. Die Windkraftanlagen mit horizontaler Drehachse sind häufiger zu vertreten. Sie besitzen ein Fundament auf dem ein Turm steht. Auf diesem Turm ist eine sogenannte Gondel befestigt, in der sich der Generator, das Getriebe und die Nabe befinden. Die Gondel sitzt entweder drehbar auf dem Turm oder sie ist fest. Bei drehbarer Gondel können die Rotorblätter immer optimal in Windrichtung verstellt werden.

Jetzt gehen wir zu den wichtigen positiven Aspekten der Windkraft in unserer Zeit an. Vor allem ist das die Erneuerbarkeit, welche jedoch bei allen alternativen Energien vorkommt. Wind wird immer vorhanden sein, zumindest solange es die Erde noch gibt, genauso wie Wasser und Sonne.

Was die negativen Aspekte der Windkraftgegner betrifft, so behaupten sie, dass die Windenergie keine Alternative sei. Wenn man von der Nennleistung ausgeht, läuft ein Windkraftwerk nur 77 Tage pro Jahr, während es die restlichen 288 Tage stillsteht. Daher sind Windmühlen in wirtschaftlicher Hinsicht praktisch unrentabel. Die Windkraftgegner behaupten auch, dass die Bevölkerung leiden müsse. Noch ein Argument ist, die Windkraftanlagen stören das Landschaftsbild. Wenn Windkraftanlagen an bestimmten Standorten gebaut sind, können sie Vogelrouten stören und Vögel durch die Rotorbewegungen zerstückeln. Nur wenige profitieren von der Windenergie. Die Hersteller der Windkraftanlagen und die Grundbesitzer, die das Land verpachten verdienen an der Windenergie. Der Umwelt und damit der Bevölkerung nützt Windkraft überhaupt nichts.

Zuletzt als Fazit: Der Energieträger Wind ist kostenlos und unbegrenzt verfügbar. Windenergieanlagen nutzen diesen „Rohstoff“, indem der Rotor der Anlage die Bewegungsenergie des Windes zunächst in mechanische Rotationsenergie umformt. Ein Generator wandelt diese anschließend in elektrische Energie um. Entscheidend für einen hohen Stromertrag sind vor allem hohe mittlere Windgeschwindigkeiten und die Größe der Rotorfläche. Bei zunehmender Höhe über dem Erdboden weht der Wind stärker und gleichmäßiger. Je höher die Windenergieanlage und je länger die Rotorblätter, desto besser kann die Anlage das Windenergieangebot ausnutzen.

Die Stromerzeugung durch Windenergieanlagen spielt daher eine bedeutende Rolle für die Energiewende. Wie bei allen baulichen Anlagen stellt auch die Errichtung von Windenergieanlagen einen Eingriff in die Natur und die Landschaft dar. Es ist daher wichtig, von vornherein Windenergiestandorte auszuweisen, bei denen potenzielle Beeinträchtigungen möglichst gering ausfallen. So sind beispielsweise bereits vorbelastete Flächen an Infrastrukturtrassen wie Straßen oder Freileitungen besonders geeignet. Um Beeinträchtigungen von Pflanzen und Tieren sowie ihrer Lebensräume zu begrenzen, sollten jedenfalls naturschutzfachlich besonders wertvolle Bereiche wie etwa Naturschutzgebiete oder gesetzlich geschützte Biotope von Windenergieanlagen freigehalten werden. Aber auch außerhalb geschützter Gebiete oder Objekte ist bei der Planung und Genehmigung von Windenergieanlagen große Sorgfalt nötig, um dem Naturschutz gerecht zu werden.

## **DISTURBANCE HYDROLOGY**

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Hydrology is the study of water on the Earth: where it is and how it is used. In hydrology one of the research directions is the study of the disruption of hydrologic functioning following disturbances and further recovery or change of objects of the hydraulic network. Disruption of water systems is associated with both natural and anthropogenic factors. More over human influence contributes to an increase in the frequency and severity of these disturbances, which leads to aggravation of hydrologic problems.

Major research challenges, according to Benjamin B. Mirus, et al., include the lack of continuous pre and „postdisturbance monitoring hydrologic impacts and the preponderance of overlapping or compounding, disturbance sequences”. Taking into account the change of natural factors in time it is also important to consider the time corresponding to the recovery of the hydrological system.

Water supply services and technical equipment that regulates natural phenomena have an impact on the disruption of hydrological processes. Landscape ecological disturbances also influence hydrological functions and biodiversity of “equated systems”. Previously, environmentalists presented these disturbances as discrete disruptions, which were evaluated by the criteria: abruptness, magnitude, duration.

Beyond the distinction regarding the temporal nature of the actual disturbances, it is necessary to consider the timing of the associated hydrologic impacts relative to the potential for system recovery, the stability of the hydrological system after disturbances is characterized by the degree of restoration of these functions, as well as ecosystem services recover within timescales that minimize costs to life, property, and economic assets.

Ecology considers the definition of sustainability as the ability of a system to absorb disturbance impacts or minimize the time to return to the equilibrium state. When assessing sustainability, the frequency of repetition of disturbances, and hydrological factors are taken into account.

In addition to quantifying the effects on properties and processes in hydrology, scientists are considering the return period or the duration of

hydrological factors. A major research challenge will be constraining these timescales of disturbance recurrence and recovery intervals to quantify hydrologic resilience.

Such anthropogenic activities as mining and intensive farming have a huge impact on the hydrological system. So, socio-hydrologists distinguish bi-directional communication between humans and water supply.

The emergence of complex disturbances is associated with the action of both hydroclimatic extreme events and anthropogenic activity.

Thereby, anthropogenic impact, high temperatures, and droughts increase the likelihood of forest fires. They in turn affect stream flow, sediment transport, and corresponding natural hazards.

In some cases, it is difficult to distinguish between anthropogenic and natural disturbances, especially considering their possible hydrological impacts. In some natural phenomena, for instance, storms and others, the indirect influence of man on climate leads to serious changes in the scale and impulsivity of disturbances.

The emergence of mass changes of various processes in the critical zones is due to complex disturbances that overlap in space and time.

In conclusion, it is stated that for projection and preparation for subsequent hydrological disturbances, it is necessary to find out the way by which overlapping disturbances affect hydrologic systems.

## **WATER AS THE MOST UNUSUAL AND MYSTERIOUS LIQUID**

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Water is the most unusual and most mysterious liquid. Water is vital. It is needed everywhere – in everyday life, in agriculture and industry. Water is needed by the body more than anything else, with the exception of oxygen.

Every living creature, including a man, consists of water, so its quality greatly affects human health.

The human body consists of 70% of water. It is known that without water a person can live only 3 days, while without food 30-50 days. A glass of drinking

water acts on the digestive system as a shower, cleansing and refreshing it. If we could follow the flow of water in hidden areas of our body, we would see that water contains all the substances in the blood that circulate through the kidneys. The kidneys work harder if there is not enough water in the body.

The required amount of water for each organism individually. It depends on the person's age, physical activity, ambient temperature and air humidity. The water requirement for an adult per day is approximately two and a half liters. In this case, the water should be of adequate quality. If it contains any toxic substances, then they will be immediately distributed throughout the body. It is very important to know that water consumed during a meal dilutes the gastric juice and thus slows down the digestive process. It is best to drink water between meals.

It is water that provides oxygen and nutrients for every cell in our body. The still water is responsible for maintaining the flexibility of your body, lubricates all joints to improve the flow of all nutrients. In addition, one interesting fact is that clean drinking water acts as an excellent tool for overweight. All this is due not only to a small decrease in appetite, but also to the rapid processing of stored fat. Only due to a good water balance, fat cells can leave our body. With a sharp reduction in water consumption, a person becomes ill or his body begins to function worse. It is water that provides oxygen and nutrients to every cell of our body. A living cell needs water to maintain both its structure and normal functioning. Water helps regulate body temperature, serves as a lubricant that facilitates the movement of joints. It plays an important role in building and repairing body tissues. And still water removes slags from our body.

Water is an extremely important source of nutrition for humans. According to statistics, a person in a month normally consumes 60 liters of water (2 liters per day). Start your morning not with a cup of coffee, but with a glass of clean water. So you will help the body to wake up, the brain to earn in full force, and the intestines and stomach to digest breakfast. If you lead an active lifestyle and play sports, remember that your body needs more water – because a large part of it is lost with sweat and rapid breathing. Add to that minimum 2 liters at least 2 cups. During an illness, especially with an increase in body temperature, you really need a lot of water. Remember that in this situation, water is one of the most important drugs.

The lack of water in the body leads to chronic dehydration, which is the most important cause of many diseases: asthma, allergies, high blood pressure, overweight, headaches, dizziness and some emotional problems.

With such a large value for humans, the water must be of adequate quality, if the water contains any harmful substances, they will inevitably be distributed throughout the body. To purify natural water from particles suspended in it, it is filtered. Filters trap most bacteria. All living organisms survive thanks to energy of water.

Only where there is water there is life. Let's take care and protect it, because there is nothing more important than water on our planet.

## **ZUBEREITUNG FUNKTIONALER LEBENSMITTEL: LEBENSMITTEL EINER NEUEN GENERATION**

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Die Verschlechterung des ökologischen Zustands der Umwelt führt unweigerlich zur Zubereitung von Lebensmitteln der neuen Generation: kalorienarm, gesund, mit den ausgewogenen Zutaten und funktionellen Eigenschaften, mit der Möglichkeit der schnellen Zubereitung und der langfristigen Lagerung. Ihre Herstellung ist ohne moderne, nicht traditionelle Lebensmittelzutaten undenkbar.

Ein funktionales Lebensmittelprodukt ist ein modifiziertes Lebensmittelprodukt, das seine traditionellen Bestandteile enthält, aber für eine bessere Gesundheit sorgt.

Da die Backwaren das Grundnahrungsmittel der Mehrheit der russischen Bevölkerung sind, können sie als zweckmäßiges Lebensmittel für die Einführung von Lebensmittelzusatzstoffen mit vorbeugender und funktioneller Wirkung auf den menschlichen Körper dienen.

Die Versorgung der Bevölkerung mit hochwertigem Eiweißnahrungsmitteln ist eines der wichtigsten Probleme, da ein direkter regelmäßiger Zusammenhang zwischen Gesundheit und verzehrtem Eiweiß besteht.

Da Lysin und Tryptophan in Weizenmehl fehlen, so fügt man solche Proteinquellen wie Erdnuss- und Kürbismasse oder Sojabohnenmehl und Amaranth hinzu.

Der hohe Nährwert von Erdnusskörnern beruht auf ihrer reichen chemischen Zusammensetzung. Die Studien der physikalisch-chemischen Eigenschaften der Proteinmasse vom Erdnuss (Korngröße – 20-30 Mikron) haben gezeigt, dass es in diesem Produkt Lipide, große Mengen an löslichen, gut verdaulichen Proteinen, viel Vitamin B1 und eine kleine Menge an Vitamin PP und E gibt.

Durch die Verwendung von Erdnuss- und Kürbismassen, sowie Produkten zur Verarbeitung von Sojabohnen und Amaranthmehl wurden neue Arten von Brot und Backwaren in der Produktion entwickelt: Brot „Amarantowij“, „Michajlowskij“, „Labinskij“ und andere. Die neuen Sorten von Backwaren haben einen hohen Nährwert sowie besitzen eine ganze Reihe neuer funktioneller



Eigenschaften. Das Brot „Labinskij“ erhielt ein Diplom der Stufe III und eine Bronzemedaille auf der russischen Agro-Industrierausstellung „Goldener Herbst“.

In den letzten Jahren wurde der Entwicklung von Backwarensorten mit reduziertem Kohlenhydratgehalt wegen der Verbreitung von Stoffwechselerkrankungen, Bluthochdruck, Arteriosklerose und Diabetes mellitus eine große Aufmerksamkeit geschenkt. Eine Möglichkeit, das Sortiment solcher Backwaren zu erweitern, besteht darin, Erdapfelknollen bei der Zubereitung zu gebrauchen.

Erdapfelknollen sind ganz einzigartig: sie enthalten 18,1 24,0% Trockensubstanzen, von denen der größte Teil aus Kohlenhydraten besteht, von denen das wertvollste Inulin ist.

Inulin hat eine positive Wirkung auf die Art und quantitative Zusammensetzung der Darmflora, reinigt den Körper von giftigen und Ballastsubstanzen, verbessert Peristaltik und verlängert die Hydrolyse von Kohlenhydraten, reduziert das Niveau von Cholesterin und Triglyceriden im Blut, reduziert Lipogenese in der Leber. Die Verwendung von Inulin verbessert die Durchblutung. Dies erhöht die Geschwindigkeit des Blutflusses, erleichtert die Zufuhr von Nährstoffen und Sauerstoff zu den Geweben des Körpers und beschleunigt deren Freisetzung von Abfallprodukten der Zellen.

Inulin und Pektin, die in Erdapfelknollen enthalten sind, entfernen Schwermetallsalze, Pestizide, Radionuklide und hochdichtes Cholesterin aus dem Körper, wodurch ihre antisklerotische, galle- und harntreibende Wirkung hervorgerufen wird.

Die Analyse der chemischen Zusammensetzung von Erdapfelknollen zeigte einen beträchtlichen Gehalt an Zellstoff und einen umfangreichen Satz von mineralischen Elementen, einschließlich Eisen – 10,1, Mangan – 44,0, Calcium – 78,8, Magnesium – 31,7, Kalium – 138,2, Natrium – 17,2 mg, bezogen auf die Trockensubstanz.

Die Verwendung von Pulver aus Erdapfelknollen trug dazu bei, die Zucker- und Gasbildungsfähigkeit von Weizenteig und die Qualität des Glutens zu verbessern. Mit dem aus Erdapfelknollen gewonnenen Pulver wurden neuer Zubereitungsrezepte von Backwaren entwickelt: das Brötchen „Appetitlich neu“ und das Baguette „Studentisch diätetisch“.

## OCEAN TEMPERATURE IMPACT ON ICE SHELF EXTENT IN THE EASTERN ANTARCTIC PENINSULA

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This paper discusses the causes of the reduction retreat and destruction of the Antarctic ice shelves. Based on the results obtained most experts mainly associate the destruction of the Antarctic ice shelves and icebergs with the warming of the Antarctic surface. However, scientists believe that increasing the temperature of the ocean can also significantly reduce the length of the ice cover.

J. Etourneau et al. (2019) claim that during the last century the largest part of ice shelves in Antarctic was warmed and primarily it happened Antarctic Peninsula. An ice shelf is a thick, floating platform of ice that forms where a glacier or ice sheet flows down to a coastline and onto the ocean surface. Ice shelves are only found in Antarctica, Greenland, Canada and the Russian Arctic.

The result of global warming is breach of stable situation. A case in point is the Antarctic Peninsula and changing of ocean level. There are many regional glaciers and ice shelves melting in the Antarctic Peninsula. Scientists have been watching this phenomenon since 1970.

That event was followed by a number of smaller but very important collapses which was caused by warming the upper layer of water in the Antarctic. The fact is the scientists make the records of temperature rise by 2-3°C in the period from 1960-s to 1990-s. It turned out that subsurface ocean warming is responsible for the loss of 50% of ice in the EAP region. There is one more reason of warming the ocean water and it is the “Circumpolar (CDW) [which] has been shown in Antarctic”.

The water flowing across the continental shelf to the shore is warm and deep so the grounding ice line is reached through cavities and troughs. Grounding line is the boundary between the floating ice shelf and the anchor. However, it is stated that the scientists have not yet studied the temperature fluctuations and the influence of this warm current on the ice shelf. Thus, having investigated the variability of the ice shelf, came to the conclusion that a weak ocean current had a vivid effect on the ice shelf break down. Besides they connected their results with the present situation and predicted the further “erosion of the EAP shelf”.

Scientists have made the analysis of recent data and calculated variations of the Ekman pumping. Ekman pumping is a very effective mechanism by which winds drive subsurface ocean current. This was done to decipher the relationship between wind power in terms of strength and position as well as assessing its effect on SOT. Subsurface ocean temperature (SOT) – is the water temperature close to the ocean's surface.

J. Etourneau (2019) argues that anomalies of Ekman pumping showed negative values in 1970-s and 2000-s. Moreover, the presence of winds blowing from the center of the continent to its periphery in particular on the Antarctic Peninsula presumably affects the Ekman pumping.

## **DEVELOPMENT OF AN EXPERIMENTAL BIOREACTOR FOR MODELING THE PROCESSES OF HYDROGEN BIOTRANSFORMATION IN METHANE WHEN USING THREE DIFFERENT CONSTRUCTIONS OF BIOREACTORS**

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Biogas production is important not only for the processing of organic waste, but also for the storage of energy generated by unstable sources used in alternative energy, such as wind turbines and solar panels.

The amount of electricity received from irregular sources varies depending on weather conditions. With maximum energy production, it makes sense to store it for use at another time. One of the ways to store electrical energy is the electrolysis of water to produce hydrogen. At the same time, hydrogen storage is associated with a large number of problems, including a high diffusibility of hydrogen, its chemical activity and explosion hazard. For this reason, the question has been raised about the using of hydrogen for methane biosynthesis, as it is more convenient for storing combustible gas.

For the production of biomethane, microorganisms of the Archaeal kingdom of two different groups are used – acetoclasts decompose acetic acid to methane and carbon dioxide, and hydrogenotrophs synthesize methane from carbon dioxide and molecular hydrogen. For industrial use of hydrogenotrophic microflora, the

using of bioreactors of at least three different designs is proposed – a bubble column, a fixed-bed and a trickle bed reactor. Our task was to develop a conceptual sketch of an experimental bioreactor capable of operating in three different modes, allowing us to simulate the processes occurring when using these three types of construction.

The reactor under development is a cylindrical tank with a liquid jacket to maintain temperature, with embedded connections for the supply of solutions and gases and their subsequent discharge. In the cavity of the reactor there are nozzles for spraying liquids, a bubbler for supplying gases, as well as a mesh divider for a more even distribution of gas bubbles throughout its volume. The change of modes is ensured by the introduction of granules for the sorption of microorganisms, a change in the rate of intake of carbon dioxide, the connection or disconnection of a hydrogenator. The developed valve system allows switching between modes without changing the overall system architecture.

To test the methane biosynthesis method based on hydrogen and carbon dioxide, we used an experimental trickle-bed bioreactor, with a working cavity filled with granules of various types. The nutrient medium was continuously pumped through the piping system from the bottom of the reactor to the top (450 ml/min), where it was applied in the form of droplets on the top layer of granules. The working temperature was chosen at the upper limit of mesophilic conditions, + 45°C.

An important step in the development of the reactor was the selection of porous granules for immobilizing the cells of hydrogenotrophic archaea. Initially, a special Hiflowrings filler was used, with a density of 77 kg/m<sup>3</sup>, with a surface of 313 m<sup>2</sup>/m<sup>3</sup> and a free space share of 91%. The result of the experiments was the choice as a filler of hydrogranules – a lightweight porous building material obtained by burning clay or slate. This material also has a large surface due to saturation of the pores and provides an increase in the efficiency of the process.

## **BIOLOGIE UND ÖKOLOGIE DER PILZE**

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Pilze sind zunächst eher unscheinbare Lebewesen und haben doch gigantisches aufzuweisen. Ihr Wachstum kann mit bis zu einem Kilometer pro Tag unerreich schnell sein. Das größte und älteste Lebewesen der Welt ist ein Pilz und zwar der parasitische Hallimasch. Es konnte nachgewiesen werden, dass ein einziger Hallimasch Kolonien mit einer Ausbreitung von 6,5 Quadratkilometern hervorbringt und 2500 Jahre alt ist. Pilzwachstum ist sprichwörtlich zum Zuschauen schnell, auch bei der Pilzzucht zu Hause, doch außergewöhnlich ist auch, dass die im Boden unsichtbaren Pilzhyphen im Prinzip unsterblich sind. In manchen Fällen trifft das auch auf die sichtbaren Fruchtkörper zu: einzelne Baumpilze werden hunderte von Jahren alt. Ihre dauerhaften Fruchtkörper werden wie Bäume Jahr für Jahr größer und können über 100 Kilo schwer werden.

Durch ihre Erscheinung und Lebensweise stehen Pilze zwischen dem Reich der Pflanzen und dem der Tiere. Nach heutigem wissenschaftlichen Standpunkt stehen Pilze im Stammbaum des Lebens den Tieren näher! Anders als Pflanzen ernähren sich Pilze nicht mit Sonnenenergie und produzieren auch keinen Sauerstoff. Sie brauchen organische Nahrung und atmen CO<sub>2</sub> aus. Wie Pflanzen bilden sie eine den Wurzeln vergleichbare Struktur aus, das Myzel. Es setzt sich zusammen aus sehr langen, dünnen Hyphen. Mit den Hyphen nehmen die Höheren Pilze Wasser und Nahrung auf. Außerdem erobert das Myzel auch ohne sexuelle Fortpflanzung neue Lebensräume indem es einfach dorthin wächst. Bei manchen Pilzen werden aus dem Myzel harte Dauerformen, die Sklerotien. Das Myzel ist der vegetative Teil eines Pilzes. Der nur sporadisch in Erscheinung tretende Fruchtkörper ist der generative Teil und dient der sexuellen Vermehrung. Der Fruchtkörper beziehungsweise die Fruchtschicht produziert Sporen, die wie Samen verbreitet werden. Großpilze werden hinsichtlich ihrer Sporen unterschieden in Schlauchpilze und Ständerpilze. Weiterhin unterteilt man nach dem Bau der Fruchtschicht in Blätterpilze (Lamellen), Röhrlinge und Porlinge, Gallertpilze und Bauchpilze.

Auch bei weiteren Merkmalen, die Pflanzen und Tieren unterscheiden, stehen Pilze dazwischen. Pilze haben Zellwände wie Pflanzen und anders als Tiere. Pilze sind deswegen ballaststoffreicher als tierische Lebensmittel. Ihre Zellmembranen enthalten Chitin wie Insekten. Pilze speichern keine Stärke wie Pflanzen, sondern Glykogen wie Tiere.

Pilze sind bis heute die Hersteller des Penicillins sowie der Bier-, Wein- und Bäckerhefen und aller gereiften Käsesorten. Ohne Schimmelpilze gäbe es weder Emmentaler noch Camembert. Sojasauce ist ebenfalls ein komplexes Brauprodukt, das mit Hilfe von Pilzkulturen reift. Pilze sind Wunder an Geschmack und stecken voller Wirkstoffe.

Speisepilze werden zu hohen Preisen gehandelt. Gute Perigord-Trüffel erzielen über 1000 Euro je Kilogramm. Pilze können in vielerlei Hinsicht wertvoll sein: Einige Arten enthalten Substanzen die nach intensiver medizinischer Forschung den Status von Arzneimitteln, insbesondere in der Krebstherapie, erlangt haben. Pilze sind ökologisch von größter Bedeutung. Sie recyceln alle organischen Abfälle zu Nährstoffen und Humus für neues Wachstum.

Vergleichsweise wenige Pilze sind Parasiten, darunter dennoch einige Speisepilze wie die Krause Glucke oder der Klapperschwamm. Sie machen krank oder töten. Andererseits gibt es mehr und mehr Anwendungen von Pilzen als natürliche Pflanzenstärkungsmittel und zur Abwehr von Pflanzenkrankheiten. Pilze sind Kosmopoliten, besiedeln viele Lebensräume und machen diese fruchtbar, wie etwa die Mykorrhiza-Pilze zu denen auch der Steinpilz gehört.

Man schätzt die Artenzahl der Pilze auf 1,5 Millionen weltweit von denen immerhin 100 000 identifiziert sind. Die Höheren Pilze, von denen hier die Rede sein soll, umfassen geschätzte 60 000 Arten weltweit.

## ANIMAL CLONING

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The issue of animal cloning has recently received a great deal attention in public discourse. Bioethicists, policy makers, and the media have been quick to identify the key ethical issues involved in animal cloning.

Cloning is powerful tool for production of genetically identical copies of desired donor animal. Other applications will also undoubtedly be discovered in the near future. Although cloning promises great advantages for commerce and research alike, its outcome is not always certain due to high pregnancy losses and high morbidity and mortality during the neonatal period.

Research into the mechanisms involved in the reprogramming of the nucleus is being conducted throughout the world in an attempt to better understand the molecular and cellular mechanisms involved in correcting these problems. Although the cause of these anomalies remains mostly unknown, similar phenotypes have been observed in calves derived through in vitro fertilization, suggesting that culture conditions are involved in these phenomena.

In the meantime, veterinarians and theriogenologists have an important role to play in improving the efficiency of cloning by finding treatments to assure normal gestation to term and to develop preventative and curative care for cloned neonates.

It's important to remember that cloning neither manipulates the animal's genetic make-up nor changes an animal's DNA. It is simply another form of assisted reproduction. Cloning allows livestock breeders to create an exact genetic copy of an existing animal, essentially an identical twin. Clones are superior breeding animals used to produce healthier offspring.

Animal cloning offers great benefits to consumers, farmers, and endangered species: Cloning allows farmers and ranchers to accelerate the reproduction of their most productive livestock in order to better produce safe and healthy food.

Cloning reproduces the healthiest animals, thus minimizing the use of antibiotics, growth hormones and other chemicals. Consumers can benefit from cloning because meat and milk will be more healthful, consistent, and safe. Most of the foods from cloning will be from the offspring of clones that are not clones themselves. Cloning can be used to protect endangered species. For example, in China, panda cells are being kept on reserve should this species' numbers be threatened by extinction.

In the process of somatic cell nuclear transfer, scientists collect a cell from the animal that is to be cloned (known as the "genetic donor"). The somatic cell contains the DNA of genetic donor animal. The scientist collects an egg from a female animal (the "egg donor") and discards the nucleus of the egg cell, which is the part of the cell that contains the egg donor's genes. The scientist then inserts the somatic cell into the egg. The resulting fused egg contains the genetic donor's DNA. The fused egg is transferred into a surrogate mother where it continues to develop. After a full-term pregnancy, the recipient gives birth as normal to an animal that is essentially the identical twin of the genetic donor.

Advancement in cloning technology promise new possibilities, but many ethical challenges have emerged with it. Decreasing the disease susceptibility of animal will benefit animal welfare and agricultural productivity so for that more research is needed for the understanding of the process involving the failures in pre- and postnatal development.

# THE EFFICIENCY OF BIOTECHNOLOGICAL INSECTICIDE “ENTOLEK” IN THE FIGHT AGAINST THE COLORADO POTATO BEETLE

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In the Russian Federation, potatoes are cultivated on an area of about 1,900,000 hectares and are an important food, fodder and technical crop. However, the yield of this crop in the country is small and does not exceed 250 centners per hectare while in European countries such as Belgium, France, Germany, the yield of this crop reaches 405-432 centners per hectare. One of the reasons for the low potato yield is the high losses from pests, diseases and weeds. According to the Ministry of agriculture of the Russian Federation, the total losses of potato crop from them reach 49.0 %.

Among the potato pests, the Colorado potato beetle is of the greatest economic importance. According to S. V. Usov and V. F. Firsov, crop losses from this pest in the conditions of the Central Chernozem region can reach 70-80 and even 100 %. Favorable climatic conditions and a large number of private farms, where pesticides are used haphazardly, allow the pest to quickly restore its population and maintain it at a high level.

The purpose of our study was to evaluate the biological effectiveness of a drug *Entolek* to control the size of the Colorado potato beetle on potato.

The tasks of the research are the following:

- 1) to study the effect of treatment on potato drug *Entolek* on the population dynamics of the Colorado potato beetle;
- 2) to assess the biological effectiveness of the tested drug.

One of the most dangerous pests of the *Solanaceae* family is the Colorado beetle (*Leptinotarsa decemlineata*, Say). The complexity of the fight against it due to the high adaptive species abilities, in the is lack of the absence of specialized entomophages in Eurasia, and the lack of the resistant potato varieties, despite of a massive insecticidal treatment. Currently, populations resistant to all classes of insecticides have been registered.

To combat pests of agricultural crops, a biotechnological insecticide of contact action was developed on the basis of avermectins of groups B1 and B2 produced by soil fungus *Streptomyces avermitilis*. Avermectins of these groups,



getting into the body of insects, have an irreversible effect on the nervous system, blocking gamma-aminobutyric acid, which is a mediator in the transmission of nerve impulses. These substances are not accumulated in plants, fruits, soil, and a special mechanism of action prevents the development of insects resistance.

The drug is being produced under the trade name *Entolek* by the *Biopreparat* company. The manufacturer claims that the mass death of the pest occurs in 2-3 days, and the maximum effect is achieved in 5-7 days after treatment, the protective effect lasts up to 10-20 days. We decided to check it out.

In 2017, the study of the bioefficiency of insecticides in the fight against the Colorado potato beetle in open ground conditions on the basis of the research laboratory of environmental engineering was carried out. The drug *Entolek* was used in the concentration of the working solution of 4 ml/l and the control variant was not treated with drugs. The treatment was realized by the method of ground spraying of sprouts. Colorado potato beetle on the experimental site unevenly populated potato plants. The number of larvae before treatment ranged from 6 to 54 specimens per 1 plant, 81.5% of plants was populated by beetles, with an economic threshold of harmfulness of 10 larvae per 1 plant and 10% of population.

Determination of biological effectiveness of insecticides was performed using Tilton-Henderson formula by comparing the number of larvae before and after treatment, adjusted for changes in the number during this period during the control.

As the result of 20 days of observation and recording of the number of larvae, 99 % of the biological effectiveness of the drug *Entolek* on the 5 day was achieved. Insecticide was retaining at the level of its effectiveness 88-99 % for seven days, and later the indicators were 0 %. The restoration of larval numbers was due to migration of beetles from untreated areas.

Thus, this insecticide requires multiple re-treatments, as its effectiveness is not long-lasting and decreases during rainfall.

## **CONTAMINATED SEDIMENT IN THE GREAT LAKES**

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Nowadays it is impossible to imagine modern geographical studies without analyzing the nature of the Great Lakes. The varieties of significant problems of the pollution of the Great Lakes are the key issues of the given report. At the beginning we could say that the Great Lakes form the largest surface freshwater system on Earth. More than 30 million people live in the Great Lakes basin, and the impact of their daily activities, from the water consumed to the waste returned, directly affects the Great Lakes environment. EPA leads U.S. efforts to restore and maintain the quality and ecosystems of the Great Lakes watershed.

While the problem of contaminated sediments persists in the Great Lakes, efforts are being made in the pursuit of remediating these contaminated sediments. The Great Lakes are, from west to east: Superior, Michigan, Huron, Erie and Ontario. They are a dominant part of the physical and cultural heritage of North America.

It could be indicated that shared with Canada and spanning more than 750 miles (1,200 kilometers) from west to east, these vast inland freshwater seas provide water for consumption, transportation, power, recreation and a host of other uses.

It should be noted that the Great Lakes are one of the world's largest surface freshwater ecosystems.

As recent research can be shown, the Great Lakes basin encompasses large parts of two nations, the United States and Canada.

- Nearly 25% of Canadian agricultural production and 7% of American farm production.

- Population is more than 30 million people – roughly 10% of the U.S. population and more than 30% of the Canadian population.

Contaminated sediments are a significant problem in the Great Lakes basin. Although significant progress over the past 20 years has substantially reduced the discharge of toxic and persistent chemicals to the Great Lakes, persistent high concentrations of contaminants in the bottom sediments of rivers and harbors have raised considerable concern about potential risks to aquatic organisms, wildlife, and humans. As a result, advisories against fish consumption are in place in most locations around the Great Lakes.

Next we should analyze the problem of causes. These contaminated sediments have been created by decades of industrial and municipal discharges, combined sewer overflows, and urban and agricultural runoff. Buried contaminants posing serious human and ecological health concerns can be dredged up by storms, ship propellers, and bottom-dwelling organisms. Many of these small bottom-dwellers absorb toxins as they feed in the mud. As larger animals eat these smaller animals, the toxins move up the food chain, with their concentrations getting higher, often thousands of times higher. Fish at the top of the food chain, such as lake trout and salmon, can be unsafe to eat in some areas because of the heavy concentrations of toxic substances in their tissues. Fish-eating birds, including the bald eagle, may suffer low reproductive rates or produce offspring with birth defects.

In conclusion it is worth stressed that EPA has made clean up and restoration of the Great Lakes a major priority. Commitments and partnerships have long been formed between the United States and Canada to keep the Great Lakes region vital for the area's millions of people and its rich array of species and habitats.

## **THIOCYANATE: IMPORTANCE AND DISEASES CONNECTED WITH THIS CHEMICAL COMPOUND PRODUCTION**

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To become a highly qualified and competent specialist in the field of my future profession – medicine, it is necessary to be interested in it and deeply study the special disciplines that give knowledge about the human body and the processes taking place in it during functioning. For this purpose we decided to study the effect of *thiocyanates* on the human body. The following tasks were set: to analyze chemical compound of *thiocyanates*, diseases connected with this chemical compound production and to defined the importance of *thiocyanates*, as well as their harmful effects at elevated concentrations in the body.

*Thiocyanates* are the chemicals relating to group of salts of thiocyanic acid. Only 4 elements from Mendelejev's table are parts of *thiocyanates*. They are carbon, nitrogen, hydrogen and metal as well.

Despite the simplicity of structure *thiocyanates* perform an important function in the human body: they are irreplaceable substrate for production of antibacterial substances of an oral cavity, demonstrate the correct work of a thyroid gland and they function in the gastric juice. The increased content of *thiocyanates* indicates the symptoms of a viral infection and also can cause color sight disturbance (*a xanthopsia*) and affects skin and kidneys. *Thiocyanates* content in saliva varies considerably. Under the influence of peroxidase enzyme *thiocyanates* can turn into gipothiocyantes which have antimicrobial action.

It was studied that the quantitative content of *thiocyanates* in saliva is influenced by adverse factors. Smoking and unfavorable ecological situation belong to adverse factors. Smoking is hazardous to health of a person in many factors and affects all human organs as the structure of cigarettes includes more than 4000 chemicals, which are dangerous. Increase in content of *thiocyanates* is

connected with the existence in the smoker of a large number of the cyanhydric acid getting into lungs as a part of tobacco smoke. The greatest number of *thiocyanates* in saliva is observed at workers of the following professions – miners, breakers, cooks, chemists, which are contacting to harmful substances, such as: toxic chemicals, soil and coal dust, tobacco smoke, etc.

Besides the concentration of *thiocyanates* changes according to an amount of B1 vitamin (thiamin) coming into an organism with food. B1 vitamin is called anti-neurotic. It is a part of the enzymes regulating carbohydrate and amino-acid metabolism. Compounds of thiamin promote metabolism of nervous tissue. Only thanks to this vitamin neurons acquire glucose, being an energy source and conveying momentum transfer. The lack of the vitamin makes the person irritable, forgetful and scattered. It is proved that the children, who receive less B1 vitamin, lag behind in the school program. This vitamin is contained in pork, offal, a yolk egg, some sorts of fish and seafood.

It should be noted that the detection of *thiocyanates* in saliva is possible at addition of solution of hydrochloric acid and solution of chloric iron. The essence of the suggested method of quantitative assessment of content of *thiocyanates* in saliva consists in the following: the more concentration of ferric rhodanides in solution, the more intensive red color. Coloring is caused by formation of the complex connection containing iron and *thiocyanates*.

Thus, the concentration of *thiocyanates* is an important factor of the immune system disturbance identification, of the thyroid gland work, of bilious juice and consequently the whole stomach, influences disinfecting of an oral cavity and food and also is necessary for the correct work of the nervous system and momentum transfer.

## **DENDROCHRONOLOGICAL ANALYSIS OF WOOD IN PARK PLANTATIONS OF BELGOROD**

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Dendrochronology (or tree-ring dating) is the scientific method of dating tree growth rings to the exact year they were formed. As well as dating them this

can give data for dendroclimatology, the study of climate and atmospheric conditions during different periods in history from wood.

The aim of our study is to consider the influence of climatic factors on the formation of radial wood growth of *Quercus robur* L. (oak tree) in the urban environment.

*Quercus robur*, commonly known as common oak, pedunculate oak, European oak or English oak, is a species of flowering plant in the beech and oak family, Fagaceae. It is native to most of Europe west of the Caucasus. The tree is widely cultivated in temperate regions and has escaped into the wild in scattered parts of China and North America.

Human activities in urban conurbations are consequently concentrated in a relatively small area and most of them contribute to emissions of large amount air pollutants, which creates a significant risk to human health and well-being.

Among these air pollutants, particulate matter represents one of the most important and widespread threat, responsible for a relevant impact both on health and on the whole environment. In this context, urban forests may be particularly important because, besides their well-known aesthetic and recreational benefits, they are able to deliver a series of important environmental benefits, defined as Ecosystem Services, such as an improvement of air quality by removing air pollutants from the troposphere.

*Quercus robur* L. is regarded as a valuable resource ensuring sustainable development of the city. Not only oak plantations have high aesthetic qualities but also produce health-improving effects on the environment and are considered of great value. Oaks perform many functions in Belgorod region too: protective, sanitary, hygienic and entertaining.

The cores for the analyses were obtained from the trunks of living trees with the help of the incremental drill Pressler (Haglöf 400 mm). For this purpose, we took 12 dendrochronological samples from living trees in oak plantations in the central park of Belgorod.

The age of the trees varied from 41 to 70 years. The estimation of the radial growth of wood was carried out according to the standard dendrochronological method. Each sample was assigned an individual number. Measurement of the width of the annual rings was carried on a high-precision device LINTAB-6 operating on the software platform TSAP-Win (Professional 4.0).

In the dynamics of the radial growth index *Quercus robur* L., the minimum growth years are 1959, 1972, 1999, 2008, as well as the years with the maximum radial growth rates – 1961, 1964, 1966.

There are also 2 periods in the growth dynamics: high growth from 1950 to 1971 and low growth in the period of 1972-2011. To detect the correlation of growth with climate, the Selyaninov hydrothermal coefficient was used.

The analysis did not show any strong correlation between the indices of radial growth and climatic indicators according to the weather station of Belgorod (precipitation and air temperature).

Thus, either the conditions of the urban environment significantly transform the climate response in the radial growth of wood *Quercus robur* L. or, the correlation analysis is not able to reveal a reliable relationship between the indicators of radial growth in conditions of the urban environment and the fluctuations of meteorological parameters.

## **EFFECT OF ELECTROMAGNETIC FIELDS ON DROSOPHILA MELANOGASTER**

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The purpose of this work is to give an account of the research on the effect of electromagnetic fields on biological objects.

As a starting point it should be noted that natural electromagnetic fields have always been present on the Earth and influenced biological processes in the bodies of living creatures who in their turn adapted to them. At the end of the 20<sup>th</sup> century there has been a dramatic change in the sources of generated electro-magnetic fields when new systems of communication and transmission emerged (cellular phones and other devices of personal communication, distant and remote control devices, television, etc.). All the existing sources could be divided into two groups according to the level of frequency they generate, namely high-frequency and low-frequency electromagnetic fields.

The effect of electromagnetic fields on biological objects has been studied extensively by E.K. Eskov, V.A.Toboev, S.F.Goretskaya, V.A.Khodorkovskiy and other scholars.

Though many experiments have been conducted for mice, birds and mammals, *Drosophila* is often chosen for such experiments as it has a short development cycle, which makes it possible to trace the influence of various factors at all stages of the life cycle in a short period of time.

E.G. Vasilieva, for example, studied the influence of high-frequency and low-frequency electromagnetic fields on four generations of *Drosophila*. It was found that the maximum mortality of the larvae is observed in high-frequency EMF in the 1st generation, in the 2nd generation this indicator is sharply reduced.

Stabilization of mortality occurs by the 3rd generation and remains in the future. Low-frequency EMF, as well as high-frequency, has a significant impact on the mortality rate, but the indicator is slightly lower. In the 2nd generation, the mortality rate decreases significantly, in the 3rd generation it increases, in the 4th again it decreases, while the mortality rate in the 1st and 3rd and in the 2nd and 4th generations is almost the same. This means that the dynamics of mortality of *Drosophila* larvae in the low-frequency EMF is of a wave nature.

Numerous studies show that probability of death of the living body in high-frequency and low-frequency EMF in each of the generations is almost the same. The mortality rate of *Drosophila* larvae in the 1st generation in the EMF increases significantly in comparison with the control. The magnitude of the probability of death decreases in the 3rd generation and again increases in 4, that is, there is a pattern that is identical for the low-frequency and high-frequency EMI. This pattern is of a wave nature. The maximum value of the indicator is noted in the 2 generation. This value is the same for both types of fields.

The maximum speed of death is noted in high-frequency EMF in 1 generation. By the 3rd generation, the indicator is stabilized at a lower level, remaining in the subsequent generation.

Compared with the control in the low-frequency EMF, the death rate increases to a lesser extent than in the high-frequency one. The dependence of the change in the wave. The highest death rate was noted in the 1st generation, the lowest - in the 2nd generation. The intensity of mortality of the larvae in the EMF increases in every 2 generations. In low-frequency EMF, this dependence is wave. In high-frequency EMF, the relative speed of death of larvae sharply decreases in the 2nd generation. In 3 and 4 generations, the indicator comes to balance and is set at the same level. Mortality in high-frequency EMF is stabilized by the 3rd generation, and in low-frequency its change is of a wave nature.

T.Y. Oleynikova and I.V. Melnik also conducted a research which gives a complex estimation of the effect of the electromagnetic field on the fertility of *Drosophila melanogaster*. They found out that the change of *Drosophila*'s fertility in generations has a wave character.

Such experiments are necessary for modeling the process of the impact of EMF on the real biosystem. In the process of evolution, living organisms have adapted to a certain level of EMF, but the long-term effect of this factor may lead to their depletion, which will entail irreversible consequences at the system level.

# TAXONOMIC COMPOSITION OF THE BACTERIAL COMPONENTS OF THE MICROBIAL COMMUNITY OF THE BIOGAS REACTOR BGS “LUCHKI”

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This study is devoted to the development of methods for analyzing complex microbial communities using the real-time polymerase chain reaction and analyzing the methanogenic community of the BGS “Luchki” biogas plant.

The biogas plant “Luchki” belonging to the company Altenergo opened in the Prokhorovskiy district, Belgorod region in 2012. This is the first industrial biogas plant in Russia, which is built for processing the waste products of a meat-ware factory and the selection and hybrid center of the Agro-Belogorye Group. This small plant with the capacity of 2.4 MW can supply electrical energy for the people of the Prokhorovskiy district during the year.

This biogas plant gives researchers great opportunities for complex microbial community studies. For this purpose, various methods can be used. Traditionally, microbiological method is applied by planting the obtained colonies on nutrient media, bringing them into a pure culture, then, determining their species.

There are methods based on the analysis of genomic DNA of microorganisms. They require the isolation of total genomic DNA of the entire community, and, in many cases, the creation of metagenomic libraries of microbial DNA. One of the common methods used is metagenomic sequencing of genomic DNA regions, as a result of which sequences of hundreds of thousands of genes belonging to various community members are identified.

Another common method that has been implemented in this work is the RT-PCR method using taxon-specific primers.

In the course of the study, an analysis of scientific information was carried out, concerning both promising approaches to optimizing and improving the technology of biogas production, and the use of real-time polymerase chain reaction for analyzing multicomponent microflora samples.

Taxon-specific primers for the detection of microorganisms belonging to the *Firmicutes*, *Actinobacteria*, *Bacteroidetes*, *Deferribacteres*, *Saccharibacteria*,



*Verrucomicrobia*, *Tenericutes*, and three classes of the heterogeneous *Proteobacteria* were used.

The dominance of the types of *Firmicutes*, *Bacteroidetes* and *Proteobacteria* is observed at both stages of the process of fermentation of substrates, with the predominant dominance of the type *Firmicutes* increasing at the stage of fermentation.

In the *Proteobacteria* type, the *Gammaproteobacteria* class dominates. Representatives of the class *Betaproteobacteria* of this type are extremely scarce, its other classes are not represented in detectable quantities.

The types of *Sacharibacteria* and *Actinobacteria* are no longer detectable during the fermentation stage.

Representatives of the types *Verrucomicrobia* and *Deferribacteria* are also practically absent.

Thus, the method used allows analyzing and monitoring the methanogenic microbial communities of biogas plants to control the processes occurring in them and optimize the technology with the maximization of biogas output.

## SECTION 2. SOCIAL SCIENCES, ECONOMICS

### CUSTOMS REPRESENTATIVE: IMPLEMENTATION OF FOREIGN ECONOMIC ACTIVITY IN THE SPHERE OF CUSTOMS

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From July 1, 2010 to the present, the customs broker became known as the customs representative. The customs representative is a Russian legal entity included in the register of customs representatives. There are certain conditions for inclusion in the register of customs representatives specified in Article 402 of the Customs Code of the Eurasian Economic Union.

The specialist in customs operations may be a citizen of the Russian Federation who has a higher professional education, passed the qualification exam and confirmed the conformity of his knowledge to the qualification exam program. A document confirming the compliance of an individual with the specified qualification requirements is a qualification certificate of a specialist in customs operations.

Services provided by customs representatives are in demand and necessary in foreign economic activity. In many ways, the need for a professional approach to customs clearance is caused by objective factors, such as the complexity and ambiguity of interpreting customs legislation, the opacity of customs administration, and a number of other factors. The existing structure of foreign economic activity in our state initially implies the participation of intermediary specialized commercial and state organizations in the provision of information for customs clearance.

Today, the customs representative has significant advantages both for participants of foreign economic activity and for the state.

Benefits for participants of foreign economic activity:

- acceleration of the process of customs operations;
- the quality of customs operations;
- minimum financial costs when passing through customs formalities;
- no need for direct interaction with customs authorities.

Benefits for the state:

- improving the manageability in the field of customs;
- improving the quality of customs administration;
- protection of the customs services market from unfair participants in foreign trade activities;
- competent preparation of a package of documents for customs operations;
- the use of systems of preliminary information and electronic declaration.

The customs representative acts as an intermediary between the customer of the service (the owner of the goods) and the customs service, representing the interests of the client. The purpose of the customs representative is the organization of fast and problem less customs clearance or cargo clearance.

The activity of the customs representative is widespread today and occupies a special and significant place in the field of customs law in particular, and customs in general. Customs authorities and customs representatives interact at all levels of customs administration. At each level, different types of interaction are carried out.

Thus, the services of a customs representative are a real help for the transportation of goods across the border. Customs representative services facilitate delivery. The growing importance and role of the customs representative is associated with the development of the customs services market, the demand for high-quality services and the infrastructure support of this sphere. Foreign trade entrepreneurs are increasingly coming to the realization that the customs representative is a prerequisite for the successful targeted development of their business.

## **PERSPEKTIVEN FÜR DIE NUTZUNG SOZIALER NETZWERKE IM PERSONALMANAGEMENT**

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Soziale Netzwerke tragen zum Aufbau der elektronischen Kommunikation innerhalb des internen und externen Umfelds der Organisation bei. Social Media

spielen eine wichtige Rolle bei der Gestaltung des moralischen und psychologischen Klimas und bieten eine komfortable Umgebung für die Kommunikation der Mitarbeiter. Die persönliche Tätigkeit des Personals unterliegt auch den Auswirkungen sozialer Netzwerke.

Social Media hat einen großen Einfluss auf das Management von Humankapital. Ihr Einflussbereich erstreckt sich auf:

- 1) das Verfahren zur Suche von Spezialisten in jeder Branche;
- 2) eine Reihe von Prozessen und Maßnahmen im Zusammenhang mit der Regulierung des Arbeitsverhältnisses zwischen dem Arbeitgeber und dem Arbeitnehmer;
- 3) zielgerichtet, organisiert, systematisch und systematisch den Prozess der Beherrschung des Wissens, der Fähigkeiten, der Fähigkeiten und der Kommunikationsmethoden unter Anleitung erfahrener Lehrkräfte, Mentoren, Fachleute und Manager durchgeführt;
- 4) einen Komplex aus materiellen und nicht-materiellen Anreizen, der dazu dient, den Arbeitern eine qualitativ hochwertige und produktive Arbeit zu bieten und die talentiertesten Spezialisten für das Unternehmen zu gewinnen und diese zu binden;
- 5) Überwachung, wie Mitarbeiter ihre Arbeitszeit nutzen, um Probleme im Unternehmen zu erkennen und Arbeitsabläufe zu optimieren.

Häufig verfolgen Unternehmen, die separate Konten in sozialen Netzwerken erstellen, ein wichtiges Ziel: das Unternehmen erkennbar zu machen und ein positives Image des Arbeitgebers zu schaffen.

Zu den Hauptfunktionen sozialer HR-Technologien gehören auch die Einstellung und Einstellung.

Beim Vergleich der beiden Rekrutierungsformen – der traditionellen, die von einem Mitarbeiter des Personaldienstes durchgeführt wird, und der innovativen, die mithilfe sozialer Netzwerke durchgeführt werden, können wir zu dem Schluss kommen, dass die Suche nach Personal mit Hilfe sozialer Medien am effektivsten ist, da dieser Prozess Folgendes bietet:

- 1) kompetente Erstellung eines Lebenslaufs der Bewerber;
- 2) die Beziehung zwischen dem Kandidaten und der Organisation;
- 3) die Bildung von Bewerbungsgesuchen.

Heutzutage werden soziale Netzwerke wie Facebook, Twitter, Vkontakte am häufigsten für die Personalsuche verwendet.

Informationen zu diesen sozialen Netzwerken sind in Tabelle dargestellt.

Name des sozialen Netzwerks	Erstellungsdatum	Beschreibung	geplantes Publikum
Facebook	4. Februar 2004	Auf der Website wurden zahlreiche professionelle Communities gegründet. Teilnehmerprofile können als bereite Basis für Kandidaten für die Vakanz verwendet werden.	Suchen Sie nach mittleren Managern und Linienmanagern für enge Spezialisierungen, Jugend.
Twitter	15. Juli 2006	Das soziale Netzwerk ähnelt eher einem Mikroblog. Die Site wird denjenigen helfen, die die Frames auswählen. Jede Nachricht ist auf 140 Zeichen beschränkt und eine detaillierte Beschreibung der Vakanz funktioniert nicht. So können Sie die Informationen übersichtlich präsentieren, ohne die Aufmerksamkeit des Bewerbers zu überfordern.	Jugend
Vkontakte	10. Oktober 2006	Mit VKontakte können Benutzer einander Nachrichten senden, ihre eigenen Seiten und Communitys erstellen und Bilder freigeben.	Jugend

Um ihre eigenen Karriereziele zum Ausdruck zu bringen, können die Mitarbeiter auf die Hilfe sozialer Netzwerke zurückgreifen, nämlich auf Foren, die auf ihrer Grundlage erstellt wurden. Foren können die Effizienz der Aktivitäten einer Organisation erheblich verbessern, da sie Feedback von Mitarbeitern erhalten. Traditionelle Wege, Talente für ein Unternehmen zu gewinnen, sind sehr kostspielig. Daher werden soziale Netzwerke zu einem vielversprechenden Instrument für das Personalmanagement, um Talente zu finden.

Talent Management implementieren, soziale Netzwerke:

- 1) als Mittel zur Kommunikation zwischen Menschen dienen;
- 2) zur Steigerung des Wissens und der Fähigkeiten der Mitarbeiter beitragen und ein positives Image des Unternehmens schaffen, das wiederum potenziellen Kandidaten zur Beteiligung verhilft;
- 3) führt eine Selbstanalyse durch, um nach Mitarbeitern zu suchen, deren Beitrag zu den Aktivitäten der Organisation den anderen vorrangig ist.

Heutzutage sind soziale Netzwerke eine der wichtigsten Möglichkeiten, sich zu vernetzen und die Kommunikation zwischen vertrauten Personen aufrechtzuerhalten. Sie ermöglichen den Menschen, unabhängig von ihrer Position, ihrem Beruf und ihrem Arbeitsplatz zu kommunizieren. Durch die Analyse sozialer Netzwerke von Mitarbeitern können Sie das interne Klima des Unternehmens, die

Mitarbeiterzufriedenheit beurteilen und die Effizienz der internen Unternehmenskommunikation steigern.

## **DIE ROLLE DER MASSEN MEDIEN IN UNSEREM HEUTIGEN LEBEN**

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Die Rolle der Massenmedien in unserem heutigen Leben ist sehr groß. Ohne Massenmedien kann die moderne menschliche Gesellschaft überhaupt nicht auskommen.

Heutzutage werden die neuen Medien überall genutzt z.B. in den Arbeitsstellen (z.B. in den Banken, verschiedenen Firmen, Schulen usw.) das erleichtert sowohl die Arbeit als auch allgemein das Leben.

Unter Massenmedien versteht man Kommunikationsmittel zur Verbreitung von Informationen in der Öffentlichkeit, Medien für die Kommunikation mit einer großen Zahl von Menschen. Zu den Massenmedien zählt man sowohl die klassischen gedruckten Medien (z. B. Zeitungen, Zeitschriften, Plakate, Flugblätter) als auch elektronische Medien (z. B. Fernsehsendungen und Internet).

Das wichtigste Massenmedium von heute ist das Internet. Unsere Existenz stellt man heutzutage ohne Internet kaum vor. Im Internet werden alle möglichen Bücher und Informationen gefunden, beliebige Lebensmittel und Waren gekauft, Tickets und Reisen gebucht, Musik und Filme down geloadet, Dienstleistungen und Waren angeboten oder gekauft, Nachrichten und Artikel gelesen, oder man beteiligt sich an diversen Foren und Blogs etc. Über Internet kann man Briefe verschicken, Daten übergeben, Telefongespräche führen und viele sonstige nützliche Sachen erledigen.

Massenmedien ermöglichen Massenkommunikation. Die Wirklichkeit wird vor Journalisten erzeugt. Die Leute sehen die Welt mit ihren Augen. Es gibt eine Menge von Neuigkeiten und die Journalisten leiten uns tagtäglich mittels ihrer Berichterstattung durch diesen „Dschungel“ an. Die Massenmedien sollen dafür sorgen, dass die Gesellschaft die sozialen und politischen sowie die wirtschaftlichen Zusammenhänge begreift, und über die Absichten und Handlungen der Politik und Politiker so Bescheid weiß, dass sie selbst daran

teilnehmen kann. Deshalb ist es von großer Bedeutung, dass die Informationen, die durch die Massenmedien weitergegeben werden, sachlich, vollständig und verständlich wie möglich sind.

Zurzeit ist es schwierig zu vorstellen, wie unser Leben ohne neue Medien aussehen würde. Die jungen Leute lernen und studieren in der digitalen Umwelt, das heißt: das Handy oder das Internet – stehen ihnen als tägliche Erscheinungen zu Verfügung. Die gesellschaftliche Internetseite wie z. B. „Facebook“ wird sehr oft zu Lernzielen genutzt. Die Schüler nehmen Kontakt auf wenn sie nach Hausaufgaben fragen möchten oder in einer Gruppe arbeiten sollen. Die Internetseite „Wikipedia“ enthält viele wichtige Informationen, die für Hausarbeit nützlich sind. Also das Internet ist eine nützliche Wissensquelle.

Massenmedien in der heutigen Welt führen sogar zu den gegenseitigen Gedanken. Sie formen Verhaltensmuster und sprechen Millionen von Zuschauern und Lesern an. Die Literaturrecherche zum Thema Medien Realität zeigt, dass man sich mehr mit elektronischen Massenmedien befasst. Die Printmedien befinden sich in der Medienforschung im Hintergrund. Deswegen kann ein oberflächlicher Eindruck entstehen, dass die Presse ihren Stellenwert als Informationsträger mittlerweile verloren hat. Es entsteht die Frage, ob sich die Printmedien neben elektronischen Medien behaupten können oder müssen.

## **UNTERNEHMERISCHE TÄTIGKEIT UND RISIKEN**

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Die heutige Unternehmensumwelt ist durch eine stark gestiegene Komplexität und Dynamik gekennzeichnet. Die wesentlichen ökonomischen Herausforderungen und Veränderungen unserer Zeit, die jedes Unternehmen betreffen, sind: sehr kurze Produktlebenszyklen, schwer prognostizierbare Veränderungen im Kaufverhalten, steigende Wettbewerbsintensität, Turbulenzen auf den Finanzmärkten und die schrumpfende Wirtschaft. Wer aber seine Märkte beobachtet, Kunden befragt, Analysen auswertet, also Risiken und Chancen auslotet und immer wieder seine Strategie anpasst, sichert das Firmenwachstum.

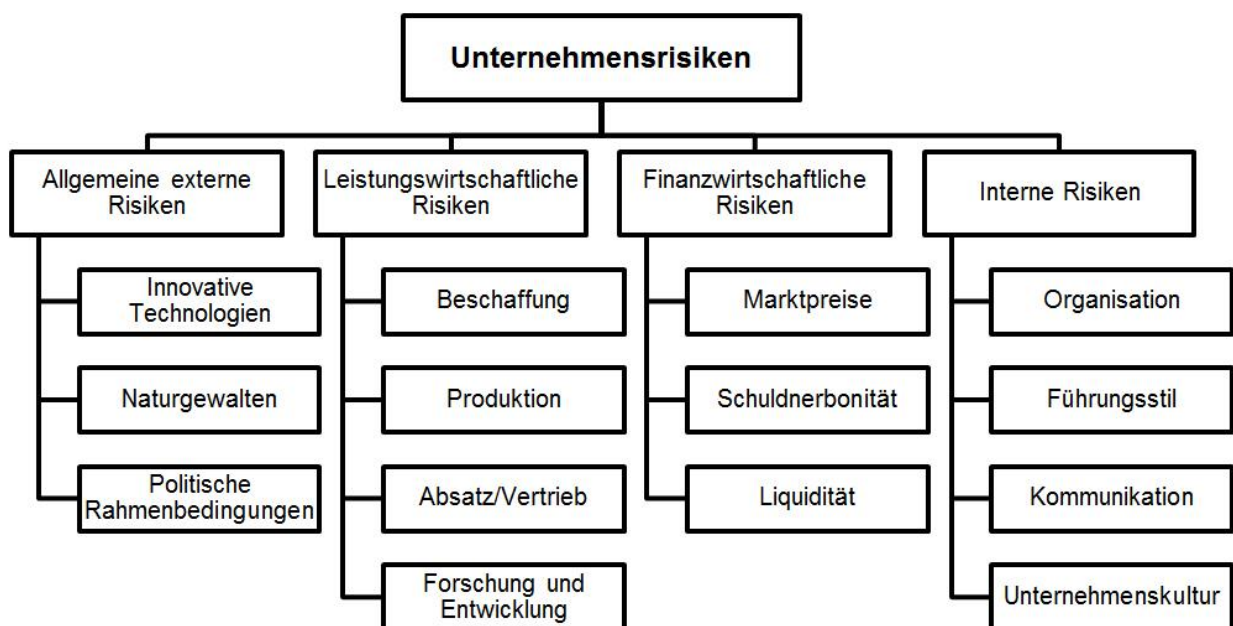
Solche Frühwarnsysteme sind von extremer Bedeutung für die Existenz des Unternehmens. Dennoch werden sie insbesondere von kleinen Unternehmen nicht

ausreichend bzw. gar nicht genutzt. Viele Firmen konzentrieren sich sehr auf die internen Risiken, etwa auf den Cash-Flow oder die Umsatzrendite. Dabei ist die Berücksichtigung externer Risiken wie die Kundenwünsche oder die Marktentwicklung enorm wichtig, denn diese bilden die Grundlage des Geschäfts. Das Unternehmen sollte die Phasen Erkennen, Bewerten, Handeln und Lernen durchlaufen und die aus Fehlern erlernten Erkenntnisse in diesen Kreislauf einfließen lassen, um sich dadurch vor Krisen schützen zu können. Ein gutes Risikomanagementsystem bildet die individuellen Strukturen des Unternehmens ab.

Unternehmerische Tätigkeit zeichnet sich dadurch aus, dass es risikobehaftet ist. Unternehmer können ihre gesamte Kapitaleinlage verlieren, Einzelunternehmer haften darüber hinaus mit ihrem privaten Vermögen. Zum unternehmerischen Risiko gehören nicht nur reale Verluste, sondern auch ausbleibender Erfolg. Ein Selbstständiger fährt zum Beispiel keine Verluste ein, kann aber auch seinen gewünschten Lebensstandard nicht mit dem Einkommen finanzieren.

Zur Risikoidentifikation können zahlreiche Instrumente eingesetzt werden, wie z. B. Unternehmens- und Umweltanalysen, Befragungen der Mitarbeiter, Checklisten, Früherkennung und -aufklärung sowie Fehlerbaum- und Flow-Chart-Analysen. Nachdem die Risiken erkannt wurden, soll eine Risikosystematik erarbeitet werden.

Die folgende Abbildung stellt eine mögliche Systematisierung der



unternehmerischen Risiken dar:

Bei allgemeinen externen Risiken handelt es sich um eine Reihe betriebsexterner Ereignisse, die beim Auftreten dem Unternehmen erhebliche Schäden anrichten können. Bei den Risiken, die aus innovativen Technologien entstehen können, geht es darum, ob das Unternehmen bzw. seine Produkte einem zunehmenden technischen Wandel ausgesetzt sind.



Leistungswirtschaftliche Risiken betreffen alle Gefahren, die innerhalb der gesamten Wertschöpfungskette auftreten können.

Zu finanzwirtschaftlichen Risiken gehören Verluste, die durch Unsicherheit zukünftiger Zahlungsströme eintreten können (Zahlungsstromrisiken). Verallgemeinert betreffen die finanzwirtschaftlichen Risiken die Liquidität und die Rentabilität des Unternehmens. Die finanzwirtschaftlichen Risiken werden in Marktpreis-, Schuldnerbonität- und Liquiditätsrisiken aufgeteilt.

Bei den Risiken der Unternehmenskultur geht es vor allem darum, ob die Mitarbeiter sich genügend mit dem Unternehmen identifizieren und eine ausreichende Teamfähigkeit besitzen. Zu der Phase der Risikosystematisierung muss noch bemerkt werden, dass eine eindeutige Abgrenzung von Risiken nicht immer möglich ist, da zwischen den Risiken starke Interdependenzen bestehen.

Daher beeinflusst das Wirtschaftsumfeld jedes Unternehmen sowie die zu berücksichtigenden Markt und Wirtschaftsrisiken.

## **THE INTERNATIONAL MONETARY FUND**

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The international Monetary Fund-intergovernmental organization designed to regulate the monetary relations between member States and providing them with financial assistance in foreign currency difficulties caused by balance of payments deficit, by providing short and medium – term loans in foreign currency. Fund—a specialized Agency of the UN – almost serves as an institutional basis of the world monetary system.

The international monetary Fund (International Monetary Fund – IMF) – a specialized Agency of UN created in 1945 after ratification of the Agreement developed at the Conference of the United Nations monetary and financial Affairs at Bretton woods (1944) and entered into force 27 December 1945, the IMF began operating in 1946 the Seat of the IMF – Washington (USA).

One of the objectives of the IMF to streamline foreign exchange rates in accordance with the Bretton Woods agreements was the settlement and sustainability of the parities of the currencies of member countries expressed in

gold or dollars. The country had no right to change the parities of their currencies by more than 10% without the approval of the IMF, as well as to allow for operations of a deviation from parity in excess of +/- 1%.

According to the IMF Charter, member States had on the basis of fixed exchange rates to introduce their convertibility for current international transactions and to pursue a policy of complete elimination of currency limitations. In practice, these provisions could not be met by many countries (exchange controls abolished only in 60 countries).

Interstate regulation of currency relations through the IMF failed to prevent the increasing contradictions of the Bretton woods monetary system in the early 70s, which led to the undermining of its principles and transformation: in 1973, the member countries of the IMF abolished the fixed parities and exchange rates and introduced a managed floating exchange rate regime, legally enshrined in a series of amendments to the IMF Charter, adopted on 1 April 1978, In accordance with the amended Charter of the IMF was replaced by the order of currency regulation Fund instead of the right to regulate foreign exchange parities established the right of “observation” over the functioning of the world monetary system and as currency.

The Charter of the IMF was changed in 1969 (with the introduction of the SDR), 1976-1978 (with the elimination of the Bretton woods monetary system and the creation of the Jamaican currency system) and in November 1992 (with the inclusion of sanctions-the suspension of voting rights – against States that fail to settle its debt to the IMF).

## **COMMUNICATIVE ACTION THEORY** **according to Jurgen Habermas**

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The subject of communication is complex and extremely topical, as we all live in society and interact with each other. Many social problems and personal problems of people in one way or another are connected with communication. This

topic is relevant not only for sociology, but also for some other humanities (psychology, linguistics, etc.). This topic is also considered by information science.

One of the approaches to the study of communication as a social phenomenon was proposed by the German philosopher and sociologist Jurgen Habermas (b. 1929). J. Habermas developed so-called «theory of communicative action», which aims to revise and update the classical concept of rationality, as well as to determine the scale of the critical assessment of the social system. Similarly-named work saw the light in 1981, but Habermas continued development of the theory in subsequent works.

Jurgen Habermas was born in Dusseldorf, but he grew up in Gummersbach, where his father, Ernst Habermas, was a managing director of the local branch of the chamber of Commerce. He was born with a cleft palate and had corrective surgery twice during childhood. Habermas argues that his speech disability made him think differently about the importance of deep dependence and of communication.

He studied at the universities of Göttingen (1949-1950), Zurich (1950-1951) and Bonn (1951-1954). His first doctoral dissertation was devoted to the philosophy of Schelling. In 1955, Jurgen married Uta Wesselhoft. The marriage had three children. Tilmann Habermas has been a Professor of psychoanalysis at the University of Frankfurt since 2002, and Rebecca Habermas has been a Professor of history at the University of Göttingen since 2000. The philosophical school of Habermas was formed not in Frankfurt open to foreign influences, but during his doctoral studies at the University of Marburg and was originally purely German. Jurgen taught at the University of Heidelberg. In 1964 he took the chair in Frankfurt. He moved to the most prominent representatives of the «second generation» theorists of the Frankfurt school. In the mid-1960s, he became the ideologist of the student movement. But in the days of student demonstrations in 1968, has distanced himself from the radical wing of the student body, accusing its leaders of „left fascism”. Since the late 1960s, he has been a moderate social Democrat – follower of Willy Brandt.

In the 1970s, he carried out a research program that corresponded to the General direction of the Social democratic party of Germany. Habermas sought to correct it in the spirit of the ideals of the Enlightenment: emancipation and equality.

After spending a decade at the max Planck Institute for the study of the living conditions of the scientific and technical world in Starnberg near Munich, due to differences of opinion with colleagues in 1981, he returned to Frankfurt. From 1983 until his retirement in 1994, he held the Department of philosophy at the University. After retirement due to the rule of the social Democrats and the immutability of his political views, he turned out to be a like-minded and gray cardinal of the European left, as a result of his own rule, who occupied the former political niche of the SPD.

In his theory, Habermas considers a number of sociological and philosophical concepts from the communication problem's point of view. He

addresses philosophical topic of reason and anti-reason when it comes to the activities of people, their connections, interactions and objective life forms. Also J. Habermas in his theory touches the problem of language.

Habermas divides social action into communicative and instrumental action. Communicative action is a social action that is aimed at mutual understanding. Instrumental action is referred to nature or labour and aimed at achieving some result. Habermas considers world of work as an embodiment of instrumental action. Although he further refused this social action classification and developed a new one, some of his ideas have a parallel with communicative and instrumental action dichotomy.

Two types of social action identified in the early classification of action correspond to two types of rationality – communicative rationality and instrumental rationality. Instrumental rationality is the goal-rationality, it is the logic of action directed outside, to achieve the goal, to master the object. Communicative rationality, designed for mutual understanding, is necessarily a critical discourse, in which controversial issues are articulated, and an attempt is made to reach agreement and consensus.

Further, Habermas develops the concepts of lifeworld and system. Lifeworld is a total of unofficial everyday communications, and the system is a total of work communications. Instrumental rationality is a logic of system, and communicative rationality is a logic of lifeworld. The boundary between the system and the life world is mobile and permeable. The system arises within the lifeworld as an unintended consequence of the action and remains associated with it in a normative sense. But both “system” and “lifeworld” act as two logically and analytically distinct functions of action, intersecting in social reality; two perspectives of consideration of social phenomena.

Habermas sees the problem of colonization of lifeworld by the systems and is concerned about it. Certain easing of exploitation in the economic sphere is accompanied by deformation (under the influence, in particular, of mass media and mass culture) of the structures of the life world (family life, life, leisure, the world of thoughts and feelings of the individual), which turn into extrinsic forms and coordination of actions. Modern civilization – based on the latest technology, the media – has launched a real attack on all these seemingly “private” and inviolable spheres. The manipulation of the inner world of the individual, the repression directed against him, the violence become unprecedented – as unprecedented and the ensuing dangers. The processes of rationalization and rationality itself take part in the “repression” of society against individuals. There is a “domination of rationality, and rationality becomes adapted to domination”. However, Habermas does not conclude that a campaign against reason and rationality as such is needed.

Nowadays, Habermas continues research in the field of communication, but in a bit different way. In his book „Between Naturalism and Religion: Philosophical Essays” he addresses the issues of dialogue between religious and non-religious people. He is also interested in problems of bioethics, epistemology and politics.

## DEVELOPMENT OF TOURISM SPACES IN DIFFERENT REGIONS

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Now the increasing interest in spatial aspect of the tourist environment of the city is explained by fast updating of a scientific and art picture of the world, emergence of new esthetic phenomena and also – sharp aggravation of spatial problems of the modern city.

The zone of recreational appointment represents sites of the territory in limits and beyond the borders of settlements, the population intended for the organization of mass rest, tourism, occupations physical culture and sport, spa facilities and also for improvement of an ecological situation and includes the parks, gardens, city forests, forest parks, beaches, reservoirs and other objects used in the recreational purposes and forming the system of open spaces of settlements.

Main task of formation of city tourist and recreational areas

– creation of conditions for mass visit, long stay and high level tourist and service (subjects to tourist display, objects of service, accommodation, leisure, information and transport service).

Formation of city tourist and recreational areas means:

– improvement of public places (streets, squares, parks and squares), restoration and capital repairs of facades of municipal buildings and objects, improvement of availability of subjects to display to survey (arrangement of approaches and journey to subjects to display, arrangement of observation decks and parkings of excursion motor transport), development of information support and safety of the city visitors who are on excursion routes and fact-finding walks (placement along tourist walking routes of indexes with the direction to monuments of architecture, history, culture, the museums and subjects to tourist service);

– improvement of tourist infrastructure and creation of the new tourist objects meeting the European standards and capable is successful to compete with target places of following of transit tourists;

– planning of more various tourist programs sated with recreational activity;

– offers on formation of subject of routes (local history, ecological);

– offers on types of routes (pedestrian, bicycle, with use of transport);

– offers on formation or further development of the special tourist product relating to event tourism (cultural mass actions, events), ethnographic tourism (the organization and carrying out national holidays, sale of products of national crafts), cultural historically to tourism (the organization of the center for expositions, exhibitions), to museum and pilgrim tourism.

One of priority activities in the sphere of tourism of the city is development of the social tourism providing opportunities for satisfaction of the needs for tourist services in the city of certain categories of the population including citizens of advanced age and physically disabled people.

Full use of city tourist and recreational areas leads to a possibility of the solution of the following tasks:

- increase in volume of information on tourist opportunities of the city and region;
- drawing attention of the public to a problem of protection of historical and cultural monuments;
- attraction of investments from large and small business;
- emphasis of attention on a solution of the problem of shabby housing in the territory with the most expensive earth;
- improvement of quality of the environment and standard of living of the population;
- development of missing infrastructure; recovery of pedestrian communications between the center and the city periphery;
- tactful inclusion of new modern construction on historical Wednesday;
- attraction of a tourist flow from the neighboring regions;
- involvement of foreign tourists for increase entrance tourism in the territory of the Russian Federation.

## **AUS DER STEUERGESCHICHTE**

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Im Vortrag handelt es sich darum, dass es Steuern schon seit dem frühen Altertum gibt. Das Wort Steuer kommt aus dem althochdeutschen „*stiura*“, das so viel wie Stütze, Beihilfe oder auch nur Hilfe bedeutete.

Der Staat erhob also Steuern, um seinen Bürgern helfen zu können, zumindest wurde dies im Mittelalter so interpretiert. Aber dies war in der Vergangenheit nicht immer der wahre Beweggrund für den Erlass von Steuergesetzen. Die Besteuerung wurde von den Bürgern vielfach als Opfer empfunden – und dies war auch von den Herrschenden so gemeint. Deshalb erhoben die Regierenden die Steuern nicht immer in Form von Geld; Naturalabgaben waren ebenfalls gern gesehen.

Abgaben in Form von Steuern gibt es seit dem frühen Mittelalter in den deutschen Landen. Schon seit Karl dem Großen wurde vorgeschrieben, was die Bauer und Jäger behalten durften und was sie automatisch abzuführen hatten. Es handelte sich dabei um den sogenannten Zehnt, den Karl der Große als eine Kirchensteuer erhob.

Aus der Zeit des Staufer-Kaisers Friedrich II. ist ein Steuerverzeichnis von 1241 erhalten, nach dem die zahlreichen Stadt-Gemeinden, Juden-Gemeinden, Königshöfe, Reichsdörfer, Abteien und Ämter eine Jahressteuer zu entrichten hatten, die auf der Grundlage des sogenannten „Bederechtes“ basierte. Das Wort „*bede*“ bedeutete im Althochdeutschen so viel wie bitten. Es handelte sich dabei um eine erbetene, freiwillige Leistung.

In den folgenden Jahrhunderten scheiterten zahlreiche Versuche der Könige und Fürsten, feste Steuern zu erheben.

Im Mittelalter gelang es den Regierenden dennoch, erste Ansätze eines Steuerwesens auszubauen. Aber schon damals orientierten sich die Stadtoberen an der Steuergerechtigkeit. Die Bürger mussten zwar Steuern bezahlen, aber nur entsprechend ihrer Vermögensverhältnisse. Deshalb handelte es sich bei diesen ersten Steuern in der Regel um Grundsteuern.

Ende des 19. Jahrhunderts wurden in Preußen erste umfassende Steuerreformen beschlossen. Der preußische Finanzminister Johannes von Miquel gilt als Schöpfer des modernen Einkommensteuersystems. Das Einkommensteuergesetz von 1891 führte die allgemeine Steuererklärungspflicht ein. Erst zu Beginn dieses Jahrhunderts gelang es dem Deutschen Reich, einen stärkeren Zugriff auf die Steuereinnahmen zu erhalten. Bis dahin profitieren die Länder am meisten von den Abgaben der Bürger.

Nach dem ersten Weltkrieg wurde in der Weimarer Verfassung im Jahre 1919 eine erhebliche Stärkung der Steuerkompetenz des Reiches festgelegt. Ein einheitliches Steuerrecht schuf um 1920 der damalige Reichsfinanzminister Matthias Erzberger. Eine Finanzreform ist in Teilen bis in die heutige Zeit erhalten. Zahlreiche direkte Steuern, vor allem die Einkommensteuer, wurden zu Reichssteuern erklärt.

Im Jahre 1969 wurden die „Steuerkarten“ noch als gemischt und erneut zwischen den drei Gebietskörperschaften aufgeteilt. Seit dieser Zeit stehen dem Bund die Einnahmen aus dem Branntweinmonopol und den meisten Verbrauchsteuern zu.

1990 trat eine grundlegende Reform des Einkommensteuerrechts mit einer Begradigung des sogenannten Progressionstarifes, der für die tatsächliche Höhe

der steuerlichen Belastung entscheidend ist, in Kraft. Nicht alle Steuern sind für die Ewigkeit geschaffen. Einige werden lediglich befristet erhoben. Einige europäische Nachbarn Deutschlands kannten diese Steuer nicht. Die Leuchtmittelsteuer zählt trotz ihrer langen Geschichte zu den umstrittensten Abgaben, da sie von den Bürgern nie so recht akzeptiert wurde. Insgesamt 26 Steuern wurden seit Bestehen der Bundesrepublik Deutschland wieder abgeschafft. Zum Beispiel die Speiseeissteuer, die als kommunale Steuer letztmalig im Jahre 1971 in einigen bayerischen Gemeinden erhoben wurde. Zu den abgeschafften Steuern zählt auch das Notopfer Berlin. Es war eine Sondersteuer auf das Einkommen der Arbeitnehmer und der Betriebe in der Höhe von vier Prozent. Erstmals wurde auch eine Art Briefmarkensteuer zu zwei Pfennigen je Postendung eingeführt. Auch die Erdgassteuer, erst vor wenigen Jahren eingeführt, sollte nur für eine kurze Zeit erhoben werden, um dem Staat aus seinen finanziellen Nöten zu helfen. An eine Abschaffung denkt derzeit niemand mehr.

## **DIE SOZIALÖKONOMISCHE ENTWICKLUNG DEUTSCHLANDS**

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Das Ziel des Vortrages ist es, über sozioökonomische Lage der BRD zu informieren. Es werden verschiedene soziale und ökonomische Aspekte betrachtet, z.B. Bruttosozialprodukt.

Die Bundesrepublik Deutschland ist eines der größten Industrieländer der Welt und nimmt die 3. Stelle in der Welt ein. Seit dem Ende des 2. Weltkrieges hat sich das Wirtschaftssystem des Landes zu einer sozialen Marktwirtschaft entwickelt. Das Wirtschaftssystem verbindet die Prinzipien des sozialen Fortschritts mit der freien Initiative der Einzelpersonen.

In Europa ist die Wirtschaft Deutschlands am größten. 2011 nahm Deutschland die 3. Stelle in der Welt nach allgemeinem Bruttosozialprodukt ein. Zurzeit ist Deutschland ein postindustrielles Land, in dem die Grundlage der Wirtschaft die Dienstleistungen (54 %), die Produktion (45.9 %) und das Agrobusiness (0.1 %) bilden. Die Wirtschaft wird durch die hochqualifizierte Arbeitskraft und die ausgezeichnet entwickelte Infrastruktur charakterisiert.



Das Streben nach Gewinn bezeichnet man als Triebkraft des Marktes. Die Bereiche der bundesdeutschen Wirtschaft, die keine Gewinne erzielen, waren nie ganz dem marktwirtschaftlichen System unterworfen. Das sind z. B., der Steinkohlenbergbau, teilweise das Verkehrswesen, und die Landwirtschaft.

Steinkohlenbergbau, Metallurgie, Schiffbau, Maschinenbau, feinmechanische, chemische, elektrotechnische, Verbrauchsgüterindustrie, optische Industrie, Nahrungs- und Genussmittelindustrie sind die bedeutendsten Industriezweige der BRD.

In Deutschland entwickeln sich die Wirtschaftssektoren ungleichmäßig. Die Entwicklung wird auf dem Gebiet des Transportwesens und im touristischen Business beobachtet. Die Rückläufigkeit wird in der Landwirtschaft beobachtet, dessen Anteil nicht mehr als 1.5 % in Bruttosozialprodukt ist.

2017 demonstriert das Land die Rekordgröße von Bruttosozialprodukt – 2.2 %. Die Kosten für die Befriedigung der persönlichen Bedürfnisse wuchsen auf 2% und der staatliche Konsum – auf 1.4%.

Die hohe Produktivität der Wirtschaft wurde durch die Rekordanzahl der Beschäftigten seit der Vereinigung des Landes unterstützt: 44.3 Mio. Menschen.

Am Anfang des 21. Jahrhunderts wurde das hohe Niveau der Arbeitslosigkeit beobachtet. Die Arbeitslosigkeit auf dem Territorium der ehemaligen DDR war besonders problematisch. Die Ursachen des Wirtschaftsverfalls gliedern die Gesellschaft in 2 Teile. Einige meinten, dass der Überfluss und die sozialen Abgaben zur Wirtschaftskrise gebracht hatten, und die anderen beschuldigten darin den wachsenden Einkommen der Bevölkerung und die Senkung der Inlandsnachfrage.

Im Februar 2005 haben 5.216 Mio. Menschen (12.6 % der arbeitsfähigen Bevölkerung) keine ständigen Arbeitsplätze. Diese Zahlen waren seit den 30er Jahren am höchsten.

Deutschland hat die riesigen Territorien für die Landwirtschaft, aber es sind darin ungefähr 3 % der arbeitsfähigen Bürger beschäftigt. Dieser kleine Beitrag an allgemeines Bruttosozialprodukt ist mit dem hohen Niveau der Industrialisierung der Wirtschaft verbunden.

Deutschland belegt den führenden Platz, nach Frankreich, in der Welt nach dem Viehwirtschaft Produkt, sowie der Kartoffel, der Zuckerrübe, dem Mais, dem Weizen, der Gerste, dem Hafer und dem Roggen. Das Land ist auf 100 % mit der Milch und auf 80 % mit dem Rind- und Schweinefleisch besorgt.

Die hohe Produktivität wird mit Hilfe der Mechanisierung der Arbeitsprozesse und der innovativen Methoden der Agrartechnik gewährleistet. Der fruchtbare Boden und die günstigen Klimafaktoren lassen die reichen Ernten bekommen.

Die Industrie Deutschlands steigt auf, aber die führenden Zweige werden allmählich ersetzt. Auf dem Gebiet der Leichtindustrie, der Metallurgie und des Baues sinkt das Tempo der Produktion. Der Anteil des Landes in der Weltproduktion der Rechengерäte, der Ausrüstung, des Transports, der

Elektrotechnik, der Autos und anderer Apparatur hält sich auf dem hohen Niveau (neben 7 % von Bruttosozialprodukt).

Die chemische Industrie Deutschlands gedeiht. Die Konzerne Linde, BASF, Bayer sind in Top-5 der Weltführer laut den Ertrag- und Gewinnkennziffern. Deutschland hat keine bedeutsamen Rohstoffvorräte, außer den Vorkommen der Braun- und Steinkohle in Saarland und Ruhrgebiet. Die eigenen Wirtschaftsressourcen besorgen nur 1/4 der Elektroenergie.

Die Regierung sucht nach anderen Energiequellen. Es gibt Erdöl aus Russland, Libyen, Saudi-Arabien, Algerien (1.6 %), Erdgas aus Russland, Holland Norwegen (11.3 %), die Atomenergie (16 %). Die erneuerten Energiequellen sind die Haushaltsabfälle, die Biomasse, den Wind, die Sonne, das Wasser (21.9 %).

Die Wirtschaft Deutschlands strebt nach der Erhöhung des Anteiles der Energie von den erneuerten Quellen und nach der Verkleinerung der Anwendung der Atomenergie zwecks des Umweltschutzes. Die Hauptrichtungen der Außenwirtschaft Deutschlands sind der Export und der Import.

Unsere Analyse zeigte, dass Deutschland ein Beispiel der rationellen Ökonomik ist.

## **INFLATION ALS MULTIFAKTORIELLER PROZESS**

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Das Wort „*Inflation*“ stammt aus dem Lateinischen „*inflation*“ – „Blähungen“. Inflation bedeutet ein kontinuierliches Wachstum des gesamten Preisniveaus. Inflation ist einen Wertverlust, der sich in Form von steigenden Preisen für Waren und Dienstleistungen äußert, die ihre Qualität nicht bessern.

Die Inflation entsteht als Resultat des Überflusses von den Kanälen der Geldzirkulation bei dem Fehlen der Warenmenge. Inflation ist kein Wachstum der Lebenshaltungskosten.

Das Wesen der Inflation ist der Wertverlust oder die Geldkaufkraft. In Abwesenheit von Geld, d.h. beim Austauschhandel ist die Inflation unmöglich. Beim Gold - oder Silbern Umlauf gibt es auch keine Inflation. Zurzeit ist Geld nur ein Symbol und kein wirklicher Reichtum, was ihren Wertverlust ermöglicht.

Inflation kann in expliziter (offenen) oder unterdrückter Form auftreten. Die explizite Inflation entsteht in den Märkten, wo es freie Preise gibt. Diese Art von Inflation äußert sich in steigenden Preisen, im Fallen der nationalen Währung usw. Die offene Inflation verformt, aber zerstört den Marktmechanismus nicht. Die Wirtschaft reagiert weiterhin auf Marktsignale und passt sich in Richtung des Gleichgewichts verschiedener Märkte an.

Die unterdrückte Inflation verläuft in versteckter Form und äußert sich in der Abnahme der Produktqualität, im Wachstum des Defizits, in den Schlangen. Bei dieser Inflation kontrolliert der Staat vollständig die Preise und Profite und hält sie auf einem bestimmten Niveau. In diesem Fall bleiben die Ursachen der Inflation bestehen, staatliche Maßnahmen sind ohne Perspektive. Die unterdrückte Inflation bricht den Marktmechanismus der Selbstregulierung, wodurch der "schwarze Markt" gedeiht.

Je nach Wachstumsrate gibt es drei Arten von Inflation:

- angemessene,
- galoppierende und
- Hyperinflation.

Angemessene Inflation. Die Preise steigen langsam, der Geldwert bleibt erhalten. Diese Art gilt nicht als gefährlich für die Wirtschaft des Landes.

Galoppierende Inflation. Der Preisanstieg wird durch zweistellige und mehrstellige Zahlen pro Jahr gemessen, das Geld wird in die Waren angelegt. Das ist eine gefährliche Art für die Wirtschaft des Landes und erfordert Antiinflationsmaßnahmen.

Hyperinflation. Die Preise steigen im astronomischen Tempo. Es wächst die Geldmenge im Umlauf, die Divergenz von Preisen und Löhnen ist katastrophal, die Wohlfahrt der Gesellschaft ist zerstört, die größten Unternehmen werden unrentabel, die wirtschaftlichen Beziehungen werden zerstört, es erfolgt der Übergang zum Tauschhandel. Die Wirtschaft befindet sich im Zustand des Überlebens. Diese Art ist äußerst gefährlich für die Wirtschaft des Landes.

Hyperinflation ist ein seltenes Phänomen.

Die galoppierende Inflation tritt regelmäßig auch in Industrieländern auf. Angemessene Inflation gibt es in fast allen Ländern der Welt.

In Russland gab es

- Hyperinflation;
- galoppierende Inflation;
- angemessene Inflation.

Inflationsprobleme sind fast vollständig mit Unsicherheit verbunden. Sie bestehen nicht darum, dass der Geldwert sinkt, sondern weil der Geldwert unberechenbar ist. Wenn die Inflationsrate bestimmt ist, mildert das die Auswirkungen der Inflation.

Die russischen Ökonomen unterscheiden zwischen den Inlands- und Auslandsfaktoren der Inflation.

Zu den Inlandsfaktoren der Inflation gehören:

- niedrige Produktionseffizienz und niedrige Arbeitsleistung;

- strukturelle Disparitäten (zwischen der Landwirtschaft und der Industrie, zwischen den Industrien usw.);
- Unausgeglichenheit der Wirtschaft (Inkonsistenz des Gesamtangebots an die Gesamtnachfrage);
- schwache Entwicklung der Märkte von Produktionsfaktoren und Wertpapieren;
- Monopolisierung in der Produktion und Handhabung, kein Wettbewerb.

Zu den Auslandsfaktoren der Inflation gehören die folgenden:

- ineffiziente Außenhandelspolitik (Rohproduktexport);
- ineffiziente Devisenpolitik;
- das Wachstum der äußeren und inneren Schulden;
- übermäßige Hilfe für ausländische Länder.

Zu den Antiinflationsmaßnahmen gehören Stabilisierung der Inflationserwartungen, Reduzierung des Haushaltsdefizits, Steuerreform, Umgestaltung und Umwandlung der Rüstungsindustrie, Regulierung des Wechselkurses, Privatisierung, Erhöhung der Sparquote, Geldreform.

## PSYCHOLOGY OF COLOR IN MARKETING

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In content marketing, color is an emotional cue. Color can help yours stand out. It's what gets your audience to see what you want them to see, feel what you want them to feel, and to do what you want them to do. Poor color choice can also negatively change the impact of your message.

Color is an essential tool because it has an impact on how we think and behave. Color directs our eye where to look, what to do, and how to interpret something. It puts content into context. It helps us decide what's important and what's not. That's precisely why, as a content marketer, you need to understand what colors mean to people.

There are a few generalities about how people respond to color, and that's what we're going to look at. It is important to correctly determine the color you need to cause people to have the right emotions and actions.

If you're looking to have a really powerful presence or get someone's attention fast, red is your go-to color. Red is a very powerful, dynamic color that reflects our physical needs whether to show affection and love, or to portray terror, fear, and survival. Red is also a very energizing color that can portray friendliness and strength, but can also be demanding and show aggression depending on its context.

Orange has a very interesting psychological meaning as it combines red's power and energy with yellow's friendliness and fun. The mix makes orange a good representation of physical comfort in our warmth, food, and shelter. It even stimulates our appetite. Orange is a color of motivation, lends a positive attitude, and general enthusiasm for life.

Yellow is the epitome of joy, happiness, cheerfulness, optimism. The wavelength of yellow is particularly long, making it has one of the most powerful psychological meanings, while also being the easiest color to visibly see.

Whenever you need to lift someone's spirits, increase their confidence, or provide inspiration, use yellow. However, avoid using yellow too much because it's also known to make us more critical causing self-esteem issues, fear, or anxiety. It is important to find the right balance of yellow to motivate rather than bring others down.

Green is a color of balance and harmony. It lends us a clearer sense of right from wrong since green incorporates a balance of both the logical and emotional. It is also a sign of growth, whether that's in a physical object like plants or in our income and wealth.

Overall, if you're looking to portray health, rest, and to relieve stress, green is your color. While green does have minor negative aspects like over-possession and materialism, it has a more positive affect than most other colors.

Blue is known for its trust and dependability. It's reliable, responsible, and mentally soothing. For that reason alone, it's one of the most-liked colors across the entire world.

Unlike red, blue lends a more mental reaction rather than physical that allows us to distress, calm down, and think of the most ideal situation. Unfortunately, it also is one of the last colors to be seen, and can be perceived as distant, cold, or unfriendly if used it great amounts.

Overall, blue is a well-liked color that can bring a sense of calmness and trust when building relationships, especially in marketing.

Purple is often used to show luxury, loyalty, courage, mystery, and magic. It's a very intriguing color as it soothes, but also presents space for mystery and new ideas. This is why creativity is most often associated with the color purple. When using purple, avoid using it too often as it can also cause too much introspection or distraction as thoughts begin to wonder.

Pink is a softer, less intense version of red that creates a sense of compassion and unconditional love. While it's a very physical color, it soothes rather than stimulates, making it a perfect color for caring, understanding, and nurturing those in need. It is also known to be very romantic as it shows empathy and sensitivity. If

too much pink is used, it can be very draining, show a lack of power, and even immature.

Black is a color of sophistication, seriousness, control, and independence. Although, it can also be used to show evil, mystery, depression, and even death. Black is a very reserved color that completely lacks any light as it's an absence of all the colors. It likes to stay hidden, in control, and separate from others. For this reason, black is a great color for high contrast and easy legibility. Unfortunately, since it's a very powerful color, too much black can cause sadness and overall negativity so use it sparingly and in your text more so than the visuals itself.

White is color that is complete and pure, making it a perfect example of purity, innocence, cleanliness, and peace. White can also represent new beginnings, providing a blank slate, and gives refreshment for new ideas. Since white has an equal balance of all the colors, it can exemplify several meanings, with equality outweighing them all. White is a great color for simplicity, cleanliness, and idea creation; however, avoid using too much white as it can cause isolation, loneliness, and emptiness.

How people behave when they see color has a direct effect on your conversions. Will they click the button on your CTA? Will they read your pop-up graphic? Will they notice your email subscription box?

According to the Institute for Color Research, people make a judgment about your content in 90 seconds or less. And, up to 90% of that judgment in that brief amount of time is influenced by the colors they see. Blogger Neil Patel gives further proof of how colors affect your conversion rate, revealing that 85% of consumers base buying decisions on color, and that full-color ads in magazines get recognized 26% more often than plain old black and white ads.

In fact, color helps people recognize your brand by up to 80%. It's important to choose your color carefully, and stick with it. And it's a question of which color tested best for you.

## **GUIDELINES FOR WRITING REVIEWS**

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Writing scientific reviews is a separate branch of writing that requires the author not only to penetrate deeply into a scientific problem, but also the ability to quickly search and analyze information, to carry out a critical synthesis of material from various sources, taking into account their importance and novelty, as well as to present complex and voluminous topics, relatively simple language. Successful reviews are waiting for reissues in the form of books and textbooks, but badly written works are not read or quoted. Here are some rules that will help you find your reader.

Clearly define the topic of the review and its audience. The topic should be interesting to you personally. Ideally, you should immediately recall a dozen recent publications that would be appropriate to critically analyze. The topic should be relevant, best of all – “hot”. This will certainly provide you with a large amount of material, and your review will receive the attention of a wide range of readers. The review should address clearly identified issues. It makes no sense to disassemble this or that area “in general” – neither paper nor forces will be enough for this. Determine your target audience. What field specialists are reading the magazine where you are going to write a review? Will the topic be interesting not only to biologists, but also to chemists, mathematicians, teachers? Knowing the level of your reader, it will be easy for you to determine the level of detail of a particular issue.

Determine the type of review. If you were taking notes all the time while reading the literature, then at the end of this process you will already be presenting an approximate amount of a future review. This is the most appropriate time to decide where to go. There are two types of review genre – mini-and full-size review. Some journals now prefer to publish short reviews focused on recent publications, with a limited number of words and quotes. Mini-review does not mean inferiority, rather the opposite – it is a concise and succinct article, a concentrate of modern ideas, attracting the attention of busy readers with its small volume. To write a competent mini-review, you must truly master the pen. The disadvantage of mini-reviews is that sometimes some problems are presented in a simplified form due to volume limitations.

A full-size review has undoubted advantages: you can bring more data and are free to dwell on those details that you consider important or interesting. However, such “monumental” articles are threatened to be put off “for thoughtful study later”, which may never occur.

Consider feedback from reviewers. As a rule, taking into account the reviews and opinions of your reviewers significantly improves the initial version of the review. Having carefully read the review, the reviewers with a fresh glance will grab those inaccuracies, inconsistencies or unsolved problems that were not noticed by you. By the way, carefully re-read the entire review immediately before sending it to the magazine – the absence of typos and confusing sentences will allow reviewers to focus on the essence of the article, and not on claims to the style of presentation.

Reviewer tips are very important, so you should try to get reviews from specialists from various fields of science. On the one hand, this may lead to conflicting views on the merits of the review and incompatible advice for improving the text. On the other hand, this situation is better than no reviews at all. A variety of comments will help you determine where the opinions of experts converge, and where controversies arise.

## **RUSSIA'S DEVELOPMENT OF ECONOMY AND POLITICS**

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How will live Russian Federation soon? Well, someone thinks about militarization of country, someone about exceptional artificial intelligence, and someone even thinks that humanity is degrading and will destroy itself soon. Every point of view has the right to exist, but without a doubt, a lot will depend on the country's political and economic development model.

It is no secret that the current economic and political situation in Russia is far from being the most successful. This is evidenced by the facts: only 60th place in terms of Gross Domestic Product according to the World Bank, and a disastrous 136th place in terms of the corruption perception index. In this case, you need to look at those countries that are leading in these indicators and at those that are now progressing quite rapidly.

China can come to mind. However, the Chinese model of economic development in Russia is simply impossible. The main reason is the absence of many rural people who are ready to work hard. In addition, the Chinese do not have social guarantees: the elderly do not have pensions, no one has medical insurance.

What then? USA? Japan? If the level of technical advancement of these countries is at the highest level, then in Russia this is much worse. That is, less development will not allow to follow the course of these countries.

But to introduce a system of Scandinavian countries is quite possible. In terms of the happiness of the population, Norway has been ranked the 1st for



several years in a row, while Sweden and Denmark have consistently held the rank of leader in terms of Gross Domestic Product. The basis of this success is government support for small and medium-sized private businesses, a high level of agricultural production, and a low level of corruption.

Another strong point is the stability of this system: it prescribes a strict balance in everything. For example, preschool and school education necessarily contains such subjects as ethics and economics. That is, a child who has not reached his 10 years yet, already knows – how to behave and manage money at his age with almost no help from his parents. Students studying politics, sociology and all the same economics and ethics actively at universities. Thus, by the age of 25, a person will know exactly which profession he chooses, is more likely to be decent family man and will have social guarantees from the state.

This is called the European model of capitalism. Russia has a huge potential for it: oil and mineral resources statistically, are the largest in Russia. So, you need to start with the proper distribution of income and support for small private businesses. And if we assume that such a model of economic and political development will be approved in 2019, then in 10 years Russia will become the leading world power.

## SECTION 3. PHILOLOGY AND LINGUISTIC

### ПРОБЛЕМА ИСЧЕЗНОВЕНИЯ И СОХРАНЕНИЯ ЯЗЫКОВ

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Данное исследование посвящено анализу основных факторов, приводящих к вымиранию языков. Эта тема является актуальной в связи с возросшей тенденцией глобализации, угрожающей наиболее уязвимым языкам и культурам.

Число языков на нашей планете стремительно сокращается. На данный момент существует приблизительно 7000 языков, по прогнозам лингвистов к концу XXI века останется в «живых» только 3000.

Организация Объединённых Наций по вопросам образования, науки и культуры (ЮНЕСКО) применяет классификацию, составленную на основе «Красной книги языков» исчезающих и уже вымерших языков мира. В соответствии с ней все языки делятся на следующие категории:

- *вымершие языки* (англ. extinct);
- *языки на грани вымирания* (англ. nearly extinct);
- *исчезающие языки* (англ. seriously endangered);
- *неблагополучные языки* (англ. endangered);
- *благополучные* (невывирающие) языки (англ. not endangered).

Согласно существующей статистике, подавляющее большинство населения планеты использует всего лишь 8 самых распространённых языков: китайский (1,2 млрд носителей), английский (478 млн), хинди (437 млн), испанский (392 млн), русский (284 млн), арабский (225 млн), португальский (184 млн) и французский (125 млн).

Значительное влияние на *витальность* (жизнеспособность) языков оказывают исторические и политические предпосылки, которые, как правило, составляют группы факторов, взаимосвязанных между собой. Всевозможные экстралингвистические факторы могут влиять непосредственно, сокращая численность населения (гибель носителей языков) или опосредованно (увядание языков при сохранении языковых коллективов). Так, природные, техногенные катастрофы и эпидемии способны полностью уничтожить целый народ, сюда же можно отнести

войны и завоевания, сопровождающиеся истреблением коренных народов. Колонизация обширных территорий Латинской и Северной Америки, например, сопровождалась насильственной ассимиляцией и истреблением жителей, соответственно их языка и культуры.

В многоязычном обществе, языки, как правило, имеют различную степень престижности. Так, представители национальных меньшинств, при неблагоприятной социолингвистической ситуации считают себя неконкурентоспособными на рынке труда и образования, поскольку их родной язык используется только в сфере бытового общения. Падение престижа родного языка приводит к его деградации, а зачастую исчезновению, если его передача следующим поколениям не происходит. Таким образом, можно говорить о том, что именно внешние факторы (исторические, демографические, экономические и политические) оказывают основное влияние на витальность языков.

Решение проблемы исчезновения языков во многом зависит от языкового планирования. Именно мудрая языковая политика, проводимая государством, определяет будущее уязвимых языков.

В свою очередь, современные ученые предпринимают различные меры по документированию и сохранению вымирающих языков. Подобно тому, как при помощи кода ДНК сохраняют и возрождают отдельные виды растений и животных, аналогично лингвисты формируют информационную базу данных, в которую вносятся огромные массивы информации о языке, включая фонетику, грамматику и лексику. Целью такой работы является донести до следующих поколений и впоследствии восстановить по сохраненной информации структуру вымершего языка.

Таким образом, несмотря на все трудности, в современном мире формируется путь сохранения языков, находящихся под угрозой исчезновения, что является положительным моментом, поскольку именно язык представляет собой важнейшую часть культурного и национального наследия каждой этнической группы.

## ЭТИМОЛОГИЯ КАК НАУКА О ПРОИСХОЖДЕНИИ СЛОВ (НА МАТЕРИАЛЕ АНГЛИЙСКОГО ЯЗЫКА)

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В английском языке встречается немало слов и словосочетаний, происхождение которых вызывает вопросы. Мой интерес к этимологии возник на занятиях по английскому языку. Понимание этимологических особенностей того или иного термина зачастую помогало лучше понять и запомнить его значение, в связи с чем я решила глубже изучить эту науку и ее методы. Поскольку я являюсь студенткой юридического института, объектом анализа были выбраны слова и выражения, связанные с правом.

Целью настоящего исследования является этимологический анализ ряда слов и словосочетаний, тем или иным образом относящихся к сфере юриспруденции.

В настоящей работе под этимологией (греч. *etymologia*, от *etymon* – истина и *logos* – слово, учение) понимается раздел лингвистики (языкознания), изучающий происхождение слов; научно-исследовательскую процедуру, направленную на раскрытие происхождения слова, а также результат такого научного исследования.

Этимологическое исследование позволяет воссоздать те процессы, которым подвергалось слово за всю историю своего существования в языке. Этимология обращает внимание на различные связи слова внутри лексико-семантической системы и процессы, происходящие в ней. Изучив эти связи, можно судить о родстве определенного слова с другими словами.

При работе с литературными источниками методом сплошной выборки был получен ряд примеров для дальнейшего анализа.

Первое выражение – *Шотланд-Ярд* – привлекло наше внимание при работе с текстом на занятии по английскому языку: было не совсем понятно, какова связь между «шотландским двором» и лондонской полицией. Этимология интересующего нас выражения не находит однозначного описания в литературных источниках. По общепринятой версии, название «*Шотланд-Ярд*» уходит корнями в раннее Средневековье.

В X веке английский король Эдгар I Миротворитель подарил королю Шотландии Кеннету II участок земли рядом с Вестминстерским дворцом в

Лондоне на условии, что тот построит здесь резиденцию, которая будет считаться территорией Шотландии, и станет посещать ее ежегодно в знак уважения к английской короне. Это стало традицией всех шотландских королей, если они, конечно, не находились с Англией в состоянии войны. Но в 1603 году английская корона перешла к шотландской династии Стюартов, и Скотланд-Ярд утратил свое политическое значение. Дворец решено было разделить на две части. Первую назвали «Большой Скотланд-Ярд», а вторую – «Средний Скотланд-Ярд». Их стали использовать как правительственные здания.

В 1829 году в Лондоне появилась первая полицейская служба, созданная министром внутренних дел Робертом Пилем (1788–1850гг). Резиденцией лондонской полиции стал тот самый комплекс зданий, который несколько столетий назад принадлежал членам шотландской королевской семьи. С тех пор за лондонской полицией прочно закрепилось неформальное название «Скотланд-Ярд». Отметим также, что официально полиция Лондона называется Metropolitan Police Service.

По мнению З.Я. Красневской, история английского языка богата событиями, каждое из которых оборачивалось бурным и стремительным становлением национального языка. Автор отмечает, что каждое слово или выражение имеет свою историю, что слова не появляются из «ниоткуда», и в доказательство приводит множество интересных фактов в своей книге. Рассмотрим, например, происхождения слова «*blackmail*» («шантаж»).

В те времена, когда Англия и Шотландия находились в состоянии войны, в приграничных областях двух королевств бытовало слово «*mail*», означавшее не что иное, как налоги или ренту. (Кстати, в Шотландии до сих пор налог на недвижимость называют «*mail*»). Отсюда легко можно понять современное значение этого слова. «Черные», или незаконные суммы поборов взимались с жителей приграничных областей как той, так и другой воюющей стороной в обмен на обещание охранять имущество плательщиков от разорения в случае прихода врага.

Заслуживающей внимания представляется и этимология слова «*phoney*» (ложный, поддельный, фальшивый, дутый). Британские воры и мошенники для общения использовали секретные обозначения, одним из которых было слово «*fawney*» (от ирландского *fainne* – кольцо). Оно использовалось вместо сочетания «позолоченное кольцо», продавая которое мошенники уверяли покупателя, что оно сделано из чистого золота. Таким образом, слово «*phoney*» (упрощенное от «*fawney*») впоследствии стали использовать для обозначения чего-то поддельного, фальшивого, ненастоящего.

Чем старше слово, тем сложнее разобраться в его этимологии, поэтому встречаются случаи, когда однозначно ответить на вопрос о происхождении слова невозможно. Выяснить происхождение слова, то есть описать «биографию» названий, непросто. Ученым приходится погружаться в древние языки, изучать жизнь людей прежних времён. Часто в этом им

помогают история, археология, география, этнография, астрономия и другие науки.

Многие этимологические загадки уже решены, но над чем-то учёные ещё продолжают ломать голову. Так, в процессе изучения данной проблемы нам встретилась лексема «*knave*», которая переводится как мошенник. Однако трансформация первоначального значения этого слова до сих пор непонятна, так как у англосаксов слово «*knave*» до начала XIII века значило всего лишь «мальчик». Причины, по которым это слово в дальнейшем получило негативную коннотацию, остаются невыясненными.

Следующее слово, историю возникновения которого мы хотели бы рассмотреть, – это термин английского происхождения «хулиган», которым во многих странах обозначают нарушителей порядка. Единого мнения по поводу происхождения вышеуказанного слова нет. Согласно первой, самой известной версии, „*hooligan*” произошло от фамилии Патрика Хулихена. Патрик и его друзья занимались вандализмом, уличными драками и грабежами. Происходило это примерно в 1870-1850 годах.

По легенде, в одной из уличных драк Патрик убил полицейского, после чего был пойман и осужден на пожизненное заключение. Так он и умер, отбывая наказание. А на рубеже XX века слово “хулиган” пришло в литературу. “Подвиги” Патрика описал писатель Кларенс Рук в книге “Хулиганские будни”. Так фамилия стала нарицательной. Согласно второму мнению, такое название произошло от имени героя комикса “FunnyFolk”, выпускаемого в Лондоне с 1874-1894 гг. Третья группа специалистов утверждает, что слово пошло от песни „Mrs Hooligan’s Christmas Cake“, исполненной в 1883 году в Music Hall. Отметим, что именно эту версию поддерживает Оксфордский словарь. Есть также и четвертая версия, согласно которой *hooligan* имеет связь с ирландским словом “*hooley*”, или “*houlie*”, что означает “пьяная, шумная вечеринка”.

Таким образом, на примере слова «*hooligan*» можно убедиться в том, что этимология ряда англоязычных юридических терминов таит в себе еще много загадок.

Анализируя работы по выбранной тематике, можно сделать вывод о том, что в этимологии прекрасно уживаются логика и фантазия. Есть этимология научная, основанная на фактах и серьезных гипотезах, а есть народная, допускающая самые невероятные предположения и ассоциации. Термин «народная этимология» введен немецким лингвистом Эрнстом Фёрстеманном в 1852 году для обозначения специфического языкового явления — полного или частичного переосмысления слова в результате произвольного сближения его с другими близкими по звучанию словами.

Перед наукой лингвистикой стоит еще достаточно много нерешенных вопросов. В настоящее время задачи этимологии тесно переплетаются с историей языка, когда на основе известных фактов выявляются недостающие звенья в историческом развитии слов. В процессе поиска исходного значения и изучения всех трансформаций, претерпеваемых словом, выявляется прямая

связь с историей государства и общества в целом, что, несомненно, представляет интерес для меня как для будущего юриста.

## PSEUDO-ANGLICISMS IN MODERN WORLD

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Pseudo-anglicisms are words in languages other than English which were borrowed from English but are used in a way native English speakers would not readily recognize or understand.

### *The classification of pseudo-anglicisms*

The well-known tripartite typology offered by Broder Carstensen is used in several recent studies on pseudo-anglicisms. On the basis of this classification, the following types of pseudo-loans can be distinguished:

- 1) Lexical pseudo-loans. That is combinations of English lexical elements to form a word which does not exist in English.
- 2) Morphological pseudo-loans. That is reduction of a compound or elision of an element in the English expression.
- 3) Semantic pseudo-loans. That is attribution of a new meaning to an already existing English words.

The most detailed classification has been offered by Cristiano Furiassi. Let's see the examples of his pseudo-loans groups.

#### **1. Derivatives**

The first one is derivatives, composed of an English free morpheme (lexical element) and an English bound morpheme (grammatical element).

One of the most productive combining elements applied in many pseudo-English formations is the compound – maker. You can see the real English words with the meaning of pseudo-anglicisms at the screen:

*Gamemaker* – game developer

*Clipmaker* – music video director

*Tattoomaker* – tattoo artist

*Autogoal* – own goal

*Trendmaker*– trendsetter

*Autostop* – hitchhiking

## **2. Compounds ellipses**

Compounds ellipses is the reducing of English words by deleting a suffix. For instance, it's *business-lady* for English "businesswoman", *shop-tour* for "an organized tour to a foreign country for shopping", *long-seller* for English "long-time bestseller", *face-control* for "a common practice at Russian night clubs: checking whether a person looks appropriate"

## **3. Ellipses**

Ellipses – the reducing of English words by deleting a suffix. Examples: *camping* – camping site, *parking* – parking lot etc.

## **4. Clippings**

Clippings –the shortening of English words by deleting a suffix. Probably the best-known instance of cross-linguistic clipping in European languages is the pseudo-Anglicism "*happy end*" standing for English "*happy ending*". Other example is "*box*" for English "*boxing*".

## **5. Semantic shifts**

There is a special group of pseudo-English loan containing words which have formal equivalents in the source language but their meaning is altered in the recipient language to the extent that it departs significantly from the English original.

These semantic shifts may involve a process of meaning extension (widening) or meaning restriction (narrowing). Examples:

*Killer* for English "hit man" or "contract killer";

*Oldtimer* for English "classic car or vintage car";

*Show-woman* for English "female TV presenter".

As English speakers we don't generally know where our words come from, and probably care even less. It's easy to be relaxed when yours is the language the rest of the world learns to get ahead. But the fact is that all of us are borrowing from each other, mixing and matching, repurposing for our needs and sometimes getting it a bit wrong. That's just how language works, and learning such phenomena as pseudo-anglicisms can help us to use a number of words correctly.



## BRITISH AND AMERICAN VARIANTS OF ENGLISH LANGUAGE

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English is spoken all over the world. Despite how much the USA and UK have in common, there are enough differences between their two versions of the English language that someone may not always understand exactly what someone from the other country is saying.

Not only are there 160 distinct dialects of the English language, but there's also different spelling and even words, used to describe one or other thing.

### British variant of English words.

***House:*** flat, lift, cooker, gas cooker, electric cooker, frying pan, standard lamp, tap, letterbox, postman, postcode, dustbin, rubbish.

***Family:*** cot, dummy, nappy, pram, pushchair, roundabout, sandpit, skipping rope, surname.

***School:*** drawing pin, form, holiday, mark, nought, public school, pupil, rubber, set square, full stop, inverted commas, round brackets.

***Food:*** biscuits, chips, crisps, scone, porridge, sweets, aubergine, beetroot, maize, stone, a cherry stone, to stone cherries, tin, tin opener, cookery book, serviette.

***Clothes:*** dinner jacket, jumper, tie, tights, trousers, pants, vest, waistcoat, windcheater, braces, court shoes, plimsolls, wallet, rucksack, wellington boots.

***Shopping:*** bill, carrier bag, note, queue, pharmacy, pub, shop, shop assistant, shopgirl, trolley.

***Airport, railroad:*** railway, railway station, sleeper, compartment, return ticket, single ticket, book a seat, luggage trolley, cabin bag.

***Cars:*** aerial, bonnet, boot, driving licence, gear lever, indicator, indicator switch, number plate, petrol, rear lights, reversing light, sidelights, silencer, spanner, torch, tyre, windscreen, windscreen wipers wing, caravan lorry, estate car, tram, motor accident.

### American variant of English words.

***House:*** apartment, elevator, stove, gas stove, electric stove, skillet, floor lamp, faucet, mailbox, mailman, zip code, garbage can, trash.

**Family:** *crib, pacifier, diaper, baby carriage, stroller, carrouse, sandbox, jump rope, last name.*

**School:** *thumbtack, grade, vacation, grade, zero, private school, student, eraser, triangle, period, quotation marks, parentheses.*

**Food:** *cookies, French fried potatoes, potato chips, biscuit, oatmeal, candies, eggplant, beet, corn, pit, a cherry pit, to pit cherries, can, can opener, cookbook, napkin.*

**Clothes:** *tuxedo sweater, necktie, pantyhose, pants, underpants, undershirt, vest, windbreaker, suspenders, pumps, sneakers, pocketbook, backpack, rubber boots.*

**Shopping:** *check, shopping bag, bill, line, drugstore, bar, store, salesclerk, salesgirl, shopping cart.*

**Airport, railroad:** *railroad, railroad station, sleeping car, roomette, round-trip ticket, one-way ticket, reserve a seat, baggage cart, carry-on bag.*

**Cars:** *antenna, hood, trunk, driver's license, gearshift, turn signal, turn signal lever, license plate, gas, taillights, backup light, parking lights, muffler, wrench, flashlight, tire, windshield, windshield wipers, fender, trailer, truck, station wagon, streetcar, car accident.*

Did you know, that the difference between spelling words like American *color* and British *colour*, or *humor* and *humour*, comes from the Brits adopting, their now called British words, from Old French language? When it came to America later, the spelling was simplified. And so is with many other American English and British English differences, as the adaptation of grammar took its part. For example, British English: *centre, fibre, litre, theatre, defence, licence, offence, pretence, apologise, organise, recognise, behaviour, colour, humour, labour, neighbour, flavour.* American English: *center, fiber, liter, theater, defense, license, offense, pretense, apologize, organize, recognize, behavior, color, humor, labor, neighbor, flavor.*

The US and the UK's imperial histories and modern influence over the world have changed the English wording forever. Because it was exported to countries all over the world, it has been forced to accept different variations of the same language, the most known one to be the British Vs. American.

## THE RAREST LANGUAGES IN THE WORLD

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The *Yokang-Sami* language, or the *Terek-Sami* language, is the easternmost of the Sami languages. It was distributed in the North-Eastern part of the Kola Peninsula. The approximate number of Terek sámi is 100 people, but the number of native speakers is much lower – in 2010 there were only 2 people, probably the language is already extinct. The language is associated with Finnish and Uralic languages, which are spoken by some nationalities in Russia and Siberia, as well as vaguely reminiscent of Hungarian.

The language of the *Yuchi* tribe living in the South-Eastern United States was forcibly relocated to Oklahoma in the early 1800-ies. In 2007, there were only 3 people with sufficient knowledge of the language. *Yuchi* is an isolated language, a connection with some other languages of the planet is not established. The *Yuchi* tribe called themselves “Children of the Sun”. Today, researchers are making video and audio recordings of an endangered language to preserve data about it.

Native speakers of the language of Oro wines live in Western Brazil in the state of Rondonia and were first discovered only in 1963. The tribe was virtually destroyed after two attacks by Brazilians, and today the tribe consists of no more than 50 people, and only 5 people are native speakers. This language uses special sounds, which are made only by lips without voice.

*Kusunda* language is an isolated language that is not associated with other languages. Native speakers lived in Nepal, they were occupied exclusively by hunting and gathering, and then slowly dissolved in the neighboring people. The language was thought to be extinct, but in 2004 researchers at Tribuvan University in Kathmandu found 8 people still speaking the language.

*Comani* language belongs to the group of languages of Africa which does not belong to other language families. Only 10 elderly people living in the territory of the Kalahari-Gemsbok National Park in South Africa speak this language. This group of languages is notable for the use of so-called “clicking consonants”. It has more sounds than any other language on the planet: 74 consonants, 31 vowels and 4 keys.

*Yereva* is one of the Andaman languages spoken by less than 20 people on the island of North Andaman in the Indian ocean. One of the few remaining indigenous languages of the Andaman Islands. The oldest language dates back to the period before the stone age.

The *Ainu* language is now spoken by a very small group of people living on the island of Hokkaido in the North of Japan. Previously, it was distributed in the South of Sakhalin, the Kuril Islands and the southern tip of Kamchatka. In the *Ainu* language there are many very complex verbs, which are skillfully used in the language and are a means to convey a very rich oral creativity – folk tales and songs. Today, efforts are being made to preserve the *Ainu* language and revive their ancient traditions.

The homeland of the *Tao* people and their language is the territory of the Central part of the Chinese island of Taiwan. *Tao* is an *Austronesian* language that is associated with languages spoken in Taiwan, Southeast. It is the language of the first *Austronesian* settlers who moved to the South and East about 3 thousand years ago.

*Ket* language is an isolated language, the only living representative of the *Yenisei* family of languages. It was spoken by the inhabitants of Siberia near the *Yenisei* river. Today there are no more than 150 people who speak it, children are no longer taught this language, as parents prefer to speak Russian. *Ket* is the only Siberian language that has a system of tonality, that is, the tone with which the phrase affects the meaning, although the words can be completely identical.

The language of *guugu-yimidhirr* is a language of aborigines of Australia, which is spoken by about 200 people living in the North of Queensland. Captain James Cook in 1770 made a small list of words with translation into English. The word “kangaroo”, which is now available in many languages of the world, borrowed from this language.

## **ТЕМАТИЧЕСКАЯ КЛАССИФИКАЦИЯ НАЗВАНИЙ АПТЕК И АПТЕЧНЫХ СЕТЕЙ (НА МАТЕРИАЛЕ РУССКОГО ЯЗЫКА)**

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В данном докладе освещаются результаты индивидуального исследовательского проекта «Тематическая классификация названий аптек и аптечных сетей (на материале русского и немецкого языков)». Координатором исследовательского проекта является доцент кафедры иностранных языков и профессиональной коммуникации Таранова Е.Н. Исполнители проекта – студенты группы 11001706.

Цель проекта: разработать тематическую классификацию названий аптек и аптечных сетей в русском и немецком языках; провести сравнительный семантический анализ для выявления частных и общих черт в особенностях номинации аптек и аптечных сетей.

Этапы проекта: 1) сбор фактического материала исследования; 2) разработка тематической классификации названий аптек и аптечных сетей; 3) проведение семантического анализа названий аптек и аптечных сетей.

Объектом исследования выступают «номинации аптек и аптечных сетей» в русском и немецком языках. Предметом исследования является семантико-культурологический аспект номинации аптек и аптечных сетей в русском и немецком языках.

Методы исследования: метод сопоставительного и количественного анализа, описательно-аналитический метод, метод комплексного семантического анализа. Прежде чем перейти к полученным результатам исследования, рассмотрим кратко историю вопроса.

В России, как и в других странах, аптечное дело возникло как составная часть медицины. Медицинские знания зарождались в недрах народного опыта, накапливались и передавались как путем устных преданий, так и через рукописи. С появлением христианства на Руси вместе с ним в страну пришло и профессиональное врачебное искусство.

Аптечное дело на Руси основано было приглашенными иностранцами, которые присваивали аптечному заведению свою фамилию. Широкой известностью пользовались аптеки Феррейна и Брунса в Москве, Юргенсона в Твери, Линдера в Вологде, Грахе в Казани.

В правление Иоанна IV Грозного на территории Московского Кремля в каменном здании напротив Чудова монастыря была устроена придворная аптека. Называли ее «Государевой», так как она обслуживала только царя и членов царской семьи. Со временем к царю стали поступать челобитные об отпуске лекарств из Государевой аптеки, в результате чего в порядке исключения в ней стали отпускать лекарства посторонним.

Так, впервые двери придворной аптеки были открыты для московского населения. Но лекарства всегда были недешёвым товаром как при Иване Грозном, так и теперь.

В современном мире существует много аптек. На выбор покупателя влияют ценовая политика и ассортимент аптеки, а также её расположение и профессиональностью сотрудников. А также немалое значение имеет название. Конечно, большинство названий, так или иначе, связаны с родом

деятельности аптек. Однако это вовсе не значит, что у владельцев аптек нет простора для воображения. Так, существует несколько основных групп названий.

Фактический материал исследования включает 159 названий аптек и аптечных сетей в русском языке. Результатом исследования является разработанная авторская тематическая классификация, включающая 11 тематических групп с последующим делением на подгруппы.

#### **Тематическая группа 1 «Названия, которые указывают на месторасположение»**

В данную группу вошли 22 номинации. Примеры: «Дежурная аптека на Таганке», «Курская фармация», «Аптека на Ленина», «Белфарм».

#### **Тематическая группа 2 «Названия, содержащие имена»**

Выделенная группа включает 7 номинаций.

2.1. «Названия, содержащие имена владельцев»

2.2. «Названия, содержащие оригинальные женские имена»

2.3. «Названия, содержащие имена известных ученых и врачей»

Примеры: «Елизавета», «Глория», «Гиппократ», «Пастер».

#### **Тематическая группа 3 «Названия, содержащие предметную лексику»**

Эта тематическая группа является самой многочисленной и содержит 38 номинаций. Тематическая группа делится на подгруппы.

3.1. «Названия, содержащие слово «здоровье» и его производные»

3.2. «Названия, которые ассоциируются со здоровьем и благополучием пациентов»

3.3. «Названия, указывающие на размер аптеки»

3.4. «Названия, содержащие указания на важность и значимость аптеки»

3.5. «Названия, ассоциирующиеся с видом деятельности аптек»

Примеры: «Не болей», «Благо», «Аптечный дом», «Неотложка», «Здоровая планета».

#### **Тематическая группа 4 «Названия, с использованием слов «фарма», «фармацевтика»**

В данную группу входят 18 названий. Примеры «Медикос Фарма», «Фармация», «Фармастер», «Фарма».

#### **Тематическая группа 5 «Названия, имеющие природную семантику»**

Объем тематической группы 16 наименований. Примеры: «Ромашка», «Арника», «Алоэ», «Лаванда».

#### **Тематическая группа 6 «Названия, указывающие на низкие цены»**

В группу входят 8 названий. Примеры: «СОЦ Аптека», «Эконом Аптека», «Аптека низких цен».

Тематическая группа делится на подгруппы.

#### **1. «Названия, которые содержат в себе слово «экономия» и его производные»**

Примерами данной тематической подгруппы являются: «Эконом Аптека», «Аптека эконом-класса».

**2. «Названия, указывающие на доступность лекарств широким массам населения».** В качестве примеров можно привести: «Социалочка», «Аптека для бережливых».

Названия, входящие в данную группу, вызывают ассоциацию клиентов, что цены в данной аптеке отличаются от конкурентов, понятны широким массам населения, указывают на доступность лекарственных средств.

#### **Тематическая группа 7 «Названия, содержащие цифры и знаки»**

В группу включены 22 названия. Примеры: «Аптека +», «36,6», «До 100 лет», «Доктор Столетов», «Аптека 03».

В названии «36,6» прослеживаются чёткие ассоциации с нормальной температурой тела. В названиях «Доктор Столетов», «До 100 лет» - ассоциации с долголетием.

#### **Тематическая группа 8 «Названия, содержащие устаревшие слова».**

Данная тематическая группа состоит из 7 наименований. Примеры: «Аптекарь», «Старый лекарь», «Целитель», «Знахарь». Такого рода названия не соответствуют фармацевтическим учреждениям и вызывают ассоциации с самолечением. Часто в этой группе можно встретить написание слова по старому правописанию.

#### **Тематическая группа 9 «Названия, содержащие необычные слова»**

Тематическая группа состоит из 9 наименований. Примеры: «Апрель», «Лапушка», «Ладушка», «Живика».

#### **Тематическая группа 10 «Названия, содержащие цвета»**

Тематическая группа включает 4 названия. Примеры: «Оранжевая аптека», «Зеленая аптека», «Зеленая линия», «Зеленый слоник». В названиях используются цвета не просто так. Каждый цвет является символом. Так, например, зелёный цвет символизирует гармонию, а оранжевый – святость и здоровье.

#### **Тематическая группа 11 «Названия, адресованные покупателям»**

Объем тематической группы 8 наименований. Примеры: «Ваш доктор», «Моя любимая аптека», «Наш аптекарь». Отличительная особенность этой тематической группы то, что в названиях аптек используют личные местоимения, указывая эти на покупателя.

Анализ тематических групп названий аптек и аптечных сетей включал в себя рассмотрение плотности каждой из выделенных групп. Таблица 1 показывает количество названий по группам в порядке уменьшения численности.

**Таблица 1**

Тематическая группа	Количество наименований
Названия, содержащие предметную лексику	38
Названия, которые указывают на месторасположение	22
Названия, содержащие цифры	22
Названия, с использованием слов «фарма», «фармацевтика»	18
Названия, имеющие природную семантику	16
Названия, содержащие необычные слова	9
Названия, указывающие на низкие цены	8
Названия, адресованные покупателям	8
Названия, содержащие имена	7
Названия, содержащие устаревшие слова	7
Названия, содержащие цвета	4
Всего:	159

Как видно из таблицы, самой многочисленной является тематическая группа «Названия, содержащие предметную лексику», самой малочисленной тематическая группа «Названия, содержащие цвета».

Разработанная тематическая классификация позволяет увидеть критерии, по которым распределяются названия аптек и аптечных сетей в русском языке.

## ENGLISH SLANG

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This paper presents slang in everyday English. To discuss colloquial words and **phrases** in the English language means to find out what words should not be used in academic writing. People should learn to understand everyday English for more effective communication.

### **Ain't**

*Ain't* – contraction form of am not, is not, are not, has not, or have not.



*Ain't* is commonly used by many speakers in oral and informal settings, especially in certain regions and dialects.

Examples:

- ⊙ *I ain't done nothing wrong*
- ⊙ *You ain't right*
- ⊙ *Ain't it fun!*

### **Awesome**

*Awesome* (Adjective) – means amazing or excited

When you use the word awesome, you're expressing that you think something is wonderful or amazing.

This word using all around the world by young to old people

Examples:

- ⊙ They look so *awesome* that visitors go there strictly to look at the *awesome* graphics
- ⊙ - *"What did you think of Titanic?"*  
- *"It was **awesome!** I loved it!"*

### **Cool**

*Cool* (Adjective) – this word can mean many things in different context. In common english it means "Calm" or "Fantastic" It also shows that you're okay with an idea

Examples:

- ⊙ - *"What did you think of my new boyfriend?"*  
- *"I liked him. He seemed like a **cool** guy!"*
- ⊙ Please, be cool and just listen to me!
- ⊙ *Angie's got some cool new sunglasses*

### **To hang out**

*To Hang Out* (Verb) - to spend a lot of time in a place or with someone

Examples:

- ⊙ - *"Hey, it's great to see you again."*  
- *"And you. We must **hang out** sometime."*
- ⊙ *I've been hanging out backstage with the band*

### **To chill out**

*To Chill Out* (Verb) - It simply means to relax or not allow things to upset you. Usually it can be used with or without the word 'out'

Examples:

- ⊙ - *"Hey Tommy, what are you guys doing?"*  
- *"We're just **chilling (out)**. Do you want to come round?"*
- ⊙ *Chill out, Dad. The train doesn't leave for another hour!*
- ⊙ - *"Sue, what did you do in the weekend?"*  
- *"Nothing much. We just **chilled (out)**."*

### **Cheers!**

Cheers! – exclamation word. It can use like a friendly expression said just before you drink an alcoholic drink. It can also used to mean "thank you".

In other meaning used to mean "goodbye"

Examples:

- ◎ *Cheers everyone! Happy birthday to John!*
- ◎ *-"I've bought you a drink."*
- "Cheers, mate."*
- ◎ *-"Bye."*
- "Cheers, see you next week."*

### **Mate**

Mate (Noun) – in common English it means a friend.

Also used as a friendly way of talking to someone, especially a man

Examples:

- ◎ *We've been mates since our school days*
- ◎ *She's my **best** mate.*
- ◎ *Have you got the time, mate?*

This is the list of slang words that learners can remember and use.

## **ABBREVIATIONS IN MEDICINE**

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Abbreviations are used very frequently in medicine. They boost efficiency as long as they are used intelligently. Certain medical abbreviations are used to prevent mistakes, and some of them can be a part of a regular conversation between medical specialists.

### **WHO**

The World Health Organization (WHO) is a specialized agency of the United Nations that is concerned with international public health. Its current priorities include communicable diseases, in particular HIV/AIDS, Ebola, malaria and tuberculosis; the mitigation of the effects of non-communicable diseases such as sexual and reproductive health, development, and aging; nutrition, food security and healthy eating; occupational health; substance abuse; and driving the development of reporting, publications, and networking.

### **HIV/AIDS**

Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV).

HIV is a virus that attacks the immune system, our body's natural defense against illness. If HIV is left untreated, a person's immune system will get weaker and weaker until it can no longer fight off life-threatening infections and diseases.

AIDS describes a set of symptoms and illnesses that happen at the final stage of HIV infection, if left untreated.

### **DNA/RNA**

Deoxyribonucleic acid (DNA) is a molecule composed of two chains that coil around each other to form a double helix carrying the genetic instructions used in the growth, development, functioning, and reproduction of all known living organisms and many viruses.

DNA and ribonucleic acid (RNA) are nucleic acids; alongside proteins, lipids and complex carbohydrates, nucleic acids are one of the four major types of macromolecules that are essential for all known forms of life.

### **LASER**

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "laser" originated as an acronym for „Light Amplification by Stimulated Emission of Radiation”.

### **ER/GOMER**

Emergency room (ER) – the section of a health care facility for providing rapid treatment to victims of sudden illness or trauma.

Get Out of My E.R. (GOMER) i.e. patient who frequently presents at the ER near death but manages to pull through each and every time.

### **SAD**

In psychiatry the acronym SAD can stand for many things.

#### **seasonal affective disorder (SAD)**

a mood disorder characterized by depression, extreme lethargy, increased need for sleep, overeating, and carbohydrate craving. It recurs each year in one or more specific seasons, most commonly the winter months, and is hypothesized to be related to melatonin levels.

**separation anxiety disorder (SAD)** A fear of being alone and/or being abandoned characterizes this mental illness. Some people have symptoms that revolve around just one person, while others feel this way about everyone.

**social anxiety disorder (SAD)** this illness is characterized by the fear of social interactions.

Some of these abbreviations aren't used exclusively by medical specialists; many other professions are familiar with these terms as well.

## MISPRONOUNCED CELEBRITIES' NAMES

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In our everyday life people often face the situation when their surnames are mispronounced. No wonder, because it's hard to make out on the first try where the stress falls. Celebrities aren't immune to mispronounced names, even if most of us have heard them correctly at one point or another.

Some names might be more difficult because of the accent on the letters, while others have some silent letters that could throw you off.

Some names can be difficult to pronounce because of the stresses they have, other names have silent letters that can easily frustrate you.

To understand how to pronounce a famous person's name correctly, you just need to watch an interview with this star and give attention to how he or she himself/herself pronounces the name. Let's take a look at some of the celebrity names you might be pronouncing wrong.

Charlize Theron is a South African and American actress and film producer. So when you say her name, make sure you say it the right way: „thEron”, not “therOn”.

Benedict Cumberbatch is an English actor who has performed in film, television, theatre and radio. In Russia, he is known for the TV series “Sherlock”.

Angelina Jolie is an American actress, filmmaker, and humanitarian. Her name is correctly pronounced with emphasis on the last syllable.

Ariana Grande is an American singer, songwriter, and actress. According to the rules, her name is pronounced “Gran-day”, but in an interview Ariana is presented as “Gran-di”.

Demi Moore is an A-list Hollywood star who's been in the entertainment industry for over three decades but people still aren't saying her name correctly. Because it looks just like the word “semi,” her first name is commonly mispronounced “DEH-mee.” The correct pronunciation is “Da-MEE.” Even though she's been married and divorced three times, the “G.I. Jane” star has always used her first husband's surname as her stage name.

Barbra Streisand is one of the biggest names in music, appeared in several movies, and has a career that spans six decades, but according to a 2016 interview

with NPR, Barbra Streisand is still struggling to get people to say her name correctly.

People must pronounce Streisand with a soft S, like sand on the beach.

Kim Kardashian is an American media personality, socialite, model and actress. In Russia, her name is often pronounced incorrectly: “Kardash-Yan”. The correct version is “KardAshian”.

If you take a look at Steve Buscemi’s name and pronounce it the same way you would say “bruschetta”, then don’t feel bad because you’re not alone – though you would be wrong. It’s pronounced “Boo-SEM-e.” Buscemi is of Italian descent and he’s best known for playing some of the dirtiest, greasiest criminals and gangsters created. He’s garnered critical acclaim and a Golden Globe as Nucky Thompson in the HBO series “Boardwalk Empire”.

Some people think that Idris Elba’s name is pretty easy to pronounce but the English actor’s first name is commonly said wrong. At first glance, a lot of people might say, “EYE-dris” but it’s said, “EE-dris ELLE-ba”.

Born in Benin, Djimon Hounsou moved to Paris as a young teenager and he was soon discovered and encouraged to pursue a career in modeling. Before becoming a successful actor, Hounsou, whose name is pronounced “JEE-mahn” “Hahn-SOO”, was first introduced to many of us as the shirtless male lead in Janet Jackson’s steamy “Love Will Never Do Without You” music video.

It is through some knowledge and practice that we can ensure that the names of the other person is pronounced correctly.

## **BRITISH ETIQUETTE AND MANNERS**

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England has glory of the country of true ladies and gentlemen. The difficult etiquette in Great Britain is connected with history and traditions of the kingdom. Lessons of rules of conduct for centuries were included into the obligatory education program of any aristocrat or wealthy person.

In England there are greetings depending on time of day: “Good morning!”, “Good afternoon!” and “Good evening!” If you communicate with the friends or with other well familiar people, then can reduce these expressions to their informal analogs: “Morning!” and “Evening!” “Bye” is the most widespread English farewell. It is universal and applicable practically in any situation.”Have a good day” (it is translated as “good day”) – it is so possible to say goodbye to business partners and colleagues, polite and courteous farewell.”Keep in touch” – so usually say goodbye when know that they will not see the interlocutor any time. In the literal translation “stay in touch”, that is write, call, do not vanish. “I’m out!” – farewell to implication, means that you rejoice to the fact that you leave. This phrase can be translated into Russian as “I am taken up”.

In the UK, people have a tendency to over-apologize. For example, if you tell someone about something unfortunate which has happened to you, it’s quite likely that they will apologize. E.g. “I’m so sorry to hear that you have been unwell”.

British people cannot resist the urge to apologize, for example, if someone accidentally bumps into you, it would be common for you to apologize and say “I’m sorry” as though you are sorry for being in their way. If you have reserved a seat on a train but somebody is sat in it, it would be common to say “I’m so sorry but you appear to be sat in my seat”. If somebody spills your coffee, again it’s quite normal for the victim to apologize. Of course, the person to blame would apologize as well, but apologizing as the victim is a very English thing to do.

In the UK, two fingers up in a V shape with the back of your hand towards the other person (“the V sign”) is almost as bad an insult as the middle finger. You therefore have to be very careful how you gesture when you ask for “two stamps” in the UK. The most common way to show the number two is simply to turn your hand around so that your palm is facing the other person (“the peace sign”). You can also stop yourself from giving the V sign by bringing your two fingers together (without needing to turn your hand around).

British humor errs of the side of sarcasm and is often centered on real life, sometimes painful observations of themselves and others. The British use humor to make the best of a situation and to lighten the mood. For example, if you spend a lot of time in your bedroom, your homestay might sarcastically ask “Why are you hiding in your room? Has your hair turned pink?!” In this case, your homestay does not really think your hair has turned pink. They have noticed that you are spending a lot of time in your room and they are joking that this could be because your hair has turned pink.

Pleasant, easy, non-binding communication, lack of arrogance and obsession, adherence to traditions and ancient foundations – this is what distinguishes the behavior of a well-bred Englishman.

## AUSTRALIAN DIALECT OF ENGLISH

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Australian English is a major variety of the English language, used throughout Australia. Although English has no official status in the constitution, Australian English is the country's national and it is the first language of the majority of the population.

Considered one of the major variations of the English language, Australian English is the official language of Australia, having originally deviated from British English in the 18th century, after the founding of the Colony of New South Wales. It has been recognised as being distinctive from British English for almost 200 years and emerged as European settlers from Britain, Ireland and Germany mixed with one another.

Generally speaking, Australian English takes features from both British and American English, so it is sometimes considered a combination of the two variations. However, it is important to understand that there are a number of unique features as well, including exclusive vocabulary.

The soft “a”, which can be heard in words like “cat” and “hat”, is usually pronounced similar to “eh”. As such, this means that the word “cat” sounds like “ceht”, while the word “hat” sounds like “heht”.

Likewise, a similar phenomenon can be observed with the hard ‘a’ sound, which features in words like “day”, “way” or “mate”. In this instance, the “a” is pronounced somewhat similar to how a British English person might say the word “aye”. Therefore, the word “mate” becomes “m-aye-te”.

Australian English truly takes on a life of its own when it comes to the pronunciation of words and this is why most people with Australian accents sound so distinctive. One of the most noticeable features is the different sound for the “I” in words like “night” and “like”. Instead, it sounds like a less pronounced “oi”, (e.g. “noight”).

Australian English is said to be a non-rhotic variation of the language, which means that the /r/ sound is not pronounced if it is after a vowel and not immediately followed by another vowel. For instance, the word “card” is pronounced “ca:d”, with the /r/ sound being dropped. Meanwhile, the ending of

words like “better” and “wetter” is lowered, to sound similar to “ah”. This means you would say “bett-ah”, “wett-ah”, “riv-ah”, and so on.

### **Australian Slang Words**

Last, but not least, it is important to learn a few slang words that are widely used in Australia. Below, we have listed fifteen of the most common slang words and phrases, along with a quick description of what they mean, or how they are utilised in conversation:

*Aussie* – An Australian person

*G'Day* – Literally means “good day” but is used as a general greeting

*Hooroo* – Goodbye

*Oldies* – Parents

*Pom/Pommie* – A British person

*Ripper* – Similar to words like “great”, “fantastic” and “awesome”

*She's Apple* – It is fine / It will be okay

*Reckon* – Used similar to “absolutely”

*Tucker* – Used to describe food of any type

*Yabber* – Talk, or chat

Like in British English, Australians say “*aluminium*” rather than “*aluminum*” and “*mobile phone*” instead of “*cell phone*”. Australian English also utilises the words “*anti-clockwise*” instead of the American “*counter-clockwise*” and “*petrol*” instead of the American “*gasoline*”. The cover on the front of a car is called a “*bonnet*”, rather than a “*hood*”, while an Australian will typically say “*holiday*” instead of “*vacation*”.

Learning the specific features can be beneficial to anyone planning on travelling to the country, or anyone hoping to find work in the country in future. So, with that in mind, here is our quick guide to Australian English.

## **MOST COMMON MISTAKES MADE BY ENGLISH LEARNERS**

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There are many common mistakes made by English learners. They're just really common mistakes that people keep making again and again sometimes



because, they know, the grammar is difficult to understand but sometimes because these mistakes have never been properly corrected for them so they become bad habits.

Here are the top 10 most common mistakes made by English learners.

### **1 – Uncountable Nouns**

So you probably know that there are two types of nouns in English – countable and uncountable nouns. Countable nouns are easy! You can count them. And when there's more than one, the noun becomes plural, we add an S.

*One apple*

*Three cars*

*A million subscribers*

The noun becomes plural when there's more than one and we can use the singular articles *a* and *an* when we're talking about just one of them. But uncountable nouns are different. They don't usually have a plural form. You can't use a singular article with them and you need to use quantifiers to help explain how much of the noun there is.

The way that you use uncountable nouns in English sentences is completely different to countable nouns. Let's just compare *apple*, a countable noun, and *advice*, an uncountable noun.

### **2 – Irregular Verbs**

Now these are also really common English mistakes. Difficult to master because there are no rules that you can learn to logically explain why one verb is regular and the other is not. Even though there are fewer irregular verbs than regular verbs, many irregular verbs are really, really common verbs.

### **3 – Subject-Verb Agreement**

Subject-verb agreement is as simple as it sounds. The subject and the verb in English sentences must agree, they must match. So why is it such a common mistake in English? Even my advanced English students sometimes make these mistakes as well. And it's simply because they've got into some bad habits. They don't realise that they're making these mistakes.

*That car looks expensive. Those cars look expensive. Paul is looking out the window. John and Tim are looking out the window. Do those students like to eat bananas? Does this student like to eat bananas?*

These mistakes are very easy to fix. Bad habits can be fixed but you need to see them.

### **4 – Auxiliary Verbs**

Yes, the three main auxiliary verbs in English: *do*, *be* and *have*. They're very important and learning a little more about them is going to help you improve your English grammar a lot because the relationship between an auxiliary verb and the main verb in an English sentence is very clear and simple.

The auxiliary verb *do* appears in the simple tenses. The auxiliary verb *be* appears in the continuous tenses and also in the passive voice. And the auxiliary verb *have* appears in the perfect tenses.

This is one part of English that is really consistent.

## 5 – Articles

Which one should you use? When and why? Articles must cause the most headaches for English learners. *The* is the definite article, *a* and *an* are indefinite articles. The difference between definite and indefinite articles is the difference between talking about a specific noun and a general noun.

If you asked me “*Can you pass me a pen?*” That means any of these pens, not a specific one. But if you asked me “*Can you pass me the blue pen?*” that only means this pen, none of the others.

But sometimes you don’t need to use an article at all. So it’s easy to see why articles are some of the most common mistakes that English learners make.

## 6 – Prepositions

Words like *in*, *on*, *at*, *by*, *with*, *for* – you get my point. These words, they help to give information about time, location and direction in English. Just like articles may also cause a few headaches, sometimes the same preposition can have different meanings depending on the context.

*If your keys are in the car*, the meaning is different to *at the car*. But if you’re in school, the meaning is pretty much the same as *at school*.

*I had a coffee at Helen’s*. That means at her house. *I had a coffee with Helen*. That means we had a coffee together but it could have been anywhere.

These tiny little words can influence the meaning of your English sentence significantly. But they are a challenge because the rules and reasons for using them are not always clear.

## 7 – Question Word Order

We’re going to talk about word order in questions. So asking questions, giving answers. It’s the basics of a great conversation in English – in any language, really.

But one common mistake is using the wrong word order when you’re asking questions.

*We can go shopping this afternoon? What are you cooking for dinner?*

## 8 – The Present Perfect Tense

Now, this tense is a challenging one. There’s the present perfect simple and the present perfect continuous. You can also use the words *for* and *since* with these tenses to help you express information about time.

Now, the structure of a present perfect sentence is probably not the difficult part. You probably know that there’s the subject, the auxiliary verb *have* and the main verb in past participle form.

But in the present perfect continuous, your past participle verb *is been* and it’s followed by a verb *-ing*. Don’t forget to conjugate that auxiliary verb depending on the subject.

So it’s confusing because this tense is about the past and the present at the same time.

## 9 – Past Simple VS Present Perfect Tense

Another mistake, the difference between the past simple and the present perfect tense. The present perfect is also about the past which is confusing in itself, right? So why not just use the past simple to talk about the past?

To understand when to use the past simple and when to use the present perfect tense, you need to think about time. Finished time and unfinished time.

*Last week* is a good example of finished time. It's complete, it's over. But *this week* is unfinished, it's an example of unfinished time, there's still more of this week to come, it's not finished yet.

So expressions of time are really important when you're using these two different tenses.

*Yesterday, last week, last month, 1991.*

## 10 – Adjectives ending in -ed and -ing

I wonder if this is a mistake that you sometimes make – not all the time but sometimes. When do you use adjectives that end in -ed and -ing? There is a big difference between “*He looks bored.*” and “*He looks boring.*”

“*I am interested.*” or “*I am interesting.*”

There doesn't seem to be much difference between these adjectives but using them incorrectly in your sentence completely changes the meaning.

Luckily, there are some simple rules to help you remember which one is the right one to use.

## 13 FOREIGN WORDS THAT SOUND RUDE IN ENGLISH

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If you're learning a foreign language you've probably been in this situation before: getting all excited about coming across a seemingly familiar word only to find out that its actual meaning is very different from what you expected. There's no doubt that false friends – i.e. words or expressions that have similar forms to the ones in a person's native language, but different meanings – can be a major minefield for language students.

In some cases, however, false friends can also be a source of great amusement: below are 13 foreign words that may be completely innocuous in their native language, but sound very rude indeed to English ears.

1. *Slagroom, Worst*. Language: Dutch. English translation: “Whipped Cream”, “Sausage”. Usage: “Wow, this restaurant has its own slagroom *and* its food is the worst! Thank you, Thrillist Rotterdam!”

2. *Fukuppy*. Language: Japanese. English translation: Again, no direct translation. Just a poor word choice by Fukushima Industries when naming their new flying egg mascot, Fukuppy. Usage: „Willkommen in Fucking. Nun verschwinden Sie bitte, wir sind alle beschäftigt, Sie wissen, womit...“. (Welcome to Fucking. Now please go away, as we are all busy, well, you know...)

3. *Slutspurt*. Language: Swedish. English translation: “Final sale” Usage: “Luckily, no one was injured in the Black Friday slutspurt at the Spokane H&M this year. Apparently they were selling promiscuous spurts at up to 70% off!”

4. *Die, die, die... Alsjeblieft*. Language: Dutch. English translation: “That one, that one, that one... please”. Usage: “This is the worst baby formula I've ever eaten. Quite frankly, it tastes like grass. If I ever have it again, Mother, you are going to die, die, die”.

5. *Dickmilch*. Language: German. English translation: “Buttermilk” Usage: “Too bad there's no IHOP in Stuttgart. I'm sure they'd serve a delicious plate of dickmilch pancakes”.

6. *Womit*. In German, this term isn't about getting sick, it's used by pontificators. The word means “whereby”.

7. *Pissala*. A French term that originated in Nice that translates as “salted fish”. It's a condiment made from pureed anchovies, olive oil, garlic, peppers, and herbs.

8. *Clatterfart*. A Tudor dictionary from 1552 defines this word as someone who is a gossip or a blabbermouth.

9. *Aktashite*. Named for a village in Russia, aktashite is a term for a rare mineral composed of arsenic, copper, and mercury.

10. *Shittah*. This Hebrew term comes from Northeast Africa and the Middle East, where it refers to a type of acacia tree.

11. *Prick*. This Dutch term means a dot or a spot.

12. *Poonga*. The name for an oil that comes from an Indian beech tree and is used to treat skin ailments.

13. *Pakapoo*. A Chinese term for a lottery that was popular in the nineteenth century.

It's important to keep an open mind when traveling overseas, in order to bridge those inevitable cultural differences and language barriers. It's also important to take a camera with a huge SD card, in order to capture all the innocent signage that'll make your friends back home laugh their asses off.

## 10 LEXICAL MISTAKES IN ENGLISH

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Have you noticed that while learning a foreign language you repeat the same mistakes all over again? This common problem can be solved only by realized what mistake it is and pay attention to it whenever it comes up. Here are the most common 10 lexical mistakes in English.

1. How do you do? vs. How are you?

“How do you do?” This is not a question. It is another, very formal way of saying “Hello!” It is also very British. The correct response is “Pleased to meet you” or “How do you do” or just “Hello”. “How are you?” This is a question, but the person asking it doesn't really want to know the truth about your aching back or hangover. A polite response is; “I'm fine thanks. And you?”

2. Advice vs. Advise.

Advice is a noun, whereas advise is a verb. She took my *advice* and took out a loan. I *advised* her to take out a loan.

3. Complement vs. Compliment.

A complement completes something else, whereas a compliment is something nice you say to someone.

His black suit was a nice *complement* o his black shoes. She *complimented* him on his shoes.

4. Good vs. Well.

The word good is an adjective, whereas the word well is an adverb. How are you today? I am doing *well*. I feel *good* today.

5. Who vs. Whom

Who refers to the subject of the sentence, whereas *whom* refers to the object of a verb or preposition. *Who* wants the last piece of pie? *Whom* do you trust more?

6. Alot vs. A Lot vs. Allot.

The “word” *a lot* does not exist! *A lot* is frequently misspelled as one word, *alot*, but it is actually two words. Think of *a lot* as meaning, *I want a whole lot full of something*. The word *allot* is a verb meaning to distribute.

7. Among vs. Between.

*Among* is used to express a loose relationship of several items. *Between* expresses the relationship of one item to another item. *I found a pen hidden among the papers on the desk. I found a pen hidden between two sheets of paper on the desk.*

#### 8. Later vs. Latter.

Use *later* when referring to time. Use *latter* when referring to the second of two persons or things mentioned previously. For example: “*There are two kinds of worries: those you can do something about and those you can’t. Don’t spend any time on the latter*”. (Duke Ellington).

#### 9. Look (at) vs. See vs. Watch.

When we *look at* something, we direct our eyes in its direction and pay attention to it: *Come and look at this photo Carina sent me.* When *look* has an object, it is followed by *at*: *Look at the rain. It’s so heavy.* *See* means noticing something using our eyes. The past simple form: *I saw Trevor at the shopping centre yesterday. Has anyone seen my glasses?* See also: *See.* *Watch* as a verb. *Watch* is similar to *look at*, but it usually means that we look at something for a period of time, especially something that is changing or moving: *We watch television every evening.*

#### 10. Lend vs. Borrow.

*Lend* means “give something to someone for a short time, expecting that you will get it back”. The past simple and the *-ed* form are *lent*. *I never lend my CDs to anyone. I lent Gary £30. (I expect that Gary will return this to me).*

*Borrow* is a regular verb meaning “get something from someone, intending to give it back after a short time”. *Could I borrow your pen for a minute, please? Laura used to borrow money from me all the time.*

In this way, examples of the 10 most common mistakes in the English language were given. Getting your head around the subtleties of the English language can be a tricky business.

Errors are an inevitable part of communication. This aspect of communication should not be regarded as unimportant. There is a need to identify the errors and help users of English reduce them.

## SECTION 4. LAW AND SCIENCE

### COLLECTION OF BLOOD EVIDENCE

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The subject of the given report is blood and body fluids. The aim of the report is to show the basic features of method of DNA analysis. We should start with the fact that blood evidence associated with a crime it can provide information that may solve the case. It is essential to correctly document, collect, and preserve this type of evidence. Improperly handled blood evidence can weaken or destroy a potential source of facts in a case. The RFLP method of DNA analysis shows blood and other fluids can be matched back to an individual with a high degree of probability. Presently, the PCR method of DNA analysis or conventional serological techniques demonstrates the fact that blood and some body fluids can be said to come from a certain population group to which the individual belongs. We could underline PCR technology advances. These population groups will become smaller, eventually giving it the same discriminating power as RFLP analysis has today.

It's worth mentioning dried blood and body fluid stains should be collected in the following special manner. A crime scene investigator should know which method or methods of bloodstain analysis are available from his or her crime lab, the FBI lab, and private labs. Blood evidence can also point the investigator in the direction he or she needs to go to solve the case. The report touches upon the problem that if the stained object can be transported back to the crime lab, then package it in a paper bag or envelope and send it to the lab. If the object cannot be transported, then the expert can use fingerprint tape and lift it like a fingerprint and place the tape on a lift back; scrape the stain into a paper packet and package it in a paper envelope. Then we go on to say that the other possible way is to absorb the stain onto ½ long threads moistened with distilled water.

It is worth pointing out that the threads must be air dried before permanently packaging. It is spoken in detail about transportation. For transportation purposes and to avoid cross contamination, the threads may be placed into a plastic container for no more than two hours. As soon as in a secure location, the threads

must be removed from the plastic and allowed to air dry. They may then be repackaged into a paper packet and placed in a paper envelope.

After studying that detailed analysis, it was found the fact that wet blood and body fluid stains should be collected in the following manner. All items should be packaged separately to prevent cross contamination. It is reported if the item can be transported to the crime lab, and then packages it in a paper bag or plastic bag if the transportation time is under two hours. On the other hand, if the item cannot be transported back to the lab, then absorb the stain onto a small square of pre-cleaned 100% cotton sheeting.

It is stressed that an expert should bring it to a secure place and allow it to thoroughly air dry, then repackage it in a paper bag or in a paper envelope if possible. Under no circumstances should wet or moist items remain in plastic or paper containers for more than two hours!

Then we should come to the point of dried blood stains. On clothing, if possible, wrap the item in clean paper, place the article in a brown paper bag or box and seal and label container. Do not attempt to remove stains from the clothes.

It should be said that on small solid objects, send the whole stained object to the Laboratory, after labeling and packaging.

In conclusion, on large solid objects, cover the stained area with clean paper and seal the edges down with tape to prevent loss or contamination. The most powerful application of blood evidence is the ability to absolutely eliminate a person as a potential suspect in a crime. If impractical to deliver the whole object to the Laboratory, scrape the stain onto a clean piece of paper, which can be folded and placed in an envelope. Do not scrape directly into evidence envelope. Scrape blood from objects using a freshly washed and dried knife or similar tool. Wash and dry the tool before each stain is scraped off. Seal and mark the envelope.

## **FORENSIC DNA TESTING**

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DNA tests have many advantages over traditional serologic methods. They are more powerful and applicable in a greater variety of specimens. Since DNA testing began being used in forensic testing in the past decade, techniques have



developed rapidly. Methods include analysis of restriction fragment length polymorphisms, dot blots of allelic sequence information, short tandem repeats, and mitochondrial sequence determination. The quality assurance standards for DNA testing are very stringent and must meet numerous guidelines required by the forensic community and by the court system.

The aim of this report is to tell about basic problems of Forensic DNA and similarities to fingerprints. It's better to start telling about the fact that DNA is similar to fingerprint analysis in how equals are determined. Every scientist tries to use either DNA or a fingerprint in order to identify a suspect. The evidence and proves collected from the crime scene are compared and linked with the «known» print. In this aspect we should mention if enough of the identifying features are the similar or identical, the DNA or fingerprint is determined to be a match. If even one feature of the DNA or fingerprint is not the same, it is determined not to have come from that suspect. In this connection it is vital to strictly follow the issues on identification, preservation, and collection of evidence.

It is interesting to say evidence invisible to the naked eye can be the key to solving such cases as a burglary, an assault, or murder. It can also be observed the evidence that links different crime scenes to each other in a small town, within a single State, or even across the Nation. The latest advancements in DNA technology are allowing law enforcement officers to solve those cases which were previously thought to be unsolvable.

Then we should go to the problem of DNA Evidence in Criminal Trials. Evidence from an expert who has compared DNA samples must be accompanied by evidence as to the sources of the samples and the procedures for obtaining the DNA profiles. The work of the judge is the following. The judge must confirm that the jury understands the significance of matches and mismatches in the profiles. The judge must also confirm that the jury does not confuse the “match probability” with the “likelihood ratio”. The judge’s functions and responsibilities are clear and distinct. It can also be observed that the “match probability” is a probability that a person picked at random has a matching DNA profile to the sample from the scene. The “likelihood ratio” is the probability that a person with matching DNA committed the crime.

It should be mentioned that the work of the juries is very difficult. All juries should weigh up contradictory and corroborative evidence and proof, using their own common sense and not by using mathematical formulae, so as to avoid “confusion, misunderstanding and misjudgment”.

Presentation and evaluation of evidence of partial or incomplete DNA profiles must be examined wisely and carefully.

R v Bates (2006) EWCA Crim 1395 Moore- Bick LJ said: “We can see no reason why partial profile DNA evidence should not be admissible provided that the jury are made aware of its inherent limitations and given a sufficient explanation to enable them to evaluate it There may be cases where the match probability in relation to all the samples tasted is so great that the judge would consider its probative value to be minimal and decide to exclude the evidence in

the exercise of his discretion, but this gives rise to no new question of principle and can be left for decision on a case by case basis. In this connection it is said: “However, the fact that there exists in the case of all partial profile evidence the possibility that a “missing” allele might exculpate the accused altogether does not provide sufficient grounds for rejecting such evidence. In many cases there is a probability (at least in theory) that evidence exists which would assist the accused and perhaps even exculpate him altogether, but that does not provide grounds for excluding relevant evidence that is available and otherwise admissible, though it does make it important to ensure that the jury are given sufficient information to enable them to evaluate that evidence properly”.

In my opinion we should agree with the key points of these words. It goes without saying that collecting, presentation and evaluation of evidence must be examined, tested and confirmed carefully. Juries should try and weigh up all kind of evidence, using as their own common sense as mathematical formulae in some degree.

In conclusion, the forensic laboratory has no control over the amount of evidence left at a crime scene or the insults to which the biologic material may have been subjected. The analysis performed therefore must be validated carefully and documented extensively before use. Also, the interpretation will often be scrutinized more stringently than routine clinical testing. Having met these challenges, the use of forensic DNA evidence is now widespread. As technology advances, forensic DNA testing will continue to evolve, leading to faster, more discriminating tests applicable to a wider array of circumstances.

## **GUY FAWKES IS A NOTORIOUS CRIMINAL**

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The subject of the given report is a famous criminal. The aim of the article is to illustrate his biography and the most remarkable facts, as shown in the title.

The object is of interest in the historical aspect and to some extent in the etymological, as we consider the origin of the well-known word “guy”.

At the beginning we should say that every year on November 5 in the UK celebrate Guy Fawkes Night. The skies of London and other major cities are lit

with fireworks and firecrackers are exploding everywhere. The main tradition is the burning of effigies of Guy Fawkes, the hero of the day. First of all, let us try to understand, so why this person is has become a symbol of all the rebels and dissenters, and where did the tradition of fireworks and fires?

Let's move to London in the early seventeenth century. It is interesting to note, that Queen Elizabeth I, who ruled England for 45 years, died in 1603. She was an ardent Protestant, and Catholics in those days were severely persecuted. It is well known that after the death of the Queen, the throne was taken by Scottish king Jacob I. English Catholics hoped that Jacob would favor them, but he was in no hurry to change the order instituted by Elizabeth. And then the idea arose to get rid of the unwanted monarch.

The next we could deal with a Grand plan. In 1605 a group of like-minded people, among whom was an aristocrat and a Catholic native of York Guy Fawkes, came up with a Grand plan, which later will go down in history as a “Gunpowder Plot”. It should be mentioned the attempt of the conspirators was very thorough. They dug a tunnel into an abandoned basement under the Parliament building. Then, from the London district of Lambeth was able to carry on the Thames and hide in the basement of 36 barrels of gunpowder purchased by them in Holland. The total weight of the powder charge was about a ton. Imagine what an explosion of such power could do!

However, insidious plans were not to be realized. On the eve of the explosion of one of the participants sent his friend to the Catholic to Lord a letter in which he asked him not to attend Parliament on 5 November. A few hours later, the letter was in the hands of the king himself. Jacob I ordered to search the cellars of Parliament, where were found 36 barrels of gunpowder and Guy Fox, intending from minute to minute to set fire to the wick.

According to some sources, this plot could not be realized, because the acquired gunpowder was raw and old, and it was not possible to set it on fire. And some historians even believe that the “Gunpowder Plot” was invented by king James I in order to strengthen his power.

Taking all these points into consideration, I would like to tell that after inhuman torture and bullying Guy Fawkes gave all the names of his accomplices. The text of his confession with illegible and uneven signature due to torture is still kept in the national archives of Great Britain.

All the conspirators were publicly executed in Central London, in the courtyard of St. Paul's Cathedral. Guy Fawkes was sentenced to a particularly sophisticated execution: he was first hanged, but did not die in a loop, then gutted at the Cathedral Square and finally quartered. According to some sources, guy was lucky-his neck was broken in a loop and he died instantly.

It is important to emphasize that shortly after the conspiracy was uncovered the English Parliament passed a special law requiring that November 5 be celebrated as “a joyful thanksgiving for salvation”. It cannot be denied that the habit of celebrating “guy Fawkes Night” has taken root so much that after the holiday lost its official status in 1859, it has not ceased to be celebrated.

It is worth to mention that. The story of the “Gunpowder plot” was immortalized in nursery rhymes, well known to every Englishman:

*Remember, remember the fifth of November,*

*Gunpowder treason and plot.*

*We see no reason*

*Why gunpowder treason*

*Should ever be forgot!*

Of particular interest is the following fact. I think many people know the word *guy* in English. It turns out that it comes from the name of our hero! First it began to mean a stuffed Fawkes, burned on the anniversary of the conspiracy, then a stuffed General, then a poorly dressed man, and finally (in spoken English) – any young man, *guy*.

It is generally agreed today that *Guy Fawkes Night* is one of the noisiest of the English holidays. The above-mentioned tradition of burning bonfires was supplemented by fireworks and firecrackers. By the way, it is believed that fireworks in the UK are widespread thanks to the celebration of November 5.

In conclusion, we have identified another interesting tradition associated with our notorious criminal. It turns out that on this day the English monarch arrives at Parliament, where before it was searched – if not lurking in one of the rooms of the treacherous *guy Fawkes* with a supply of gunpowder?

On the whole, I found that *Guy Fawkes Night* is celebrated in some of its former colonies – in New Zealand, South Africa, the province of Newfoundland and Labrador (Canada), and in Australia.

Summing up the arguments we presented, we came to the following conclusion. Crime can leave its mark on history. Maybe he'll be forgotten in a year, or, as in our case, it will be a holiday with a history of over four centuries. However, it should not be forgotten that a crime, though unsuccessful, always remains a socially dangerous act and poses a threat to people.

## **FIREARMS AND TOOLMARKS**

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The subject of the given report is a firearm and its peculiarities. The aim of the text is to tell about specifications the Firearms and Toolmarks Details of the laboratory. It is responsible for the comparison of firearms, cartridge cases, projectiles, and other evidence.

One issue is that bullets and casings can also be examined at the crime lab. Sometimes they tell an investigator what make and model of weapons may have expended the casing or bullet. It should be noted that a bullet found at the crime scene can sometimes be matched back to the same lot of ammunition found in a suspect's possession.

The next point is that firearm safety is a must at any crime scene. The firearm should necessarily be packaged in an envelope or paper bag separately from the ammunition and magazine, which must also be packed in a paper envelope or bag. It is important that the ammunition found in the gun be submitted to the crime lab.

By type of firearms is divided into rifles, carbines, machine guns, pistols, revolvers, shotguns.

Depending on the goals that must be struck (by appointment), all weapons are divided into combat, hunting and sport. Military weapons are intended to defeat humans and are used primarily to arm the army. Hunting is intended for amateur and trade hunting, sports – for educational trainings and sports competitions.

According to the method of manufacture, factory-made weapons are self-made, home-made and converted (sawn-off).

The length of the barrel weapon is divided into short-barreled (*pistols*) and long-barreled (*rifles, guns*).

In terms of the number of barrels, weapons can be single-barrel (*rifles, machine guns, pistols*), double-barreled (*hunting rifles*), and multi-barreled.

By caliber weapons can be small, medium and large-caliber. The caliber is the inner diameter of the bore, and for a rifled weapon it is the distance between two opposing rifling fields (protruding sections of the bore).

According to the number of charges, the weapon is subdivided into a single-shot (*hunting rifle*) and a multiply-loaded (*automatic*).

The knives or other sharp object found should also be submitted to the lab for toolmarks, fingerprints, serology etc. In this case the blade and point should be wrapper in stiff unmovable cardboard and placed in a paper bag or envelope. The container should be labeled to warn that the contents are sharp and precautions should be taken. This is to prevent anyone from being injured.

In conclusion I could tell that the knives or other sharp object found should also be submitted to the lab for toolmarks, fingerprints, serology etc. In this case the blade and point should be wrapper in stiff unmovable cardboard and placed in a paper bag or envelope. It gives an opportunity to study specifications of examining firearms.

## THE HISTORY OF FINGERPRINTS ANALYSIS

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The subject of the given report is fingerprinting. Its aims are to present some dates when fingerprinting was started and to tell about the main names.

At the beginnings we could emphasize that there is no clear date at which fingerprinting was first used. Picture writing of a hand with ridge patterns was discovered in Nova Scotia. In ancient Babylon, fingerprints were used on clay tablets for business transactions. It is worth mentioning that in ancient China, thumb prints were found on clay seals. In 14th century Persia, various official government papers had fingerprints (impressions), and one government official, a doctor, observed that no two fingerprints were exactly alike.

In 1686, Marcello Malpighi, a professor of anatomy at the University of Bologna, noted in his treatise ridges, spirals and loops in fingerprints. A layer of skin was named after him; “Malpighi” layer, which is approximately 1.8mm thick. In 1823, Jan Evangelista Purkinje, a professor of anatomy at the University of Breslau, published his thesis discussing 9 fingerprint patterns, but he too made no mention of the value of fingerprints for personal identification.

Secondly we deal with the information that the English first began using fingerprints in July of 1858. Sir William Herschel, Chief Magistrate of the Hooghly district in Jungipoor, India, first used fingerprints on native contracts. He made local businessman impress their hand prints on a contract to frighten them out to follow it.

It should be mentioned that Dr. Henry Faulds, the British Surgeon recognized the importance of fingerprints as a means of identification and devised a method of classification. In 1880 in the Scientific Journal “Nature” he described a method for obtaining inked impressions. Returning to the UK in 1886, he offered the concept to the Metropolitan Police in London but it was dismissed.

Then we could give you some essential dates in the history of fingerprinting to analyze this science more carefully. In 1892 Sir Francis Galton published a detailed model of fingerprint analysis and identification. He encouraged its use in forensic science in his book Finger Prints.

By the 1930s, law enforcement agencies in the United States began using fingerprint analysis, and some tried to change their fingerprints, while others tried

to remove them. Famous gangster John Dillinger burned his fingerprints with acid. Robber Phillips consulted with the doctor about grafting the skin from his chest to the tips of his fingers. Unfortunately for him, he forgot to remove the fingerprints on his palms.

In 1974 the National Society of Fingerprint Officers was established. It was the UK first professional fingerprint organization but quickly expanded to international scope and was renamed The Fingerprint Society in 1977.

In conclusion we can emphasize our days in the history of fingerprinting. In 2007 the largest AFIS repository in America is operated by the Department of Homeland Security's US Visit Program, containing over 74 million persons' fingerprints, in the form of two-finger records. It is clear that the index finger records are non-compliant with FBI and Interpol standards, but sufficient for positive identification and valuable for forensics because index fingers are the most commonly identified crime scene fingerprints.

In our time, the study of patterns, relief and finger lines engaged in such science as fingerprinting. It has a great number of interesting facts; especially human papillary patterns are formed long before birth. Patterns on human fingers have their own classification.

They are arc, loop and curl.

1) Arc patterns are the simplest and very common in people.

They consist of no more than two streams of papillary lines that originate at one side of the finger and go to the other, forming in the middle part of the pattern arched figures that bend towards the upper stream.

2) Loop patterns are less common. In the middle of the pads formed loop. It has a head, legs and an open part.

3) Curl patterns are diverse in structure, but are less common. Their internal pattern is formed by lines in the form of ovals, circles, spirals, loops or their combination.

It is interesting fact, that 1 in 64 billion – such is the probability that your fingerprint will match the fingerprint of another person.

It's fantastic! Nowadays the development of computer technology has allowed to create fingerprint scanners that are installed on laptops, cell phones and locks equipped with such scanners, you can open a simple touch of a finger!

Also, in the study of fingerprints, experts try to compare as many points of comparison as possible. In addition, there is an inevitable element of human error. A 2011 study found a false positive of 0.1%. This means that there are 60,000 potential false positive identities each year.

## KORRUPTION ALS GLOBALES PROBLEM

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Dieser Vortrag ist dem Thema Korruption und ihrer Folgen in der modernen Gesellschaft gewidmet. Heute ist dieses Thema aktueller denn je. Die Korruption ist die Bewertung eines sozialen Handelns in Hinsicht auf kulturelle Grundwerte der modernen Gesellschaft. In unserer Gesellschaft weiß jeder was Korruption ist und was nicht.

Die Korruption wird in unterschiedlichen Handlungsfeldern unterschiedlich wahrgenommen. Was versteht man unter Korruption und wie wird dieses Phänomen gesehen?

Am Anfang klären wir den Begriff „*Korruption*“. Das lateinische Wort „*corrumpere*“, aus dem sich das Wort Korruption ableitet, bedeutet: Es wird etwas verdorben, untergraben, zugrunde gerichtet – sei es der Ruf eines Unternehmens, der Wettbewerb im Marktsegment oder die Existenz eines Mitarbeiters.

Laut noch einer Definition ist die Korruption die private Zweckentfremdung öffentlicher Güter. Solche Definition enthält eine Unterscheidung zwischen Öffentlichkeit und Privatsphäre, die für die Kultur moderner Gesellschaft typisch ist.

Im Allgemeinen ist der Begriff Korruption auch mit Bestechung, Käuflichkeit oder Vorteilsannahme in Verbindung zu bringen.

Man definiert auch den Begriff als Missbrauch einer beruflichen Funktion, um einen materiellen oder immateriellen Vorteil für sich oder einen Dritten zu erlangen, wobei gleichzeitig mit dem „Eintritt eines Schadens oder Nachteils für die Allgemeinheit (...) oder für ein Unternehmen“ zu rechnen ist. Aus der letzteren Definition ergibt sich die strafrechtliche Relevanz von Korruption, weil gegen geltendes Recht verstoßen wird – beispielsweise durch Untreue, Betrug oder Urkundenfälschung.

Dieses Phänomen betrachtet man als Effekt der Modernität. Heute lesen wir viel über die zahlreichen Korruptionsskandale. Die werden weltweit durch die Medien präsentiert. Man kann mit Sicherheit sagen, die Korruption ist ein globales grenzüberschreitendes Problem. Dieses Problem betrifft arme und reiche Gesellschaften in gleicher Maße.



Die Begriffe, die für Korruption verwendet werden, sind so vielfältig wie die Erscheinungsformen der Korruption. Die Korruptionserscheinungen kann man im Bildungssystem, im Gesundheitssystem, in der Justiz, in der öffentlichen Verwaltung, in der Politik oder in der privaten Wirtschaft beobachten.

Nicht die Korruption als solche ist das soziale Problem. Die Veränderungen der Wahrnehmungen und Deutungen von Korruption und die Gründe dafür stellen heute Probleme dar.

In diesem Bezug ist noch ein Begriff zu erwähnen. Dieser Begriff ist „*die Korruptionskultur*“. Er umfasst nicht nur die Praxis des korrupten Verhaltens im engeren Sinne, sondern auf Korruption bezogenes Denken und Handeln in einzelnen Handlungsbereichen der modernen Gesellschaft. Es gibt eine Pluralität von Kulturen der Korruption nicht nur in verschiedenen Ländern, sondern in einer Gesellschaft.

Jetzt sehen wir die Folgen der Korruption an:

1) Man sieht in der Korruption das größte Hindernis im Kampf gegen Armut. Die benötigten Ressourcen und Naturschätze werden von einzelnen korrupten Politikern und Beamten geplündert. Laut den Schätzungen der Weltbank belaufen sich die jährlichen Schäden, die durch Korruption entstehen weltweit ein bis vier Billionen US-Dollar. Diese Zahlen sind sehr hoch. Insgesamt macht das zwölf Prozent der weltweiten Bruttowirtschaftsleistung.

2) Die Korruption hemmt die nachhaltige Entwicklung eines Landes. Darunter versteht man die politische, die wirtschaftliche und soziale Entwicklung eines Landes. Öffentliche Gelder kommen nie an und öffentliche Ressourcen verschwenden spurlos.

3) In vielen Ländern der Welt führt die Korruption dazu, dass die Menschenrechte oft verletzt werden.

4) Die lebenswichtigen Ressourcen wie z.B. Wasser sind in Folge von der Korruption ausschließlich zu überhöhten Preisen verfügbar. Das macht das Leben der einfachen Menschen schwer.

5) Der Zugang zu öffentlichen Dienstleistungen wie Bildungseinrichtungen und zur Gesundheitsversorgung wird durch überhöhte Preise erschwert oder ganz verhindert.

Heute gibt es in der Welt besonders anfällig für Korruption geltende Krisenländer wie der Irak, Afghanistan und ressourcenreiche Länder wie Kamerun. Die Verwaltungsapparate dieser Länder, die eine schlechte Bezahlung leisten, bieten den Nährboden für Korruption. Die Regierungen solcher Länder wie Simbabwe, die die freie Meinungsäußerung und die Freiheit der Presse verhindern, oder die Konzentration von Medienmacht in den Händen einzelner Politiker tolerieren wie Honduras oder Italien, begünstigen die Korruption noch mehr.

Zum Schluss, wie kann man die Korruption bekämpfen? Das vermutlich eine der wirksamsten Mittel gegen Korruption wäre die größere Transparenz in allen Bereichen des Regierungshandelns und der Verwaltung. Der Kampf gegen Korruption ist die wichtigste Herausforderung für die Regierung jedes Landes ohne Ausnahmen.

Zu internationalen Antikorruptionsbemühungen zählen die Konventionen gegen Korruption, die Bestechung ausländischer Amtsträger unter Strafe stellen oder die Regierungen dazu aufruft, Bestechung und Bestechlichkeit unter Strafe zu stellen.

## **DIFFERENCE BETWEEN SOLICITOR AND BARRISTER**

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### ***Difference between Solicitor and Barrister: The Work***

Put very simply, barristers tend to practice as advocates representing clients in court, whereas solicitors tend to perform the majority of their legal work in a law firm or office setting. There are, however, exceptions to this rule in both cases.

From an advocacy perspective, for example, the line between the two professions has become more blurred in recent times. Solicitors can obtain ‘rights of audience’ which enables them to represent clients in court. This means that solicitors can now perform many of the functions of a barrister up to a certain point, although barristers are able to work in a significantly higher level of court than their solicitor counterparts.

Although many solicitors do have rights of audience, the majority of them typically perform “behind the scenes” type-work such as:

1. Advising people who come to them with legal issues;
2. Holding negotiations and discussions between parties who are trying to reach agreement on a legal issue;
3. Drafting and reviewing legal documents, such as contracts.

### ***Difference between Solicitor and Barrister: The Training***

Following completion of a qualifying law degree, or a non-law degree and a law conversion course, such as the GDL, you need to make the decision as to whether you wish to practice as a solicitor or barrister because this is where the road splits:

1. To become a solicitor, you must complete a vocational 1-2-year course called the Legal Practice Course (LPC) which is designed to prepare you for solicitor practice. Following this, you must complete a 2-year training contract, which is practical legal work experience (typically carried out in a law firm) which

must be completed in order to qualify as a solicitor. Your training contract allows you to explore different areas of law, you will spend terms in different ‘seats’.

2. To qualify as a barrister, on the other hand, you need to complete the Bar Professional Training Course (BPTC). After this, fledgling barristers will do a 1-year pupillage, which usually takes place in chambers. Pupillage involves shadowing a barrister before getting involved in the practical work of chambers.

#### ***Difference between Solicitor and Barrister: Employed v Self-Employed***

Most solicitors are employed by a law firm or commercial organization as an “in-house” solicitor. As an employee, they will receive a regular income, holiday pay, sick pay, benefits etc. This obviously offers a lot of job security.

Barristers, on the other hand, tend to be self-employed and affiliated with a chambers which they share with other self-employed barristers. With self-employment comes greater uncertainty in relation to income and during any holidays or sick leave, a barrister will not be paid. As barristers become more senior and can charge higher fees, this becomes less of an issue, but for barristers just starting out, this can be a real challenge.

Barristers, however, are not always self-employed. Some barristers are employed “in-house” at law firms and large commercial organizations (such as the Government Legal Service), which takes away the uncertainty associated with being self-employed and brings with it regular income and benefits.

#### ***Difference between Solicitor and Barrister: Access to the Public***

Members of the public are free to contact and instruct a solicitor. This is not always true of barristers. For reasonably straight forward cases, a member of the public can instruct a barrister, if they go through the Public Access Scheme. Public access is available in all types of work that barristers can do, except for work funded out of legal aid. It is also unlikely to be appropriate in cases involving children.

#### ***Difference between Solicitor and Barrister: Robe v Suit***

Traditionally, a barrister in court was expected to wear traditional court attire in the form of a long black robe and wig. Although many barristers are still expected to dress in this way, for an increasing number of barristers, including, for example, some civil practitioners, this is no longer necessary.

As a solicitor, there is no dress code.

#### ***Difference between Solicitor and Barrister: Work Experience Opportunities***

If you are thinking about pursuing a career as a barrister, the work experience you should consider undertaking is different as compared with the work experience you would consider if you were thinking about pursuing a career as a solicitor.

Budding solicitors would be considering work experience in a law firm-type environment, in the form of vacation schemes or otherwise. Budding barristers, on the other hand, would be considering work experience in the form of a mini pupillage.

## LEGAL POSITIVISM AS THE DOMINANT TRADITION IN THE JURISPRUDENCE OF MODERNITY

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Legal positivism is a label for a set of related approaches to law which have dominated western jurisprudence in the last 150 years. Using such labels is always a matter of including a number of varying projects and answers to the question “what is law”, but, in general, legal positivism has asserted two essential defining elements: (i) law is a human creation, it is “posited” by humans in some way, for example through the express volition of political ruler; – the sovereign – via a process of legislation; (ii) law can be studied and properly understood by adopting the methodology developed by the so- called “natural” or “physical” sciences during the 18th and 19th centuries known as the positivist approach; this approach sought to strip all subjective considerations from the scientist in the interests of objectivity. When appropriate data had been collected - usually the concepts that legalism worked with – a purely analytical methodology appeared ideal to break down the objects into manageable form and the legal scientist must be careful to prevent his values from intruding upon the investigation.

In recent years legal positivism has lost its previous dominance within jurisprudence, partly because its projects of conceptual analysis occurred at the expense of asking questions concerning the entirety of the legal enterprise and they lacked social awareness as to law’s social effectivity. Its critics, moreover, have claimed that instead of being a value-free approach to law, it is itself a particular value-laden approach, reflecting a certain body of assumptions, which in turn lead us on to thinking of law in a particular way. The contrasting projects of different writers take on a different complexion when we locate them as historical constructions, rather than treating them as if they were all concerned with dealing with some common pure essential form, some trans-historical entity. Law is not some stable or essentially trans-historical phenomenon, but differently constituted empirical phenomena in varying socio-historical locations. It is not only that asking different questions leads to dissimilar answers, but a variety of perspectives may be a consequence of inherent diversity and variation in the basic material of investigation. Thus variation in the answers proposed to the asking ‘what is law?’ may be not so much proof that some writers are right and some wrong, but

evidence of the wealth of questions and perspectives on offer when looking at the issue of law and legality across the richness of history.

How did those writers who saw themselves as legal positivists define the tradition?

In the late 1950s HLA Hart (widely regarded as the foremost legal positivist of modern times) offered a summary of several possible tenets of legal positivism:

- (1) the contention that laws are commands of human beings;
- (2) the contention that there is no necessary connection between law and morals, or law as it is and ought to be;
- (3) the contention that the analysis (or study of the meaning) of legal concepts is (a) worth pursuing and (b) to be distinguished from historical enquiries into the causes or origins of laws, from sociological enquiries into the relation of law and other social phenomena, and from the criticism or appraisal of law whether in terms of morals, social aims, “functions”, or otherwise;
- (4) the contention that a legal system is a “closed logical system” in which correct legal decisions can be deduced by logical means from predetermined legal rules without reference to social aims, policies, moral standards; and
- (5) the contention that moral judgments cannot be established, or defined, as statements of fact can, by rational argument, evidence, or proof (“non-cognitivism” in ethics)

A core element of legal positivism is the understanding that modern law – positive law – is something posited by humans for human purposes. Thereby modern law can be viewed as an important tool. It is variously presented as an instrument of governmental power, or simply as an instrument for facilitating a basic social interaction and laying out the conditions for individuals to enter into contracts, make wills, transfer property, rely upon public institutions, and so forth. Moreover, a fundamental tenet of legal positivism is that while the laws of any one society may reflect moral and political choices, there is no necessary or conceptual link between law and morality. Law does not need to be moral to be recognized as valid law. The existence of the law was a factual question answerable by observation, rather than some complex process of moral interpretation and evaluation. To determine the legality of some enactment, for example, it was only necessary to follow through some de facto source test. This highlights an important feature of legal positivism: it was a jurisprudence deeply concerned with reinforcing the use of law as an instrument of the modern state. Sovereignty has been a key concept, however as modern western societies developed into social structures administered by bureaucracy, “officials” replaced the sovereign as the central figure(s) of authority. But in linking law to its institutional and instrumental role as the servant of the state, legal positivism was always in danger of becoming a methodology without a soul. For how could there be an essence to law if law lost its pre-modern connection with a transcendental signifier, becoming instead solely a mutable human instrument? Would this not mean that there are as many kinds of (non-)law as there are forms of human/social arrangements? Legal pluralism has always been the “other” of state law.

## DETENTION OF MINORS IN RUSSIAN FEDERATION

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Detention is a measure of state coercion, which consists in deprivation of liberty and personal integrity for a specific period of time.

The detention of minors is regulated by Chapter 12 of the Code of Criminal Procedure of the Russian Federation, as is the detention of adult citizens. According to the Code of Criminal Procedure, there are the following grounds for detention, in particular of a minor:

- when a person is caught in the process of committing a crime or immediately after its committing;
- when victims or eyewitnesses point to a person as having committed a crime;
- when clear traces of the crime are found at a person, his clothes or his home.

It should be noted that the rights of a minor in case of detention are somewhat expanded. However, they can be implemented directly by officials of the Internal Affairs bodies, parents or guardians. For example, police officers must immediately inform the parents of a minor of his detention.

Despite the legislative consolidation of the grounds for detention, law enforcement officers often exceed their powers in the detention of adolescents. At the same time, they rely on legal illiteracy or unsettled psychic of a minor.

An example of such a violation is a well-known story of the “Arbat boy”, who was detained by the police for reading poetry. As it became known, on May 26, 2017, the police detained a 10-year-old child, forcibly loaded him into a service car, and then delivered him to the Police Department “Arbat”. According to a police statement, the boy's actions were regarded as begging, as he moved between the cars alone and carried a bag to collect money. At the same time, an administrative case was initiated against the boy's father for the improper performance of his parental duties, and a criminal case against the stepmother for the use of violence against a representative of the authorities.

Analyzing this situation, it should be noted that the police have committed some violations. First, if we proceed from the press reports, the police incorrectly qualified the boy's actions. Police officers did not ask the child where his parents

were and what he was doing. Instead, they decided that the minor was homeless and engaged in begging. Secondly, the officials used physical force. According to the Federal law “On the police”, law enforcement officers have the right to use physical force, but before that an official must introduce himself, inform about his intentions and provide an opportunity to voluntarily fulfill his requirements. In the described situation, police officers without any preliminary actions began to forcibly take the child to the official car.

In addition, based on the Federal law “On the police” and the law “On the basics of the system of prevention of neglect and juvenile delinquency”, the minor was to be taken to the Police Department, where the duty officer was to transfer him to the police for minors, which was not done. Also, measures must have been taken to notify the legal representatives of the delivery of the child to the Department. Employees didn't report about detention, and the father learned about it from the stepmother of the son.

We should also refer to the Regulations on the order of execution of the duties and rights of police officers in the territorial body of the Ministry of Internal affairs of Russia after delivering citizens. It states that the duty officer must immediately investigate the circumstances of the detention. After clarification of the circumstances regarding minors, the decision on their transfer to the body of inquiry or investigation, the official of Department of Juvenile Affairs, their parents or other legal representatives, officials of educational establishments or health care institutions.

From this case, it becomes clear that the detention of adolescents is often accompanied by violations of their rights. And at the same time, there are more and more such stories nowadays.

Although the current legislation contains some additional requirements for the protection of the rights of minors, these provisions are insignificant and are limited to mandatory notification of legal representatives and to cases of enforcement of measures against adolescents, as well as establish a minimum age for detention. In this regard, it is necessary to eliminate gaps in the legislation that applies to minors, in particular, it is necessary to clearly regulate the procedural order of detention of these persons.

## DOCUMENTING THE CRIME SCENE – STILL PHOTOGRAPHY

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The subject of the given report is the rules of documenting the crime scene. The analysis and the scheme of collecting facts in the crime scene are some basic principles which we should take into account during the investigation of the crime. Before the investigators begin examining the scene of the crime, they should gather as much information as possible about the scene.

Forensic photography, also referred to as crime scene photography, is an activity that records the initial appearance of the crime scene and physical evidence, in order to provide a permanent record for the courts. Crime scene photography differs from other variations of photography because crime scene photographers usually have a very specific purpose for capturing each image.

A slow and methodical approach is recommended. If available, a video camera is the first step to documenting a crime scene. Whether a video camera is available or not, it is absolutely essential that still photographs be taken to document the crime scene.

We should take into account the fact that almost will do in crime scene photography. The taping should begin with a general overview of the scene and surrounding area. The taping should continue throughout the crime scene using wide angle, close up, and even macro (extreme close up) shots to demonstrate the layout of the evidence and its relevance to the crime scene. The flash unit used with the camera should be one that is not fixed to the camera. It should be able to function at various angles and distances from the camera. This is to allow lighting of certain areas to provide maximum contrast. For example, you can place the flash in hard to reach areas, and reduce flash wash out which can render the item photographed invisible.

It is interesting to say it may be of help to the investigation to have a camera handy for instant photographs. For example, an instant photograph of a shoeprint found at a crime scene can be provided to investigators who are running a search warrant on a suspect's residence. The photo will tell them the type of shoe for which they are searching.

The photography of the crime scene should begin with wide angle photos of the crime scene and surrounding areas. When shooting the general overall scene,



the photos should show the layout of the crime scene and the overall spatial relationships of the various pieces of evidence to each other. A good technique to use indoors is to shoot from all four corners of a room to show its overall arrangement.

It is worth mentioning that a ruler should be photographed with item where relative size is important. The same is done for items which need to have one-to-one comparison photographs. The object should firstly be photographed as is, then photographed with the ruler. It is important that when doing one-to-one photography that the ruler is on the same plane as the object being photographed and the film plane is parallel to the ruler. This is why a level and a tripod are necessary.

In this connection we should also take into consideration as to what the investigator is photographing or wishes to demonstrate in each photograph. This is to prevent the investigator from getting the picture back at a later date and trying to figure out what he or she was trying to accomplish with the photo. The same areas should be photographed in the same sequence as mentioned above in the paragraphs on videotaping.

Based on the above, it can be noted that the information forensic photography is an indispensable tool in modern forensic science. Its protocol aids in investigative procedures, maintenance of archival data, and to provide evidence that can supplement medico legal issues in court. Proper selection and implementation of the appropriate photography and computer equipment combined with necessary training and correct workflow patterns make incorporating photography into the field of forensics, an easily obtainable goal.

In conclusion we should also take into consideration the role of the forensic photographer. It is rather crucial, as a good skill in photography with updated knowledge of the mechanics and techniques involved is required for proper documentation of evidence. This paper aims to shed light on the various aspects of forensic photography with emphasis on its diverse applications and advancements.

# THE APPLICATION OF THE RULES ON THE INVIOABILITY OF THE HOME IN THE CRIMINAL PROCEDURE OF THE RUSSIAN FEDERATION

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The Constitution of the Russian Federation guarantees a wide range of individual rights that are implemented in criminal proceedings, in particular, the right to inviolability of the home. The principle of inviolability of the home is also enshrined in many international acts, such as the universal Declaration of human rights, the international Covenant in civil and political rights and other National legislation enshrines this principle in addition to the Constitution of the Russian Federation, the Criminal Code of the Russian Federation and the Code of Criminal procedure of the Russian Federation.

Restriction of the right to inviolability of the home is possible in the course of investigative actions. The Code of Criminal procedure of the Russian Federation specifies that inspection, search and seizure in the dwelling is made only with the consent of persons living in it or on the basis of the court decision.

Thus, the legislator points to three investigative actions that can be carried out with the penetration into the home. But the practice of investigation shows that other investigative actions and measures of criminal procedural coercion are carried out in the home, for example detention, drive, seizure of property, examination.

At the same time, the Code of Criminal procedure does not contain rules that prohibit other investigative actions in the home, in addition to search, seizure and inspection. It is this gap that gives the investigator (inquirer) the freedom to choose a place that seems more appropriate for investigative actions. Thus, for tactical reasons in the home can be carried out examination, confrontation, identification, verification of testimony on the spot and other investigative and criminal proceedings. However, article 12 of the Code of Criminal procedure does not indicate the nature and extent of restrictions on the inviolability of the home in the production of these investigative actions and coercive measures. This omission leads to a violation of the principle of inviolability of the home, since the choice of the nature and extent of the restriction of inviolability of the home depends on the law enforcer.

The Code of Criminal procedure of the Russian Federation does not clearly regulate the procedure and form of obtaining the consent of residents in the course of investigative actions with penetration into the home.

For example, basing on Article 12 and Article 177 of the Code of Criminal procedure, when inspecting the home it is enough to obtain the oral consent of a resident. If it was necessary to have a written consent for inspection, the legislator would point to it directly, as it is done when carrying out judicial examination according to Article 195 of the Code of Criminal Procedure.

Meanwhile the provisions of the Code of Criminal procedure do not say about the necessity to reflect in the Protocol of the investigative action the fact of giving such consent. It should be noted that the investigator has to reflect the fact of consent or disagreement in the Protocol in the production of any investigative action.

Therefore, provisions should be made to ensure that the consent of the resident to the investigative action is done in writing. If a resident refuses, the investigator (inquirer) initiates a petition for carrying out an investigative action, or performs actions on the basis of the resolution of the investigator (inquirer) in urgent cases.

At the same time, the status of the resident whose consent must be obtained for entry into the home is not very clearly defined. The code of criminal procedure does not define and does not include anyone in the category of residents.

In this case it is necessary to refer to the Housing code of the Russian Federation which specifies that the premises are intended for accommodation of citizens. In order to meet the needs for housing, citizens have the right to enter into various housing legal relations, as a result of which one of the parties to such relations moves into the dwelling and uses it for their own purposes. In this regard, the residents should include, in addition to their owners, as well as lodgers, temporary residents and persons who use the premises on the basis of actually established housing relations. Therefore, residents do not include persons who are temporarily in the home, that is guests, neighbors, friends and so on.

Thus, violation of the principle of inviolability of the home leads to a violation of the legitimate rights and interests of citizens, which directly enshrines the Constitution of the Russian Federation. In order to avoid these violations, it is necessary to eliminate gaps in the current legislation for the correct implementation of the principle of inviolability of the home in the production of investigative actions and coercive measures.

## **BARRISTERS AND SOLICITORS: THE HISTORY AND POSSIBLE DEVELOPMENT**

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Today, the developing process of globalization encompasses all aspects of human life, including the transformation of the traditions, acquiring new forms, but maintaining its identity.

The most widely known example of Britain's adherence to tradition in the legal field is the advocacy, whose history dates back to the 13th century, and which is still represented by two groups of human rights defenders: solicitors and barristers.

The formation of a group of solicitors was due to the need for a person to participate in the proceedings. A solicitor would act as an "interpreter" for the parties to the proceedings, since the original language of the proceedings was Norman French, which few people knew. Soon, however, solicitors, referred to as "attorneys", began to provide the necessary practical advice on legal issues.

The predecessors of solicitors were attorneys. These persons had no professional education and were engaged in the preparation of the client's cases in the courts of General law. After the XV century, when the consideration of cases began to be carried out on the basis of "justice", this type of work has been performed by attorneys, referred to as solicitors.

Barristers, in the first stage of formation of the system of English advocacy, were engaged in oral report of cases in court proceedings, in defending the position of his client and also in legal expertise. Their role was to participate in the trial as if a client were handling the case in person.

The term "*barrister*" appeared in the result of the need to identify individuals who were eligible for admission to the "judicial barriers" – the Bar, separating the judges from the dock.

At the same time, the admitted persons were divided into those who could be behind the barrier – barristers, and those who could be inside it, being invited by judges. The latter category of persons was referred to as "Royal lawyers" and was defined as the highest professional rank.

At the moment, such status is available only to barristers who have considerable experience in resolving a wide range of issues in the field of English

law and are able to advise governments and companies of various countries of the world community.

Quite natural result of this peculiar division of duties was the declaration of barristers themselves as “independent” persons, performing a noble duty.

The consequence of this phenomenon was the gradual removal from the performance of their technical work on the case, the responsibility of which was entrusted to the solicitors. It was through these persons that contact was made with the client (the selection of which was also conducted by the solicitor), since personal contact was regarded by barristers as discrediting the position of the lawyer.

It can be assumed that the tendency to recognize barristers as a kind of “higher professional caste” also takes its roots from a specific system of training.

Legal education was obtained in specialized inns of courts, under the guidance of experienced practicing lawyers, organizing classes in the form of court sessions and trials.

Besides, young professionals and teachers have Dining Sessions – formal dinners, designed to establish the closest contacts. About four Dining Sessions are held every year and there is a rule that a student must have dinner in the school canteen at least three times.

Upon completion of the relevant training, persons were awarded the title of barrister, who belonged to one of the four existing Inns of Courts.

The education of solicitors was carried out in the Chancery boards. At the end of the specified period of study persons were examined by judges and then brought in special lists.

This phenomenon could not but contribute to the formation of a separate closed community of lawyers with high-quality theoretical and practical knowledge in the legal sphere, as well as public speaking skills that are not available to a wide audience.

The result of following such customs, and consequently strengthening them, was the desire of the barrister group itself to maintain its isolation. Born in families with high social status and significant financial resources, and then trained in prestigious specialized educational institutions, barristers perceive their profession as a “gentleman's” activity, and therefore wish to be surrounded by equals.

The fact that her Majesty Attorney General of England and Wales is elected from among the barristers is another indication of the barristers' belonging to the “English business elite” and their significant influence on the political life of the state. This person acts as a legal counsel and Counsel for the Crown of England, conducts explanations of various Ministerial projects from the legal side.

At the present stage of development of the English advocacy, adherence to tradition creates difficulties, first of all, for the population.

Often, individuals have to pay for the services of a solicitor and a barrister at the same time. In addition, the statistics confirm that solicitors, by assisting the professional side in various types of transactions, carrying out a variety of

procedural actions and providing advice, represent a profession of human rights defender which is closest to the needs of a wide range of persons.

Thus, in my opinion, it is possible to carry out appropriate reforms, according to which solicitors should have the status of a “lawyer”, and barristers, because of their considerable experience and more qualified training, to serve as scientific advisers to assist the legislative branch in lawmaking.

Such events will preserve the historical group of barristers and their experience, and the services of a lawyer for the public will become more accessible and transparent.

## SECTION 5. MEDICAL SCIENCE

### COXSACKIE VIRUS

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#### **Introduction**

Since ancient times, the problems of combating infections and finding measures to prevent the emergence and spread of infectious diseases have been among the most important in medicine. This also applies to enterovirus infections.

The aim of our research work was to study Coxsackie viruses as the main mechanisms causing enterovirus infection (EVI). In this connection the following tasks were set:

- 1) to study epidemiology, clinical picture, treatment of the disease;
- 2) to identify the modern aspects of EVI and to establish methods of prevention.

A group of enteroviruses that perfectly survive in the stomach and intestines is called Coxsackie viruses. The first time an infection was found in the United States in the small town of Coxsackie, where the name of the disease came from. Coxsackie enterovirus quickly spread throughout the world. The virus and today affects the gastrointestinal tract (GIT) multiplying in the children's body especially rapidly.

It is necessary to mention that the first representatives of Coxsack viruses were isolated by G. Doldorf and G. Cycles in 1948 from the intestines of children with polio-like lesions in a hospital in the town of Koksaki (New York, USA). The name of the Coxsackie virus is associated with a city in the United States where it was first discovered.

#### **Epidemiology**

The source of infection is a sick person or a virus carrier. It is an anthroponotic infection. Coxsackie is a disease of dirty hands. It is evident that that 97% of infections occur through the food - through hands, dishes, unwashed fruit, tap water. That is why mostly young children are sick.

It should be added that more often the virus has seasonal manifestations. Its outbreaks occur in the warm seasons, when unwashed fruits are consumed most of all, raw tap water is used.

### **Clinical picture**

The first symptom of the disease is an increase of body temperature to 39 - 40 ° C. Fever can persist for several days or goes in waves.

Patients complain of weakness, fatigue, headache. Due to the defeat of the pharyngeal mucosa, ingestion can be difficult. In some cases, manifestations of disease are very severe. There is the pain in the abdomen, bloating, repeated vomiting, diarrhea, rashes on the upper and lower limbs, as well as on the face and chest.

### **Treatment**

In order to maintain the body in the first few days of the acute manifestation of the disease, when the immune system has not yet produced a sufficient number of interferons, lymphocytes and other immune bodies, symptomatic treatment is used, for example, they reduce the temperature and maintain the water balance.

### **Conclusion**

Having studied the modern aspects of EVI, the following topical issues can be identified:

- 1) the main causative agents of EVI are Coxsackie viruses;
- 2) the disease depends on the state of the immune system;
- 3) every infected person becomes a potential source of infection;
- 4) vertical transmission mechanism suggests the development of congenital pathology in children;
- 5) it is necessary to develop specific preventive measures of the disease, which are absent at present.

## **IMPLANTABLE MEDICAL DEVICES**

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The main subject of the given report is the implantable medical devices that may never need replacing. Advances and developments in present medicine are



progressively relying on electronic devices implanted inside the patient's body. The aim is to analyze and to demonstrate the implantable medical devices.

At first we should mention that for patients with pacemakers and other implantable medical devices, there is no lifetime guarantee on the technology. That's why researchers at UCLA and the University of Connecticut have been working on creating a new technology. This technology should run on the energy of fluids – straight from the human body. A device that has wires which are implanted into the heart tissue and can deliver electrical shocks, detect the rhythm of the heart and sometimes “pace” the heart's rhythms, as needed.

It is interesting to note: “In theory, it is actually possible to make devices that will last a lifetime”, says Dr. Richard Kaner, PhD, a professor of chemistry and biochemistry, and materials science and engineering at UCLA. “The problem is they need to be bio-compatible and they need a power source. That's how we became interested in bio-super capacitors”.

The next fact we could deal with the reinventing the battery. It should be stressed traditional implantable medical devices, such as pacemakers, are powered by batteries that have a lifespan of approximately 10 years. This means surgery is inevitable, simply because the battery needs replacing. But thanks to a team of researchers led by Dr. Kaner, battery-powered pacemakers may eventually become a thing of the past.

It is worth mentioning that the team invented a new energy-storage device, called a biological supercapacitor. It is long-lasting, non-toxic and ultra-thin. The device is made of graphene (a thin layer of pure carbon) and human proteins that act as electrodes, and gets its charge from electrolytes found in blood serum and urine. Dr. Kaner's paper about the device was first published in July 2015 in the journal *Advanced Energy Materials*.

Unlike batteries, super capacitors are often limited by low energy densities, so the research focused on designing a device that would capture energy effectively and be compatible with the human body.

“We call it laser-scribed grapheme and that enables one to actually make a storage device that stores all its energy on the surface”, says Dr. Kaner. “It has no expansion and no contraction and therefore you can literally go millions of cycles with this new type of energy storage cell”.

Dr. Kaner's paper argues that the bio-super capacitor is not only a viable form of power, but that it can in fact store a comparable amount of charge to lithium ion batteries – while lasting much longer. It should be said that unfortunately, as Dr. Kaner explains, the biological super capacitor is still a long way from being used for implantable medical devices.

The industry of implantable medical devices is constantly evolving, which is dictated by the pressing need to comprehensively address new challenges in the healthcare field. Therefore, these devices are becoming more and more sophisticated. Not long ago, the range of IMDs industry of implantable medical devices' technical capacities was expanded, making it possible to establish Internet connection in case of necessity and/or emergency situation for the patient.

In conclusion we could underline that there are a lot of approval processes and all sorts of safety testing. This really a proof-of-concept shows that this is possible. But often once you show something is possible, there are a lot of people in the biomedical area and a lot of biomedical device companies that may become interested and decide this is worth pursuing.

## CHARAKTERISTIK VON HAEMOPHILUS INFLUENZAE

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Das Thema meines Vortrags ist mit dem Bakterium *Haemophilus influenzae* verbunden. Am Anfang des Vortrags möchte ich dieses Bakterium charakterisieren.

*Haemophilus influenzae* ist ein Bakterium der Gattung *Haemophilus* (gramnegative, fakultativ anaerobe Stäbchen). Über die Mikrobiologie hinaus wurde das Bakterium im Jahre 1995 als erster Organismus bekannt, dessen Genom vollständig sequenziert wurde.

Der hämophile Bazillus wird unterschiedlich genannt. Man nennt ihn den Pfeiffer-Zauberstab, den Afanasyev-Pfeiffer-Zauberstab, *Haemophilus influenzae*, Zauberstab *influenzae*. Es sei betont, dass die ersten hämophilen Bakterien empfand Robert Koch. Die Mikrobe erhielt verschiedene Namen aufgrund der Entdeckung von zwei Wissenschaftlern Afanasyev und Pfeiffer.

*Haemophilus influenzae* (*Hämophilus influenza*, *hämophile Bazillen*) ist der Erreger der akuten Entzündung im menschlichen Körper, bei der sich im Gewebe des Nerven- und Atmungssystems eitrige Foci-Abszesse bilden.

Die Dauer der Inkubationszeit von *Haemophilus influenzae* ist nicht genau definiert. Es wird angenommen, dass sie 2-4 Tage ist. Während dieser ganzen Zeit wird der Patient für andere Menschen gefährlich.

Wenn wir über die Symptome der Erkrankung sprechen, so ähneln sie sich im Anfangsstadium den Symptomen einer hämophilen Infektion Erkältungen. Die Erkrankung verläuft meist als banales ARVI. Es kommt jedoch vor, dass die Infektion schwerwiegendere Erkrankungen mit bestimmten Ausprägungen verursacht.

Die Mikrobe weist eine Vielzahl von Varianten auf. Diese Merkmale erschweren oft die Diagnose der Infektion und sind sie für die Epidemie gefährlich. In der Medizin sind nur die schwersten Fälle der Krankheit bekannt.

*Haemophilus influenzae* lebt in den oberen Atemwegen des gesunden Menschen. Im Normalzustand ist es nicht für Gesundheitsschädlich. Bei einem geschwächten Immunsystem werden diese harmlosen Mikroorganismen aktiviert und führen zu vielen Problemen.

Die klinischen Zeichen der Pathologie werden durch die Lokalisierung des pathologischen Prozesses bestimmt. Intoxikationen und katarrhalische Syndrome sind charakteristisch für jede klinische Form der Infektion. So sieht das Krankheitsbild aus: Bei Patienten steigt die Temperatur auf 40 Grad, Schüttelfrost, Kephalgie, Rhinitis, Halsschmerzen, Husten, Müdigkeit, Lethargie, Rumpeln und Bauchschmerzen, Stuhlgang, Blähungen, Schmerzen in Muskeln und Gelenken.

Die Labortests für die Erkrankung sind:

- Allgemeiner Blut- und Urintest – zur Ermittlung von Entzündungszeichen;
- PCR – um die Erreger-DNA nachzuweisen;
- Sputum, Liquor cerebrospinalis oder Pharynx Ausfluss – um den Erreger zu isolieren;
- Serologische Tests – zur Bestimmung von Antikörpern im Blut;
- Immundiagnose – Nachweis eines Kapselantigens eines hämophilen Stabes mittels ELISA.

Es werden dabei instrumentelle Maßnahmen durchgeführt, um die beabsichtigte Diagnose zu bestätigen und bestehende Komplikationen zu identifizieren. Die häufigsten und informativsten darunter sind: Ultraschall, Radiographie, CT und MRI.

Die mikrobiologische Untersuchung von klinischem Material ist die Hauptdiagnosemethode. Mit dieser Methode kann der Stab vom Patienten isoliert werden. Die Laboranalyse meint: Abgabe der oberen Atemwege, Eiter aus dem Ohr, Auswurf, Hirnflüssigkeit, Gelenkflüssigkeit, Blut. Das Biomaterial wird unter einem Mikroskop und auf Nährmedium ausgesät. Nach der Isolierung einer Reinkultur und der Identifizierung des Erregers wird ein Antibiotikaresistenztest durchgeführt.

Wie bekannt ist, das Eingangstor der Infektion ist die Nasopharynxschleimhaut. Die Pathologie zeichnet sich durch eine langfristige Persistenz des Erregers im Infektionsbereich aus. Dies ist das latente Stadium der Krankheit. Mit einer Abnahme der allgemeinen Widerstandsfähigkeit des Organismus manifestiert sich dieser. Eine Zunahme der gesamten mikrobiellen Masse und die Hinzufügung einer Virusinfektion sind Bedingungen, die diesen Prozess beschleunigen. Mit der Lokalisierung des Erregers sind folgende Krankheiten wie Epiglottitis, Mittelohrentzündung und Sinusitis verbunden.

Die Infektion breitet sich lymphogen oder hämatogen durch die umgebenden Gewebe aus und verursacht die Entwicklung von Bakteriämie, Septikämie und Entzündungen in den Bronchien, Lungen und Fettgewebe. In schweren Fällen

kommt es zu einer hämatogenen Verbreitung von Mikroben mit Schädigungen der Gelenke, Knochen und inneren Organe.

*Haemophilus influenzae* dringt in den Blutkreislauf ein und bleibt asymptomatisch, bis die Anzahl der Mikrobenzellen ihr Maximum erreicht. Dann dringt der Bazillus über die Blut-Hirn-Schranke in das zentrale Nervensystem ein und verursacht die Entwicklung einer eitrigen Meningitis.

Es ist wichtig die Faktoren, die zur Entwicklung einer hämophilen Infektion beitragen, zu wissen. Das sind:

- Rauchen
- Alkoholismus und Drogenabhängigkeit
- Langzeit-Antibiotika-Therapie
- Nervöse Überanstrengung und emotionale Wellen
- Hypo- oder Hyperthermie
- Schlechte Lebensbedingungen
- Schlechte Umgebungsbedingungen.

Wer gehört eigentlich zur Risikogruppe für hämophile Infektion? Dazu gehören: die Patienten mit Agammaglobulinämie, die Menschen, die eine Splenektomie hatten, die Patienten die Zytostatika einnehmen, die Kinder der ersten Lebensjahre, künstlich gefütterte Babys, die Frühgeborene, die Vorschularbeiter, ältere Menschen, Krebspatienten, Kinder, die in Waisenhäusern leben, Personen mit angeborenem oder erworbenem Immundefekt, Kinder, Kindergärten die besuchen.

Weiter betrachten wir die Wege der Ausbreitung der Infektion. Es erfolgt durch einen Aerosolmechanismus, der durch Tröpfchen aus der Luft umgesetzt wird. Der Erreger dringt bei starkem Husten in die äußere Umgebung ein, niest und spricht mit dem Abfluss der Atemwege. Das Infektionsrisiko wird bei Personen maximal hoch, die sich im Umkreis von drei Metern von einem Kranken befinden. So werden Kinder in den ersten Lebensjahren von erwachsenen Trägern infiziert. Die Übertragung des Erregers auf kontakthaushaltliche Weise ist aufgrund seiner geringen Resistenz in der Umwelt äußerst selten. Möglich ist auch eine Infektion mit einem Handtuch, Spielzeug, Geschirr und anderen Haushaltsgegenständen, die mit Bakterien besät sind.

Heute untersuchen die Mediziner die Eigenschaften und Merkmale von Bakterien immer weiter, da dies bei Kleinkindern eine der häufigsten Ursachen für eitrige Meningitis ist.

Meningitis betrifft hauptsächlich Babys zwischen 6 Monaten und 5 Jahren. Die Symptome dieser Krankheit sind hohe Körpertemperatur, laufende Nase, starke Kopfs- und Halsschmerzen, Husten. Die Krankheit entwickelt sich normalerweise im Saison Herbst-Winter und im frühen Frühling. In dieser Zeit ist Immunsystem des Körpers besonders geschwächt. Sie kann seine Schutzfunktionen nicht vollständig erfüllen.

Die Diagnose der Krankheit umfasst körperliche Untersuchung und Labortests. Die Behandlung hämophiler Infektionen ist im Ganzen konservativ, etiotrop und antimikrobiell.

Zusammenfassend: Die Krankheiten, die durch *Haemophilus influenzae* verursacht werden, haben oft eine günstige Prognose. Sie gefährden das Leben der Patienten nicht. Bei rechtzeitiger und korrekter Behandlung treten nur in 30% der Fälle neurologische Komplikationen auf. Der Prozentsatz der Sterblichkeit ist ebenfalls niedrig und macht nur 5%. Dank der aktiven Immunisierung der Bevölkerung beträgt die Inzidenz 25 Fälle pro 100.000 Menschen. Heutzutage hat die Behandlung der Infektion den Charakter eines allgemeinmedizinischen Problems. Dieses Problem ist mit einer Erhöhung der Resistenz des hämophilen Bazillus gegen die meisten Antibiotika verbunden.

## **COLOR THERAPY AS THE TYPE OF ART THERAPY**

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Color therapy is one of the various types of the art therapy, one of the sections of psychotherapy, and an immediate method of treatment which is based on the fact that each biologically active zone triggers on one of the colors: through the visual organ and the visual analyzer each color affects on the nervous system.

Color therapy can help you:

- in case of stress, neurosis
- in case of psycho-emotional disorders
- for insomnia, seasonal depression, emotional stress;
- headaches, high and low blood pressure (vegetative-vascular dystonia, hypertension).

### **Black color**

The one who wears it, often seems to be unfriendly and even evil. Black has the ability to weight other colors. The preference for black color means the lack or absence of something very important in life, the feeling of death, the feeling of fate, religiosity, the onset of depression, the rejection of others. But it can slow down making decisions and changes in life.

### **White color**

This is a positive color, it symbolizes innocence and purity. Although white color belongs to neutral colors, it is considered cold because it is associated with snow and ice. White is often used to express sterility and safety.

### **Red color**

It is the most intense color in emotional terms. It helps to speed up the heartbeat and increase breathing. It also promotes activity, confidence, friendliness. Red color preference means self-confidence, readiness for action, a statement of one's strength and capabilities.

### **Pink color**

It is the most romantic and one of the most soothing and relaxing colors. Fans of pink are truly peaceful, subtle and sensitive people with a tender heart. Pink color can calm, and it is believed that it promotes digestion.

### **Orange color**

This is an excellent antidepressant. Orange color has stimulating properties, creates the impression of friendliness, openness. Preferring orange colors are capable of creative thinking, full of enthusiasm, but prone to irresponsibility.

### **Blue and light-blue**

The calm blue color induces the body to produce calming chemicals, so it is often used in the interior of the bedrooms. But blue is also a cold and a depressive color, and an excess of blue color is not recommended. The preference for blue and light-blue means the desire for peace, harmony with others and with oneself and loyalty.

### **Green color**

It is the easiest color for the eyes, its overabundance does not negatively affect the psyche. It is a soothing and a refreshing color, giving new vitality and stimulating the body's defenses. Preferred green color means: self-esteem, hardness, naturalness and truthfulness in relation to oneself, nobility of character, justice and willpower.

### **Yellow color**

Yellow color is the invigorating color of the sun. Perception is the most difficult color for the eyes, and its excess has an overwhelming effect on the psyche. Preferred yellow color means desire for freedom, openness, mobility, independence from reality, sociability.

### **Purple color**

It is a soothing, harmonious color with elements of spiritual contemplation and mysticism. It promotes inspiration, compassion and sensitivity. The preference for purple color means the desire to charm, sensuality and suggestibility.

### **Brown color**

Brown is a warm, “cozy” color, it is associated with earth, trees, and home. In clothes it symbolizes a person stinging on emotions, possibly with an unpleasant character. It can have a repulsive effect on others.

### **Grey color**

It is an “invisible” color. It carries almost no information and does not have any strong influence on the psyche. If you want to become “inconspicuous”, just wear gray. Gray color corresponds with impartiality, formalism, arrogance and conservatism, associated with wisdom and maturity.

There are recommendations for using color therapy in everyday life:

1. Try to choose clothes of a certain color. If, after the morning awakening, a person feels tired and he is in a bad mood and depressed, it is better to choose clothes of joyful, light and warm colors.

2. If you are feeling an excess of energy or are too agitated or annoyed, wear a soothing green or cool blue suit.

3. The place where a person spends the most time during the day can be recommended to draw in stimulating tones. For example, hang a picture or put a small object, the color of which will allow you to recharge your batteries.

4. If person is in a bad mood, it is recommended to try a visualization technique. To do this, they offer an imaginary brush to paint the room in which he is at the moment, in a color that is pleasant to him and plunge into a state of relaxation.

## **THE EFFECT OF COMBINED ORAL CONTRACEPTIVES ON THE COURSE OF THE EPIDEMIC PROCESS IN VIRAL HEPATITIS**

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The combined oral contraceptive pill (COCP), often referred to as the birth control pill or colloquially as “the pill”, is a type of birth control that is designed to be taken orally by women. It includes a combination of an estrogen (usually ethinylestradiol) and a progestogen (specifically a progestin). When taken

correctly, it alters the menstrual cycle to eliminate ovulation and prevent pregnancy.

Today, viral hepatitis occupies one of the leading positions in its epidemiological and socio-economic importance, that is, in the damage to human health, material costs for the provision of medical care and labor losses. The purpose of the present study is to study of the features of the flow the epidemic process in viral hepatitis on the background of admission combined oral contraceptives.

Viral hepatitis is a group of etiologically heterogeneous anthroponotic diseases caused by hepatotropic viruses (A, B, C, D, E, G and probably others) having different mechanisms of infection and characterized by a predominant the defeat of the hepatobiliary system with the development of General toxic, dyspeptic and hepatolienal syndrome, dysfunction of liver and often jaundice.

According to the world organization almost 30% of the world's population is infected hepatitis B. The number of deaths from acute and chronic forms of this disease reaches 250 people annually. The spectrum of modern contraceptive methods includes various hormonal contraceptives (combined and progestogen drugs), intrauterine, surgical, barrier contraception, spermicides and natural methods of family planning. When choosing a method of contraception many criteria are taken into account: efficiency, safety for a specific patient, side effects, non-contraceptive effects, reversibility of the method, accessibility, cost and other criteria, including social and personal nature. With the aim of hormonal contraception, synthetic analogues of female sex hormones-estrogens and progesterone are used, whose structure is close to natural, and the activity is much higher. This allows you to get contraceptive effect when used in very low doses.

Against the background of taking combined oral contraceptives with a high degree of levels of internal and external generalizability, violations of bilirubin metabolism are noted in patients with VH according to the cholestatic variant of the pathological process. It was noted that the severity of cholestatic component of the course of viral hepatitis depends on the power combined oral contraceptive and to a lesser extent on the duration of the drug intake (significant excess of biochemical parameters when taking the medium and high-dose combined oral contraceptives). The severity of symptoms is most dependent on the activity of the drug used.



## ULCERATIVE COLITIS

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Ulcerative colitis is the type of inflammatory bowel disease. In ulcerative colitis, it is the large intestine (colon) that becomes inflamed and ulcerated, often producing bloodstained diarrhea.

The exact cause of these disorders is unknown, although stress-related, dietary, infectious, and genetic factors may all be important.

Establishing a proper diet and a less stressful lifestyle may help to alleviate these conditions. Bed rest during attacks is also advisable. However, these simple measures alone do not usually relieve or prevent attacks, and drug treatment is often necessary.

Three types of drug are used to treat inflammatory bowel disease: corticosteroids, immunosuppressants, and aminosalicylate anti-inflammatory drugs such as sulfasalazine. Nutritional supplements and antidiarrhoeal drugs may also be used. Surgery to remove damaged areas of the intestine may be needed in severe cases.

Drugs cannot cure inflammatory bowel disease, but treatment is needed, not only to control symptoms, but also to prevent complications, especially severe anaemia and perforation of the intestinal wall. Aminosalicylates are used to treat acute attacks of ulcerative colitis, and they may be continued as maintenance therapy. People who have severe bowel inflammation are usually prescribed a course of corticosteroids, particularly during a sudden flare-up.

Once the disease is under control, an immunosuppressant drug may be prescribed to prevent a relapse.

Taken to treat attacks, these drugs relieve symptoms within a few days, and general health improves gradually over a period of a few weeks. Aminosalicylates usually provide long-term relief from the symptoms of inflammatory bowel disease.

Treatment with an immunosuppressant drug may take several months before the condition improves; and regular blood tests to monitor possible drug side effects are often required.

Immunosuppressant and corticosteroid drugs can cause serious adverse effects and are only prescribed when potential benefits outweigh the risks involved.

The side effects of corticosteroids can be reduced by the use of budesonide in a topical preparation that releases the drug at the site of inflammation.

It is important to continue taking these drugs as instructed because stopping them abruptly may cause a sudden flare-up of the disorder. Doctors usually supervise a gradual reduction in dosage when such drugs are stopped, even when they are given as a short course for an attack. Antidiarrhoeal drugs should not be taken on a routine basis because they may mask signs of deterioration or cause sudden bowel dilation or rupture.

Antidiarrhoeal drugs are usually taken in the form of tablets, although mild ulcerative colitis in the last part of the large intestine may be treated with suppositories or an enema containing a corticosteroid or aminosalicylate.

## **DIE GESCHICHTE DER MEDIZIN IN DEUTSCHLAND (AM BEISPIEL VON BERLIN)**

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Einen Einblick in die Vergangenheit der Heilkunst bietet die Geschichte der Medizin. Die moderne wissenschaftliche Medizin basiert sich auf den Grundlagen der Heilkunst. Berlin vereint jahrhundertalte medizinische Tradition.

Aus der frühen Geschichte der Medizin in Berlin ist es nur wenig bekannt. Was eigentlich? Die Namen von Leibärzten, einigen karitativen Einrichtungen, wenige Daten von Seuchenzügen, die Errichtung der ersten Apotheke.

Johann Carl Wilhelm Moehsen hat in seiner „Geschichte der Wissenschaften in der Mark Brandenburg, insbesondere der Arzneiwissenschaft“, die im Jahre 1781 erschien, die Namen der Leibärzte getreulich überliefert. Er versuchte ein Bild von diesen Personen zu entwerfen. Aber kaum wissen wir mehr als die Namen dieser Ärzte und die wichtigsten Lebensdaten. Häufig waren die Ärzte nur zufällig durch ihre Leibarztfunktion mit Berlin verbunden. Im Ganzen repräsentierten sie die Berliner Medizin nicht.

Die Versorgung der Kranken war damals in Berlin nicht in den Händen von studierten Ärzten, sondern von Wundärzten. Sie wurden als „Geschworene“

städtisch bestellt. Darunter waren die Bader und Barbieren, Hebammen und die weisen Frauen.

Es ist bekannt, dass seit Beginn des 16. Jahrhunderts bildeten die Barbieri und Wundärzte in Berlin eine eigene Innung. Sie waren berechtigt die Chirurgie zu betreiben.

Es entsteht eine Frage: Welche medizinische Einrichtungen existierten in jener Zeit? Seit dem 13. Jahrhundert gaben es in Berlin das Heilig-Geist-Hospital und das Georgen-Hospital. Seit dem Anfang des 15. Jahrhunderts war noch das Gertrauden-Hospital.

Aber es handelte sich dabei nicht um Krankenhäuser. Diese Einrichtungen stellten Asyle für Männer und Frauen, denen die Unterkunft in der Familie fehlte. Diese Leute waren alt und arm, vielleicht auch krank. Ärztliche Hilfe wurde ihnen jedoch dort nur am Rande zuteil. Die angestellten Ärzte gab es in diesen Einrichtungen nicht. Ob diese genannten Hospitäler auch als Aufnahmeorte für Lepröse, für Aussätziges dienten, kann man mit Sicherheit nicht sagen. Es gibt nur eine einzige Urkunde, die darauf hinweist, dass das Georgen-Hospital auch „Gutleutehaus“ war.

Hier treffen wir einen neuen Begriff „Gute Leute“. Was versteht man unter diesem Begriff? Der Begriff „Gute Leute“ ist die euphemistische Umschreibung für die Aussätziges im späten Mittelalters, die durch scharfe Auflagen aus der bürgerlichen Gesellschaft ausgeschlossen wurden.

Ludwig Formey schrieb in 1796 einen „Versuch einer medizinischen Topographie von Berlin“. Er erzählte in seinem Werk über die Seuchengeschichte in Berlin. In früheren Zeiten verwüsteten mehrere tödliche Epidemien die Stadt Berlin. Die Pest soll dort selbst sehr oft geherrscht haben. In diesem Werk trifft man den Begriff „die Pest“. Die Pest war in dieser Zeit Vorfahren sehr unbestimmt gewesen. So kann man mit Gewissheit nicht sagen, welche Seuche damals war.

Im Jahre 1488 wurde in Berlin die erste Apotheke eröffnet. Hans Zehender erhielt vom Magistrat ein erbliches Privilegium zur Eröffnung und zum Betrieb dieser Apotheke.

Aus der Frühzeit ist der Name von Matthäus Fleck (1524—1592) bekannt. Er hatte in Leipzig studiert und promoviert. Seit 1552 hat er in Berlin praktiziert und war Stadtphysikus geworden. Matthäus Fleck hat sich nicht nur als Autor von gelehrten und praxisbezogenen Büchern hervorgetan, so durch seine Abhandlung über die Seele, durch die Ausarbeitung einer Apothekertaxe und durch eine Pestschrift, die den Schwerpunkt auf die Prophylaxe legte, die Quarantäne und andere Schutzmaßnahmen empfahl, sondern auch als anerkannter Praktiker.

So ist ein kurzer Blick auf die Geschichte der Medizin in Berlin.

## THE ISSUES OF OBESITY

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According to estimates of the World Health Organization more than a billion people all over the world are overweight. The problem of obesity is relevant even for countries in which most of the population is constantly hungry, and in industrialized countries it became a serious aspect of public health.

The aim of researching work was to study the mechanisms of obesity as physical and psychological problem and measures connected with its prevention.

To achieve the stated goal, the following tasks were set: to analyze the causes of obesity and to identify the role of educational work among the population.

Everywhere there is an increase in obesity in children and teenagers. Obesity is not only a physician problem as well as psychological.

It is believed, that a full person is a victim of his appetite and sedentary lifestyle, which means that the treatment is his own choice. As a rule, people communicate with obese people with disdain and irony, which can cause them psychological trauma. Children and teenagers are particularly affected. Ironical statements of peers and adults have a negative effect on a person's self-esteem, leading to the formation of complexes.

Educational work of preventive medicine staff among the population is of great importance. The most effective and simple way for a healthy life is the disease prevention. That is why the following information should be known and available for the whole population.

First of all, it is a *balanced diet*. Proper balanced and healthy eating involves the implementation of simple and accessible rules.

You need to exclude carbohydrates that contribute to excess weight:

- bakery products and pasta (especially those made from high-grade flour);
- sweets such as cakes, sweets, cookies, and so on;
- juices from the store;
- sugar (a tablespoon is the maximum allowable rate per day);
- salt (if you cannot refuse it completely, then at least reduce its quantity in dishes);

- fish and meat in the form of smoked meats, canned and semi-finished products, chocolate bars and carbonated drinks.

It should be mentioned proper nutrition as a very important mechanism of the disease prevention.

- start your morning with a glass of clean water;
- take short breaks with a duration of no more than 3 hours between meals;
- you need to move after eating, do not lie;
- the last meal should be 3-4 hours before bedtime;
- at least one fourth of the ration should consist of plant foods (fruits and vegetables must be raw);
- fat should not be more than 20% of the daily diet (emphasis should be placed on unsaturated fatty acids, which are contained in vegetable oils, nuts and red fish);
- for breakfast and for lunch you should eat carbohydrate foods to saturate the body with enough energy;
- evening meal should include only proteins (boiled, baked);
- drink 1.5-2 liters of pure water per day.

It can be concluded that in order to lead a healthy lifestyle it is necessary to change the mentality and educational activities of medical workers among the young population is very important for obesity prevention. One of the main points to be singled out is to eliminate the deficit of knowledge among the population, and the priority areas are weight control, avoiding bad habits, and increasing physical activity.

## **DIE GYNÄKOLOGIE: VON FRÜHER BIS HEUTE**

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In diesem Vortrag sehen wir die Anfänge der Gynäkologie an und betrachten die moderne Stellung dieser medizinischen Teildisziplin.

Die Geschichte der Gynäkologie kann bis in die Mitte des 19. Jahrhunderts zurückverfolgt werden. Ursprünglich war die Gynäkologie ein Zweig der Chirurgie. Die Gynäkologie nennt man auch auf Deutsch die Frauenheilkunde.

Als Begründer der Frauenheilkunde gilt Ignaz Semmelweis. Er deckte die Zusammenhänge zwischen Desinfektion oder Keimreduzierung und Kindbettfieber bei Müttern kurz nach der Geburt auf.

Im Jahre 1878 führte der Frauenarzt W. A. Freund die erste operative Entfernung einer Gebärmutter durch. Seit 1925 konnte man ein Muttermund im Rahmen einer Kolposkopie mit dem Mikroskop begutachten. Weitere Fortschritte in der Gynäkologie sind die Analyse von Östrogenen und die künstliche Erzeugung des Gelbkörperhormons Progesteron. Im Jahre 1961 stellte die Pharmaindustrie die Verhütungspille für die Frau her. Die Weiterentwicklung der chirurgischen Techniken, die künstliche Befruchtung und minimal invasive Methoden der Schlüssellochchirurgie modernisierten die Gynäkologie. Große Fortschritte gaben es in den Bereichen künstliche Befruchtung, Krebsbehandlung und Organerhaltung.

Die Gynäkologie befasst sich mit der Prävention, Erkennung und Behandlung von Erkrankungen des weiblichen Sexual- und Fortpflanzungstraktes, von geschlechtsspezifischen Hormonstörungen und -veränderungen sowie von manchen urologischen Erkrankungen. Die Frauenheilkunde ist eng mit der Geburtshilfe, verknüpft. Die Betreuung von Schwangeren und die Sterilitätsbehandlung gehören zum Leistungsspektrum von Gynäkologie-Spezialisten und gynäkologischen Kliniken.

Die Fachleute, die im Bereich Gynäkologie beschäftigt sind, bezeichnet man als Facharzt für Frauenheilkunde und die Geburtshilfe (Gynäkologen oder Frauenärzte).

Um in der Gynäkologie zu arbeiten, sollen die angehenden Gynäkologen eine entsprechende Weiterbildung über mindestens 5 Jahre absolviert haben.

Jetzt gehen wir zum Berufsfeld der Frauenärzte über. Dazu gehören:

- konservative und operative Behandlung von Erkrankungen der weiblichen Geschlechtsorgane sowie der Brust;
- die Früherkennung von gynäkologischen Tumoren (z.B. Brustkrebs), die Indikationsstellung zur Strahlenbehandlung und die Nachsorge der Frau mit gynäkologischen Tumorerkrankungen;
- die Feststellung einer Schwangerschaft, die Mutterschaftsvorsorge, die Erkennung und die Behandlung von mit der Schwangerschaft assoziierten Erkrankungen, die Risikoschwangerschaften, die Geburtsbetreuung und die Wochenbettbetreuung;
- die Erkennung und Behandlung der Harninkontinenz sowie der Analinkontinenz nach der Geburt, Anleitung zum Beckenbodentraining;
- die Indikationsstellung zu plastisch-operativen und rekonstruktiven Eingriffen im Genitalbereich und der Brust der Frau;
- die Erkennung und Behandlung des prämenstruellen Syndroms sowie Störungen des weiblichen Zyklus und der Ovarien einschließlich der Basisbehandlung der weiblichen Sterilität;
- die Familienplanung und Kontrazeption sowie Sexualberatung der Frau und des Paares;

- die Beratung bei Schwangerschaftskonflikten sowie Indikationsstellung zum Abbruch einer Schwangerschaft;
- die Prävention und Therapie der Osteoporose.

Die Gynäkologen können sich auch zum Facharzt für Frauenheilkunde und Geburtshilfe weiter spezialisieren.

Zum Schluss betrachten wir die Schwerpunkte der Teilbereiche der Gynäkologie.

Gynäkologische Endokrinologie und Reproduktionsmedizin beschäftigt sich mit der Erkennung und Behandlung hormoneller (d.h. endokriner und neuroendokriner) und fertilitätsbezogener Störungen sowie von Fehlbildungen des inneren Genitale in den diversen Entwicklungsphasen der Frau.

Gynäkologische Onkologie hat mit der Erkennung und Behandlung von bösartigen Erkrankungen der weiblichen Genitale und der Brust zu tun: Gebärmutterhalskrebs, Gebärmutterkrebs, Gebärmutterosenkung, Myom Eierstock- und Eileitererkrankungen wie z.B. Ovarialkarzinom, polyzystisches Ovarialsyndrom (PCOS), Ovarialzyste u.a.

Spezielle Geburtshilfe und Perinatalmedizin hat das Ziel die Erkennung und Behandlung mütterlicher und fetaler Erkrankungen, invasiven und operativen Maßnahmen sowie Erstversorgung von gefährdeten Neugeborenen.

## **IMPFUNGEN GEGEN VIELE INFEKTIONSKRANKHEITEN**

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Impfungen schützen eine Person vor bestimmten Infektionskrankheiten. Aber nicht nur für den Einzelnen, auch für die Allgemeinheit sind Impfungen wichtig: Je mehr Menschen sich gegen eine Erkrankung impfen lassen, desto höher ist die Wahrscheinlichkeit, dass man einzelne Krankheitserreger regional eindämmen und schließlich auch weltweit ausrotten können.

Sobald ausreichend viele Menschen geimpft sind, reißt eine Infektionskette ab und die Krankheit kann sich nicht weiter ausbreiten. Überträgt sich eine Infektionskrankheit nur zwischen Menschen, kann sie durch Impfungen sogar nahezu ausgerottet werden, wie das bei den Pocken bereits der Fall ist.

Mehr als jeder dritte Mensch hat sich bereits einmal mit dem Hepatitis-B-Virus infiziert. Durch ausreichend Impfungen wäre es jedoch möglich, das Virus auszulöschen. Dasselbe gilt für Erkrankungen wie Masern und Kinderlähmung (Polio).

Impfungen sind in Deutschland keine Pflicht mehr, wie dies früher zum Beispiel bei der Pockenschutzimpfung der Fall war. Jedoch geben die obersten Gesundheitsbehörden der Bundesländer Impfempfehlungen heraus. Nimmt eine Person nachweislich durch Impfungen Schaden, muss der Staat dementsprechend dafür haften.

Eine entscheidende Rolle bei den Impfempfehlungen hat die Ständige Impfkommission (STIKO) am Robert Koch-Institut (RKI) in Berlin inne. Sie überarbeitet die Impfempfehlungen regelmäßig und veröffentlicht sie. Alle Bundesländer stützen sich bei ihren Empfehlungen darauf. So kann man der Bevölkerung den bestmöglichen Schutz vor Infektionskrankheiten wie etwa Masern, Keuchhusten oder Grippe (Influenza) bieten.

Standardimpfungen sind Impfungen, die jeder durchführen lassen sollte – denn vor bestimmten Infektionskrankheiten sollten Sie sich permanent schützen.

Viele der Standardimpfungen verhindern sogenannte Kinderkrankheiten wie Masern, Mumps oder Keuchhusten (Pertussis). Trotz des harmlosen Begriffs „Kinderkrankheiten“ stellen gerade diese Beschwerdebilder zum Teil recht aggressive Infektionskrankheiten dar, die manchmal zu erheblichen und bleibenden Schäden führen.

Umso wichtiger ist es, sich an die empfohlenen Standardimpfungen zu halten und den Impfschutz rechtzeitig aufzufrischen.

Die Weltgesundheitsorganisation (WHO) hat es sich zum Ziel gesetzt, durch weltweite Impfprogramme bestimmte Infektionskrankheiten auszurotten oder stark zu reduzieren. Die Standardimpfungen sollen dabei helfen, dieses Ziel zu erfüllen.

Es wird empfohlen, Standardimpfungen gegen folgende Erkrankungen beziehungsweise Erreger durchführen zu lassen:

- Diphtherie
- Tetanus
- Rotavirus
- Keuchhusten
- Masern
- Mumps
- Röteln
- Windpocken (Varizellen)
- Haemophilus influenzae Typ b (Erreger von Hirnhautentzündung und Kehlkopfentzündung)
- Hepatitis B
- Kinderlähmung (Poliomyelitis)
- Pneumokokken (Erreger von Lungenentzündung (Pneumonie))
- Meningokokken C (Erreger von Hirnhautentzündung (Meningitis))



Darüber hinaus sollten Frauen vor dem ersten Sexualkontakt (in der Regel Mädchen zwischen 9 und 14 Jahren) gegen das Humane Papillom-Virus geimpft werden, um sich vor Gebärmutterhalskrebs zu schützen. Diese Standardimpfung ist auch bei bereits aktiven Frauen zu empfehlen, jedoch sinkt der Impfschutz mit steigender Partneranzahl.

Welche Standardimpfungen in welchem Alter vorgenommen werden sollten beziehungsweise wie oft eine Impfung aufgefrischt werden sollte, empfiehlt die Ständige Impfkommission (STIKO) am Robert Koch-Institut.

Standardimpfungen gelten grundsätzlich immer für alle Personen. Die Impfung von Babys, Kleinkindern und Kindern wird sogar dringend angeraten. Aber auch Erwachsene sollten laut Impfempfehlung den im Kindesalter erworbenen Impfschutz regelmäßig auffrischen.

Infektionskrankheiten sind auf dem Vormarsch. Zum einen führt die erhöhte Mobilität durch Reisen auch außerhalb Europas, aber auch die verbreitete Impfmüdigkeit bei Erwachsenen führen dazu, dass sich Erreger schneller und weiter verbreiten können. Zum anderen lassen zu wenig Erwachsene ihre Impfungen auffrischen (sog. Impfmüdigkeit).

Ebenfalls von Bedeutung: Wer einer Impfempfehlung folgen möchte, muss sich an die entsprechenden Impfdosen halten – ansonsten kann die Impfung nicht richtig wirken. Nur wenn die vom Hersteller definierte Zahl der Einzeldosen verabreicht wurde, kann der Impfschutz vollständig greifen.

Für bestimmte Personengruppen gelten zusätzliche Empfehlungen. Hierzu zählen insbesondere:

(Geschäfts-)Reisende: Personen, die oft im Ausland unterwegs sind, sollten sich je nach Reiseland zusätzlich zu den Standardimpfungen gegen bestimmte Erreger impfen lassen.

Berufstätige mit erhöhter Infektionsgefahr: Bestimmte Berufsgruppen aus dem Pflegebereich, in der Lebensmittelverarbeitung, Ärzte oder Personen, die möglicherweise in Kontakt mit infektiösem Material kommen, sollten sich an die Impfempfehlungen halten und sich zum Beispiel gegen Grippe (Influenza) sowie Hepatitis A und B impfen lassen.

Wer sich an die Impfempfehlung hält, ist gut gegen viele Infektionskrankheiten geschützt!

## **PROBLEME MIT DEM BRUSTKREBS (MAMMAKARZINOM)**

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*Brustkrebs* (auch *Mammakarzinom* genannt) ist ein bösartiger Tumor der Brustdrüse, der meist bei Frauen, in seltenen Fällen aber auch bei Männern auftreten kann.

Brustkrebs ist in Deutschland die häufigste Krebserkrankung der Frau: Rund 70.000 Frauen erkranken in Deutschland pro Jahr daran. Auch Männer können betroffen sein – dies kommt allerdings sehr selten vor. Nur etwa eine von 100 an Brustkrebs erkrankten Personen ist ein Mann.

Bei Brustkrebs sind die genauen Ursachen bislang nicht vollständig geklärt. Die überwiegende Mehrheit der Betroffenen erkrankt spontan, also ohne dass Mediziner sichere Ursachen ausmachen können. Jedoch sind mittlerweile verschiedene Risikofaktoren bekannt, die die Krankheit begünstigen können.

Zu den Risikofaktoren für Brustkrebs zählen:

- fortgeschrittenes Alter;
- langfristige Einnahme weiblicher Sexualhormone;
- Einsetzen der Regelblutung in sehr jungem Alter und spätes Einsetzen der Wechseljahre;
- regelmäßiger Konsum von größeren Mengen Alkohol;
- fortgeschrittene Mastopathie (also eine zunächst gutartige Vermehrung der Drüsenläppchen und des Bindegewebes der Brustdrüsen);
- Kinderlosigkeit bzw. eine späte erste Schwangerschaft (nach dem 30. Lebensjahr);
- erbliche Einflüsse.

Bei 25 Prozent aller Frauen mit Brustkrebs (also bei etwa jeder vierten Betroffenen) finden sich mehrere Fälle eines Mammakarzinoms in der Familie, etwa bei der Mutter oder Schwester. Hier scheinen genetische Ursachen eine Rolle zu spielen.

BRCA-1 und BRCA-2 erhöhen das Risiko. Nachweislich stehen die beiden „Tumorgene“ BRCA-1 und BRCA-2 mit Brustkrebs in Verbindung. BRCA steht dabei für Breast Cancer (engl. für Brustkrebs). Statistisch gesehen entwickelt sich bei etwa 50 bis 80 Prozent der Frauen, bei denen die Tumorgene BRCA-1 oder

BRCA-2 eine Erbgutveränderung (Mutation) aufweisen, vor dem 70. Lebensjahr ein Mammakarzinom – meist im Alter von 40 Jahren. Das Risiko für Brustkrebs steigt bei den betroffenen Frauen etwa um das 10-Fache.

Die veränderten BRCA-Gene erhöhen zudem das Risiko für andere Krebserkrankungen wie Eierstockkrebs (Ovarialkarzinom). Bei Männern steigt durch ein mutiertes BRCA-Gen die Wahrscheinlichkeit für Brustkrebs ebenfalls, wenn auch nicht im gleichen Ausmaß wie bei Frauen.

Frauen, die zu dieser Risikogruppe zählen, haben ab dem 25. Lebensjahr Anspruch auf eine halbjährliche Früherkennungsuntersuchung beim Frauenarzt und ab dem 30. Lebensjahr auf eine Mammographie in ein- bis zweijährlichen Abständen.

Eine spezielle Therapie für Träger derartiger Mutationen gibt es derzeit jedoch nicht. Eine mögliche Behandlung in solchen Fällen besteht zum Beispiel darin, das Brustgewebe auch ohne einen bestehenden Tumor in einer Operation zu entfernen und die Brüste zum Beispiel mit einem Implantat wiederaufzubauen.

Zu den Früherkennungsmaßnahmen von Brustkrebs zählt auch die Selbstuntersuchung der Brust. Idealerweise sollten Frauen ihre Brüste einmal im Monat selbst untersuchen und auch die Haut von Brust und Achselhöhle genau anschauen und abtasten. Auffälligkeiten sollte man von einem Arzt abklären lassen, wie zum Beispiel:

- Verhärtungen,
- Knoten,
- nicht heilende Wunden,
- Einziehungen der Haut,
- Anschwellung der Lymphknoten oder
- aus der Brustdrüse austretende Flüssigkeit.

Einer Brustkrebs-Erkrankung lässt sich nur bedingt vorbeugen, indem man bestimmte Risikofaktoren meidet. Übermäßiger Alkoholgenuss zum Beispiel kann begünstigen, dass ein Mammakarzinom entsteht. Nach den Wechseljahren steigern Übergewicht und mangelnde Bewegung das Risiko für Brustkrebs.

Wer Hormone einnimmt, um Wechseljahresbeschwerden zu lindern, sollte das so kurz wie möglich tun. Betroffene Frauen halten hierzu am besten mit dem behandelnden Arzt Rücksprache, um gemeinsam Vor- und Nachteile einer Hormontherapie abzuwägen.

## CHILDREN`S COMPUTER ADDICTION

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This problem is very important in nowadays, because compulsive gaming, mood swings, social isolation, health problems are all according to video game addiction. Our primary goal is to explain the causes of this addiction and identify ways to prevent.

Video game addiction (VGA) has been suggested by some in the medical community as a distinct behavioral addiction characterized by excessive or compulsive use of computer games or video games that interferes with a person's everyday life.

In May 2013, the American Psychiatric Association (APA) declined to include video game addiction in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders. Gaming disorder is a diagnosis characterized by the uncontrollable and persistent playing of video and computer games. Many mental health professionals believe these games can cause a distinct type of addiction by triggering reward-motivated behavior, which releases dopamine and triggers the reward centers of the brain. Such disorders can be diagnosed when an individual engages in gaming activities at the cost of fulfilling daily responsibilities or pursuing other interests, and without regard for the negative consequences. For gaming disorder to be diagnosed, the behavior pattern must be of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning and would normally have been evident for at least 12 months.

The world that a computer creates, we call virtual reality. This universe is very bright and enticing. It is an alternative source of pleasant emotions for children. The Internet environment also serves as a means of self-protection against bad mood, pain and misunderstanding. According to psychological studies, there are 4 main reasons: economic; social; biological; individual. A child, who has the lack of communication, the lack of the emotional relations in family will have a tendency to computer addiction. If a parents do not find for the child time necessary for daily participation in the child's life. If a parents do not ask about what really concerns and disturbs their child. Also we can say, that a child who has

an absence of serious hobbies, interests, extracurricular activities. A child's inability to interact with people around, absence of friends.

The development of unhealthy enthusiasm for computer games greatly increases the chances of the appearance of extra pounds, sleep problems and disruption of the heart and blood vessels, say scientists who have published an article in the journal "Plos One". This addiction can be the reason of deep asocialization, such as manic depression and etc.

The modern psychologists believe that a computer addiction in children can be prevented. These are the main ways to overcome this phenomenon

1. Process includes the cooperation of the teacher, parents and children
2. Parents should present a computer to their child, explaining its risks, and to avoid drastic bans on use of the computer
3. To install the system of encouragement and sanctions for child
4. To create the attractive and interesting environment for the child in real life

## **HEALTH BENEFITS OF WALKING**

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Set of scientific studies prove that walking really brings benefit. The analysis of several researches found out that the simple act of walking reduces the risk of cardiovascular disease by 31% and the risk of death by 32%. Walks strengthen bones, improve balance, regulate arterial blood pressure, reduce cholesterol level, tone up muscles and improve sleep.

Walks are necessary for achievement of moderate level of physical activity. Each your step causes energy release, increase in hormones and good health thanks to effect of chemicals in a brain.

At the same time, more blood and oxygen is pumped to the muscles. When you walk, you start to burn 5 calories per minute, and these calories proceed to be burned till one o'clock after walk, even when you have a rest. The number of the burned calories depends on the weight of the person. When the weight is bigger, more calories are burned per kilometer.

Walks can extend our life expectancy. According to data of the American cardiological association, each hour of a cheerful walk adds two hours to our life expectancy. According to a study published in 2015, 30 minutes walking gives every day a multifaceted effect of raising of mood, increases energy, reduces stress and increases self- assessment. Besides, daily walks have double function of alleviating bad mood and prevent the return of depression symptoms.

Walks help to increase the flow of oxygen to the lungs, thereby contributing to an increase in their volume and improving the endurance of the body as a whole. In addition, this exercise helps to reduce the concentration of toxins in the blood. With this breathing exercise, you can fight the negative demonstrations of some lung diseases.

The scientific justification for the use of accelerated walking therapy to improve the gastrointestinal tract is the stimulation of blood filling of the digestive system with low-intensity work. During an easy walk the secretion of gastric juice increases. And heavy physical activity, such as fast running, on the contrary, has the opposite effect. This is due to the process of redistribution of blood – during a fast run, the narrowing of the vessels of the gastrointestinal tract is observed, and accordingly the flow of blood to its departments decreases.

Studies in recent years have shown that leisurely walking is much more beneficial than running for patients with diabetes. During the experiments, it was found that if a patient with diabetes mellitus devotes half an hour to walking every day for 6 months, then his glucose tolerance increases by 6 times.

At first glance, it may seem that the visual organ does not have a close anatomical connection with the legs, but scientists have proven that walking has a positive effect on the condition of the eyes. First, regular walking helps to reduce the manifestations of glaucoma. Secondly, deep and rhythmic breathing helps to relax, thereby removing visual fatigue.

With age, the bones lose elasticity, which makes them more fragile. But if you devote to walking half an hour every day, then you can strengthen the bone tissue. Hiking can prevent the hardening of your bones, thereby reducing the likelihood of osteoporosis development and the integrity of the bones. Systematic walking is also a prevention of inflammatory diseases of the joints and the occurrence of dystrophic changes in them.

If you want to increase your mental abilities, then walking every day can accomplish this feat. It is better than strength training and the weight lifting, walking increases the size of the part of the brain which affects memory and learning. It improves brain structure and functioning, strengthens the connection between neural networks that affect planning, strategy development and multitasking.

In addition to willpower and a pair of good sneakers, walking every day will not cost you a lot of things and money. There is no need to buy special equipment or gym membership. Actually, getting into a few minutes of a routine walk, you will even save money on expensive prescriptions and visits to the doctor.

## KINDER UND MEDIKAMENTE

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Kinder nehmen oft Medikamente, die sind nicht für sie gemacht, sondern für Erwachsenen. Wenn ein Kind krank ist, ist es meistens erforderlich, dass es bestimmte Arzneimittel einnimmt. Das ist nicht leicht. Besonders ist es ein Problem bei kleinen Kindern, weil das Verabreichen von Medikamenten zur Geduldsprobe wird. Die Kinder spucken das eingenommene Präparat einfach wieder aus oder erbrechen es. Oder sie machen das Präparat gar nicht in den Mund auf. Deshalb müssen die Kinderärzte bei vielen Medikamenten Tricks machen, um den Kindern zu behelfen.

Man muss verstehen, grundsätzlich sollte man kleinen Kindern keine Medikamente verabreichen, die nicht vom Kinderarzt verordnet wurde. In erster Linie muss man vom Kinderarzt beraten lassen, der Tipps gibt, wie man das Medikament kinderrecht verabreicht.

Manchmal genügt die Umstellung von einem Präparat zum anderen, das zahlreiche Wirkstoffe in Tabletten, Tropfen, Säften oder Zäpfchen enthalten.

Bei Babys ist es sehr schwer Medikamente einzunehmen. In diesem Fall kann man das Baby zur Medikamentengabe in eine Decke wickeln und sanft festhalten. Das Baby soll si gehalten werden, als ob man es füttern wird. Auf keinem Fall auf den Rücken liegen lassen!

Bei Säuglingen und Kleinkindern werden die Säfte und Tropfen sehr leicht mit einer Einmalspritze ohne Nadel aufziehen und in den Mund träufeln. In der Regel lassen sich Tropfen oder Zäpfchen leichter einnehmen als Tablette, die Probleme beim Herunterschlucken bereiten können. Eine gute Alternative dazu ist Medikamentensauger. Der wird in der Apotheke erhältlich.

Wenn man die Methode benutzt, dem Kind die Medizin ins Essen zu mischen, um den unangenehmen Geschmack gut zu überdecken, muss man an die Wechselwirkungen denken. Aber diese Vorgehensweise hat auch Nachteile.

Bestimmte Medikamente sollen besser nicht mit Nahrungsmitteln zusammen eingenommen werden. Sinnvoll wäre es dem Kind einen Löffel Brei, Quark oder einen Schluck vom Lieblingsgetränk zu geben, um den Geschmack von den Medikamenten herunterzuspielen.

Aber man muss sehr vorsichtig sein! Zum Beispiel, man darf nicht mit Antibiotika Milch oder Milchprodukte einnehmen. Die Wirkung der Medikamente kann negativ beeinflussen. Besser sind dagegen Säfte oder Tees. Man muss auch den Kinderarzt befragen, welche Medikamente mit Lebensmitteln vermischen werden dürfen.

Grundsätzlich sollen die Eltern das Kind beim Einnehmen der Arznei beachten, damit es nicht verschluckt.

Wenn man dem Kind Nasen- oder Ohrentropfen gibt, muss man diese vorher in einem Wasserbad gewärmt werden. So empfindet sie das Kind als weniger unangenehm.

Auch Zäpfchen gleiten besser, wenn man sie mit der Hand vorwärmt und mit etwas Wasser anfeuchtet. Dazu kann man auch ein wenig Vaseline verwenden. Flüssige Medikamente verabreicht man am besten mit einem Löffel oder einer Pipette.

Beim Verabreichen des Arzneimittels sollte man immer ruhig auf das Kind einwirken. Ist es schon etwas älter, kann man ihm erklären, wozu die Einnahme des Mittels nötig ist. Manchmal hilft auch eine kleine Belohnung, um das Kind für die Einnahme zu motivieren. Auf keinen Fall darf man das Medikament mit Gewalt einflößen.

Seit dem Jahre 2007 gibt es EU-Verordnung für kinderrechte Medikamente. Laut dieser Verordnung sollen alle neuen Präparate auch an Minderjährigen getestet werden.

## **ALLERGIC DISEASES IN CHILDREN**

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Allergies are abnormal immune system reactions to things that are typically harmless to most people. When a person is allergic to something, the immune system mistakenly believes that this substance is harming the body. An allergy happens when the immune system overreacts to an allergen, treating it as an invader and trying to fight it off.

**Common allergy triggers in children are:**



Outdoors: tree pollen, plant pollen, insect bites or stings.

Indoors: pet or animal hair or fur, dust mites, mold

Irritants: cigarette smoke, perfume, car exhaust

Foods: peanuts, eggs, milk and milk products

Allergy symptoms in children are: skin rashes or hives (atopic dermatitis or eczema), difficulty breathing (asthma), sneezing, coughing, a runny nose or itchy eyes, stomach upset. This causes symptoms that can range from annoying to serious or even life threatening. In an attempt to protect the body, the immune system makes antibodies called immunoglobulin E (IgE). These antibodies then cause certain cells to release chemicals (including histamine) into the bloodstream to defend against the allergen "invader." It's the release of these chemicals that causes allergic reactions. Childhood atopic disease includes atopic dermatitis, allergic rhinitis, asthma, and food allergy.

**Atopic dermatitis**, also called eczema, is a chronic, relapsing inflammatory disease of the skin that leads to itching and risks for skin infection. It is the most common skin disease in children: about 10% to 20% of children in the United States and Western Europe have atopic dermatitis. Skin treatment typically includes moisturizers and anti-inflammatory treatments such as steroid creams.

**Allergic rhinitis** is caused by allergic inflammation in the nose and throat after being exposed to an allergen. Symptoms include runny nose (rhinorrhea), stuffy nose (nasal congestion), itching, and sneezing. Itchy or watery eyes can also be symptoms. For some patients, the symptoms are seasonal; for others, the symptoms are year round. Treatment often consists of trying to reduce exposure to the allergen and using medicines such as nasal steroids, oral antihistamines, or decongestants.

**Asthma** is a disorder that includes airway obstruction that is reversible, lungs that are much more sensitive to allergens and irritants, and chronic airway inflammation. Symptoms include wheezing and difficulty breathing. Treatment often includes medicines that are inhaled as well as taken by mouth to open the airways and reduce inflammation.

**Food allergies** are common in children. The most common are nut and egg allergies. Some food allergies commonly resolve in later childhood, and others do not. Treatment involves being prepared in case of accidental exposure and avoiding that food.

Estimations based on the data from epidemiological surveys conducted in areas in Russia have ascertained that allergic diseases affect from 40% of children population of Russia. Bronchial asthma, pollinosis, drug-induced allergy are most frequently occurring allergic diseases. The highest incidence of allergic diseases was registered in the regions where large industrial complexes are located.

## STRESS: THE CAUSES AND TREATMENT

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Stress is the response of an organism to negative emotions or negative events. Very often a person faces them. The cause of stress and a way of fight against it are two important aspects. Under the influence of a stressful state, a person feels tired, irritable, uneasy and is in constant tension. But it is impossible to stay in a stressful state all the time. After excitement all functions begin to slow down that results in apathy and a depression.

The situations and pressures that causes stress are known as stressors. We usually think of stressors as being negative, such as an exhausting work schedule or a rocky relationship. However, anything that puts high demands on you can be stressful. This includes positive events such as getting married, buying a house, going to college, or receiving a promotion.

Of course, not all stress is caused by external factors. Stress can also be internal or self-generated, when you worry excessively about something that may or may not happen, or have irrational, pessimistic thoughts about life.

Finally, what causes stress depends, at least in part, on your perception of it. Something that's stressful to you may not faze someone else; they may even enjoy it. While some of us are terrified of getting up in front of people to perform or speak, for example, others live for the spotlight. Where one person thrives under pressure and performs best in the face of a tight deadline, another will shut down when work demands escalate. And while you may enjoy helping to care for your elderly parents, your siblings may find the demands of caretaking overwhelming and stressful. Modern medicine claims that stress is the main reason of all diseases. It is extremely unhealthy, permanent staying under stress can cause such serious diseases as cancer, hypertension and various cardiovascular diseases.

There are five types of stressful tension: emotional, psychological, physiological, administrative and informational stresses.

The reasons of stressful tension predetermine the situations provoking a stress. Such situations are called stress factors. There are two groups of stress-provoking factors. Personal factor: death or illness of a close family member, divorce or marriage, change of type of activity. Organizational factor: high

demands for you, absolutely uninteresting and very boring work, an increase in the volume of work.

But it is necessary to get rid of a stress as it is extremely unhealthy. The reason causing a stress cannot be eliminated, you should try to remove stress and relieve your condition.

There are several quick and effective ways to deal with stress. These include: switching attention, physical activity, respiratory gymnastics, herbal collecting, relaxation, relaxing baths, tears, adherence to sleep and nutrition.

All experts agree that it is much easier to prevent uncontrolled stress than to cope with its consequences. Therefore, it is very important to determine the stress state in the early stages and take measures for its prevention.

## **THE APPLICATION OF GENE THERAPY TO RESTORE NERVES AFTER INJURY**

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Acupuncture is a direction in traditional Chinese medicine in which effects on the body are carried out with special needles through special points on the body by introducing them into these points and manipulating them. It is believed that these points are located on the meridians, which allegedly circulate chi (“vital energy”). The method is used for pain relief or for medicinal purposes.

For more than 4,000 years people in Asia have used acupuncture to treat illnesses. It is an old Chinese form of healing in which your skin is pierced with thin needles to relieve pain. Today acupuncture is also very popular in Europe, America and Australia.

The theories of acupuncture and moxibustion hold that the human body acts as a small universe connected by channels, and that by physically stimulating these channels the practitioner can promote the human body’s self-regulating functions and bring health to the patient. This stimulation involves the burning of moxa (mugwort) or the insertion of needles into points on these channels, with the aim to restore the body’s balance and prevent and treat disease. In acupuncture, needles

are selected according to the individual condition and used to puncture and stimulate the chosen points. Moxibustion is usually divided into direct and indirect moxibustion, in which either moxa cones are placed directly on points or moxa sticks are held and kept at some distance from the body surface to warm the chosen area. Moxa cones and sticks are made of dried mugwort leaves.

Acupuncture can control pain and sickness. It can also be used if you have a headache or back pain. Some doctors use acupuncture along with regular treatments for asthma, high blood pressure or stress. Doctors have even used acupuncture to stop pain during an operation. Some people think that acupuncture can treat depression and even help people to stop smoking. Many patients feel more energy after a treatment, while others may feel more relaxed.

How acupuncture may relieve pain is unclear. One theory suggests that pain impulses are blocked from reaching the spinal cord or brain at various “gates” to these areas. Another theory suggests that acupuncture stimulates the body to produce narcotic-like substances called endorphins, which reduce pain. Other theories suggest that the placebo effect, external suggestion (hypnosis), and cultural conditioning are important factors.

Scientists from Russia and Taiwan have proposed a method of gene therapy, which restores the nerves after injury. Nerve tissue regeneration is helped by a gene that normally works in liver cells. The technique has already been tested on mice, and soon it will be possible to begin clinical trials if the drug proves its safety.

Approximately every fifth fracture is accompanied by damage to the peripheral (that is, not related to the brain and spinal cord) nerves. Sometimes this happens due to other limb injuries or during surgeries. Peripheral nerve damage can make a patient disabled by depriving him of limb control.

A damaged peripheral nerve can regenerate, or recover. But often patients do not receive treatment on time, or this recovery is too slow. The authors of the new study proposed to solve this problem with the help of a gene that causes liver cells to grow. It is called the human hepatocyte growth factor (HGF). This gene was not chosen by chance: its ability to protect nerve cells from damage and force blood vessels to grow without causing inflammation has long been known.

For experiments, scientists used mice. They crushed the peripheral nerve in the same way as it happens with injuries or some operations. To deliver the liver cell gene to the nerves and make it work, the scientists embedded it in a plasmid - ring DNA molecules. In the cells of animals, where plasmids with the HGF gene were introduced, the corresponding protein began to be synthesized and accumulated. It performed his usual biological functions: stimulated the regeneration and growth of cells and vessels, suppressed cell death and reduced inflammation. Thanks to this, the damaged nerve was regenerated in mice, its electrophysiological indices and the function of the injured limb improved.

The authors of the research work believe that the results will soon allow to proceed to the first clinical trials in humans with various injuries of peripheral nerves. This will occur after preclinical evaluation of the safety of the drug.

## THE 2018 NOBEL PRIZE IN PHYSIOLOGY OF MEDICINE

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Cancer kills millions of people every year and is one of humanity's greatest health challenges. By stimulating the inherent ability of our immune system to attack tumor cells this year's Nobel Laureates have established an entirely new principle for cancer therapy. James P. Allison studied a known protein that functions as a brake on the immune system. He realized the potential of releasing the brake and thereby unleashing our immune cells to attack tumors. He then developed this concept into a brand new approach for treating patients. In parallel, Tasuku Honjo discovered a protein on immune cells and, after careful exploration of its function, eventually revealed that it also operates as a brake, but with a different mechanism of action.

The fundamental property of our immune system is the ability to discriminate "self" from "non-self" so that invading bacteria, viruses and other dangers can be attacked and eliminated. T cells, a type of white blood cell, are key players in this defense. T cells were shown to have receptors that bind to structures recognized as non-self and such interactions trigger the immune system to engage in defense. But additional proteins acting as T-cell accelerators are also required to trigger a full-blown immune response (see Figure). Many scientists contributed to this important basic research and identified other proteins that function as brakes on the T cells, inhibiting immune activation. This intricate balance between accelerators and brakes is essential for tight control. It ensures that the immune system is sufficiently engaged in attack against foreign microorganisms while avoiding the excessive activation that can lead to autoimmune destruction of healthy cells and tissues.

During the 1990s, James P. Allison studied the T-cell protein CTLA-4, that functions as a brake on T cells. He had already developed an antibody that could bind to CTLA-4 and block its function. He now set out to investigate if CTLA-4

blockade could disengage the T-cell brake and unleash the immune system to attack cancer cells. In experiment mice with cancer had been cured by treatment with the antibodies that inhibit the brake and unlock antitumor T-cell activity. Started in 2010, an important clinical study showed striking effects in patients with advanced melanoma, a type of skin cancer. In several patients signs of remaining cancer disappeared. Such remarkable results had never been seen before in this patient group.

In 1992, a few years before Allison's discovery, Tasuku Honjo discovered PD-1, another protein expressed on the surface of T-cells. The experiments showed that PD-1, similar to CTLA-4, functions as a T-cell brake, but operates by a different mechanism. This paved the way for utilizing PD-1 as a target in the treatment of patients. Clinical development ensued, and in 2012 a key study demonstrated clear efficacy in the treatment of patients with different types of cancer. Results were dramatic, leading to long-term remission and possible cure in several patients with metastatic cancer, a condition that had previously been considered essentially untreatable.

After the initial studies showing the effects of CTLA-4 and PD-1 blockade, the clinical development has been dramatic. We now know that the treatment, often referred to as "immune checkpoint therapy", has fundamentally changed the outcome for certain groups of patients with advanced cancer. Similar to other cancer therapies, adverse side effects are seen, which can be serious and even life threatening. They are caused by an overactive immune response leading to autoimmune reactions, but are usually manageable. Intense continuing research is focused on elucidating mechanisms of action, with the aim of improving therapies and reducing side effects.

Of the two treatment strategies, checkpoint therapy against PD-1 has proven more effective and positive results are being observed in several types of cancer, including lung cancer, renal cancer, lymphoma and melanoma. New clinical studies indicate that combination therapy, targeting both CTLA-4 and PD-1, can be even more effective, as demonstrated in patients with melanoma. Thus, Allison and Honjo have inspired efforts to combine different strategies to release the brakes on the immune system with the aim of eliminating tumor cells even more efficiently. For more than 100 years scientists attempted to engage the immune system in the fight against cancer. Until the seminal discoveries by the two laureates, progress into clinical development was modest. Checkpoint therapy has now revolutionized cancer treatment and has fundamentally changed the way we view how cancer can be managed.

## UNUSUAL PROFESSIONS OF MEDICINE

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Thanks to medicine, people have learned to treat their body and thus prolong life. Science has always helped doctors, offering them new technologies, tools, techniques. Despite this medicine is not always space technology and absolute sterility.

It turns out that many achievements are associated with representatives of completely unique and even strange professions. We will talk about the most unusual professions.

A podologist (podiatrist or chiropodist). These doctors are engaged in the feet. They pick up shoes so that you do not have problems with the deformation of the foot or, for example, with an ingrown nail because of not comfortable shoes.

An audiologist is an expert in hearing impairment. The tasks include the selection and installation of hearing aids.

A gerontologist deals with the social, biological and psychological aspects of age-related changes in the body. They also study the causes of aging of a person, study ways of rejuvenation.

An andrologist is a male disease specialist whose work is to restore and preserve the reproductive health of a man, he studies and solves problems, as well as the prevention of pathologies that can affect the male reproductive system.

It is believed that the rarest medical specialty is a doctor aflacologist. There are only thirty people in the whole world, and only two in Russia. A flacologist is a specialist in intestinal gases.

A radiologist is a medical specialty that deals with the diagnosis of various diseases and pathological conditions in the human body, using the method of radiological research.

An emetologist a new specialty in medicine, highlighted as a separate direction. A specialist studies the pathophysiology of nausea and vomiting, in

various ways prevents the development of symptoms or relieves a person from a pathological condition.

A naturopath is a nutritionist, psychologist, assistant patient who works not only with the body but also with the soul.

A parapsychologist is a specialist in psychological study of the mental functions, personality and emotional peculiarities of the sick.

A pathologist is a doctor specializing in the treatment of tuberculosis

Today, the medical profession is considered one of the most popular. Medical workers are found not only in urban clinics, but also in private hospitals and offices. No school, kindergarten or enterprise can do without a medical worker.

## **BERUFSBILD DES PATHOLOGEN**

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Das Thema meines Vortrags ist mit dem Berufsbild, der Ausbildung und Karrieremöglichkeiten des Pathologen verbunden. Über die Pathologie kursieren in den Medien viele bunte Geschichten.

Die wörtliche Übersetzung des griechischen Wortes „*pathologia*“ bedeutet „die Lehre vom Leiden/von der Krankheit“ – was nichts anderes heißt als: Pathologen beschäftigen sich mit der Entstehung und Entwicklung von Krankheiten – der Pathogenese. Dabei geht es nicht so sehr um Verstorbene, sondern ganz überwiegend um lebende, erkrankte Patienten, denen der Pathologe mit seiner Diagnose zu einer geeigneten Therapie verhelfen kann.

Jetzt gehen wir zur Fachausbildung des Pathologen. Um Pathologen zu arbeiten, braucht man die sechsjährige Facharztausbildung. Die Ausbildung zum Pathologen ist sehr fordernd. Weil man bei der Arbeit mit den unterschiedlichsten Gewebeveränderungen und Krankheiten konfrontiert wird, müssen Mediziner sich während ihrer sechsjährigen Facharztausbildung ein sehr breites Wissen aneignen und sich während ihres Berufslebens kontinuierlich fortbilden.



Die erste Basis bilden ein herkömmliches, sechs- bis siebenjähriges Studium der Humanmedizin, das Praktische Jahr und die Approbation als Arzt. Während der Assistenzarztzeit folgt für gewöhnlich die Weiterbildung bzw. Facharztausbildung zum Pathologen – entweder akademisch oder in einer Praxis.

Während der Facharztausbildung müssen die angehenden Pathologen ein großes Pensum in folgenden Wissenschaftsbereichen in Theorie und Praxis bewältigen und ihre Kenntnisse darin in einer abschließenden Prüfung nachweisen.

Innerhalb der Pathologie sind Spezialisierungen auf bestimmte Regionen des Körpers möglich und ratsam: etwa Gynäkopathologie, Dermatopathologie, Lungenpathologie und andere.

Wer sich als Mediziner auf die Pathologie spezialisiert, untersucht Gewebeproben (Biopsien) oder von Fall zu Fall auch Körperflüssigkeiten (Blut, Urin). In den meisten Fällen handelt es sich aber um die histologische Untersuchung des Gewebes unter dem Mikroskop und mit Hilfe hochauflösender bildgebender Verfahren. Auch hochspezialisierte Methoden wie etwa die molekularpathologische Analyse des DNA-Materials im Gewebe (Molekularpathologie) kommen immer häufiger ergänzend zum Einsatz.

Was die Arbeitsgebiete von Pathologen betrifft, so kann man:

- an den Universitätskliniken;
- in Großkrankenhäusern, die über eine eigene pathologische Abteilung verfügen in Arztpraxen, die sich auf Pathologie spezialisiert haben. Neben dem Status als angestellter Arzt können Pathologen sich auch mit einer eigenen Praxis selbständig machen;
- als Wissenschaftler in Forschungseinrichtungen der Universitäten oder an außeruniversitären Einrichtungen – hier besonders häufig in der Krebsforschung;
- als Forscher für die Pharmaindustrie – hier vor allem als Molekularpathologen, die die Entwicklung neuer Medikamente arbeiten.

Weiter sehen wir genau den Alltag des Pathologen an. Die Pathologen untersuchen die Gewebeproben. Sie weisen in der Regel anormale oder bereits als krankhaft identifizierte Veränderungen auf, die zum Beispiel auf Entzündungen, Erregerbefall oder Krebserkrankungen hinweisen.

Der Pathologe erhält vom behandelnden Facharzt eine Gewebeprobe, die er zunächst in Augenschein nimmt (Makroskopie), um anschließend unter Mitarbeit von Medizinisch-technischen Assistenten Schnitte von bestimmten Arealen des Gewebes anzufertigen und diese unter dem Mikroskop zu untersuchen. Mit ihrer detaillierten Diagnose nach der Mikroskopie tragen Pathologen entscheidend dazu bei, zum Beispiel eine Krebserkrankung schnell zu erkennen und/oder bereits erkannte Tumoren näher zu spezifizieren. Ihre Arbeit ist die Grundlage für die Auswahl einer womöglich lebensrettenden Therapie mit den richtigen Medikamenten.

Zum Alltag der Pathologen gehören auch tägliche Besprechungen mit etwa einem halben Dutzend behandelnder Kollegen anderer Fachgebiete. Die Pathologen referieren über ihre Biopsie-Befunde und tauschen sich mit den anderen Medizinern über die erkrankten Patienten aus. Zudem arbeiten Pathologen

auch bei Operationen den Chirurgen zu: Oft müssen während einer Operation sogenannte Schnellschnitte vom Gewebe des zu operierenden Organs angefertigt und analysiert werden. Das muss schnell passieren, denn es geht häufig um Leben oder Tod. So ist das Berufsbild des Pathologen und seine Tätigkeitsbereiche.

## MEASLES

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Measles is a very infectious disease. The disease passes from one child to another. The first symptoms are: sneezing and coughing. The disease begins with signs of a heavy cold, a running nose and dry cough. The temperature is high and the child has a dislike of the light.

The rash appears on the third or fourth day behind the ears and around the mouth and then covers the whole body.

The infectious agent of disease is PNA-virus, which has spherical form. It doesn't live in the external environment and dies outside the organism. The virus remains active in the air and on surfaces up to 2 hours, it is not resistant in the external environment.

The source of infection is a sick human. Measles is transmitted through airborne droplets. The virus is released into the environment in large numbers by a sick person with mucus during coughing, sneezing. Measles is one of the most infectious diseases in the world. Penetration of the virus into the human body occurs through the mucous membrane of the upper respiratory tract and then with blood flow (primary viremia) the virus enters the reticuloendothelial system (lymph nodes) and affects all types of white blood cells. From the 3rd day of the incubation period in the lymph nodes, tonsils, spleen, you can find typical giant multinucleated cells Warthin-Finkeldey with inclusions in the cytoplasm. After multiplying in the lymph nodes, the virus then enters the blood, re-developing (secondary) viremia, which is associated with the beginning of the clinical manifestations of the disease. The measles virus suppresses the activity of the immune system (possibly direct damage to T-lymphocytes), there is a decrease in immunity and, as a result, the development of severe secondary, bacterial

complications with the predominant localization of processes in the respiratory system.

Measles is dangerous for development of complications: laryngitis, otitis, pneumonia, encephalitis, hepatitis, lymphadenitis. A rather rare late complication is subacute sclerosingpanencephalitis.

People who are at high risk for complications are infants and children aged less than 5 years; adults aged over 20 years; pregnant women; people with compromised immune systems, such as from leukemia, HIV infection or innate immunodeficiency; and those who are malnourished or have vitamin A deficiency.

In recent years cases of measles are increased, because many parents refuse to vaccinate their children. In Russia, the incidence of measles in 2018 is amounted to 1.7 cases per 100 000 people. The measles vaccine was created in 1963. There are currently several live measles vaccines. Measles vaccine is very effective. The vaccine is generally safe, including for patients with HIV infection. Side effects are usually mild and pass quickly. These include pain at the injection site or a slight fever.

Measles affects about 20 million people a year, primarily in the developing areas of Africa and Asia. While often regarded as a childhood illness, it can affect people of any age. It is one of the leading vaccine-preventable disease causes of death. In 1980, 2.6 million people died of it, and in 1990, 545,000 died; by 2014, global vaccination programs had reduced the number of deaths from measles to 73,000.

Drugs for specific treatment of measles are not developed. Symptomatic treatment includes expectorants, mucolytics, anti-inflammatory aerosols to soften the inflammatory processes of the respiratory tract. To reduce fever and pain, the patient can use ibuprofen or paracetamol.

To relieve itching on the skin recommended daily rinsing and washing the solution with a powder Gelaskin (synthetic tannin). To wash the eyes during illness, the patient can use a solution of baking soda or strong tea. Conjunctivitis recommended drops with antibiotic (chloramphenicol at 0.25 %, sulfacetamide 20 %). The mouth can be rinsed using an infusion of chamomile, solution of chlorhexidine.

In the case of pneumonia or other bacterial complications in measles, antibiotics are indicated, in severe cases of cereals, corticosteroids are used.

The world health organization in the treatment of measles recommends the use of vitamin A, which reduces the risk of complications in the eye and reduces mortality by 50 %. In the absence of proper medical care and malnutrition, the disease is fatal for 10 % of the patients.

## GENETIC DISEASES IN CHILDREN

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Medical and genetic counseling is one of the types of specialized assistance to the population, aimed primarily at preventing the appearance in the family of children with hereditary pathology. To this end, the prognosis of the birth in this family of a child with a hereditary disease is made, parents are explained the probability of this event, advice is given on the prevention of the birth of a sick child, modern methods of preclinical diagnosis and therapy.

### **Turners Syndrome**

Turner syndrome is a chromosomal condition that affects development in women. A lot of strucked girls do not undergo puberty and most are unable to conceive. Females with this syndrome have additional folds of skin on the neck (webbed neck), a low hairline at the back of the neck, lymphedema of the hands and feet, skeletal abnormalities, or kidney problems. Turner syndrome is associated with the X chromosome; when one normal X chromosome is available in a female's cell and the other sex chromosome is missing or structurally altered.

### **Downs Syndrome**

Most cases of Down syndrome result from trisomy 21, which means each cell in the body has three copies of chromosome 21 rather than usual two copies. Down syndrome is a chromosomal disease that is associated with mental invalidity, an indication of facial form, and weak muscle tone in childhood. All affected persons have cognitive delays, but the intellectual incapacity is usually easy to temper.

### **Klinefelter's Syndrome**

Klinefelter syndrome is a genetic condition that happens when a boy is born with an extra copy of the X chromosome. Klinefelter syndrome is a common genetic disease affecting men. Klinefelter syndrome adversely affects testicular growth, and this can result in smaller than normal testicles. This can lead to lower production of the testosterone, reduced muscle mass, reduced body and facial hair, and extended mammary gland tissue. Klinefelter syndrome often isn't diagnosed until maturation. Most men with this syndrome produce little or no sperm.

## **Progeria**

Progeria, also known as Hutchinson-Gilford syndrome, is rather rare, progressive genetic disorder that causes children to get older quickly, though they are usually born normal. Heart problems are the possible reason of death. The average life expectancy for a child with progeria is about 13 years, but some with the disease die younger and some live 20 years or longer. In comparison with lots of other genetic mutations, progeria isn't transmitted in families. Researchers think affects a single sperm or egg just before conception. The parent is not a carrier, so the mutations in the child's genes are new.

## **Cri Du Chat**

Cri-du-chat (cat's cry) syndrome, is a chromosomal disturbance that results when a piece of chromosome 5 is missing. Infants with this condition often have a high-pitched cry that sounds like that of a cat. The disorder is characterized by mental disability and slow development, microcephaly, low birth weight, and weak muscle tone (hypotonia) in childhood. Affected individuals also have characteristic facial features, including widely set eyes (hypertelorism), low-set ears, a small jaw, and a rounded face. Some children are born with a heart defect.

## **THE INFLUENCE OF PHYSICAL ACTIVITY ON THE FUNCTIONAL STATE OF THE FEMALE STUDENTS CARDIOVASCULAR SYSTEM**

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The process of education and various biological and environmental factors are affecting the health of students. This connection can be demonstrated by the example of the influence of physical activity on the reaction of the cardiovascular system.

The aim of the study was to assess the impact of physical activity on the functional state of the cardiovascular system in female students.

To achieve this goal, the following tasks were formulated:

- to study the functional state of the cardiovascular system of students;

- to identify the relationship between the level of physical performance, the state of the cardiovascular system and individual typological characteristics of students.

46 healthy girls studying at the natural-scientific, engineering and pedagogical directions of training at BSU aged from 18 to 22 years old participated in the research.

The experiment was conducted in the first half of the day, from 8.30 to 12.30, at the temperature from 18 to 22°C. It consisted of several stages. At the first stage girls were questioned about their health state. During the second stage somatometric and physiometric indicators and heart rate variability indicators at rest were taken. The third stage consisted of two functional tests: The Martine test and the Harvard step test.

The following somatometric parameters were studied: body length, body weight. To determine the length of the body a medical rostopmer was used. Measurement of body weight was carried out using mechanical floor scales, with an accuracy of up to 500 g. To determine the body mass index (BMI) the Quetelet formula was used.

The main indicators of the state of the cardiovascular system are: heart rate and blood pressure, bullet pressure, systolic volume and minute blood volume.

Heart rate can be measured in several ways: by palpation, or finger method, and by registering with sensors – electronic method. In the study pulse counting was carried out in two ways.

Martine's test included 20 deep squats per 30 seconds, alternating with 10 minutes' rest. The Harvard step test consisted of climbing to a platform of 40 cm high with a frequency of 30 times a min, the duration of the exercise was 3 minutes. After each test the values of blood pressure and heart rate were recorded.

The reliability of the results was assessed with using of the Mann-Whitneys test at the significance level ( $p < 0,05$ ).

The research allowed us to identify different types of regulation of cardiovascular system function according to the frequency of the heart rate prevailing tone of the autonomic nervous system. Among the student, 20% of vagotonics, 23% of normotonics and 57% of sympathotonics were noted.

According the Martine test, sympathotonics had the more expressed increase in systolic pressure and the increase of heart rates compared with the values of the similar indicators in normotonics by 6.7% and by 14.1% and in vagotonics by 13.5% and by 15.7%, respectively.

At the end of a three-minutes rest after the Martine test, there was not a complete restoration of the students cardiovascular system functional state with a predominance of the tone of the parasympathetic division of the autonomic nervous system, since the indicator of the blood minute volume of blood did not return to the values of the relative rest state.

After the Harvard step test, it was found that the level of physical efficiency of sympathotonics was characterized as low (55.6% of students) and as below average (44.4%).

Thus, the students with different types of regulation demonstrated distinctive data on blood pressure, heart rates, as well as indicators of body recovery after exercise, which indicates the influence of the autonomic nervous system predominant department on the cardiovascular system.

## **THE PROBLEM OF RH-CONFLICT DURING PREGNANSY: CONSEQUENCES AND THREATS, ANTI-D PREVENTION AS A PRINCIPAL MEANS OF FIGHT AGAINST RH-CONFLICT**

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A couple of decades ago RH-negative blood in women was considered to be almost a curse, not allowing her to have many children. The birth of the second, and in some cases even the first healthy child was almost an insoluble problem. The reason is the developing of rhesus-conflict during the pregnancy.

The aim of our work was to study the mechanisms of physiological problems connected with the RH-conflict phenomenon in pregnant women in order to have an opportunity to delve deeper into that issue which will allow to use it in my future work in a prenatal care center where pregnancy is constantly and closely monitored.

To achieve the stated goal, the following tasks were set and solved:

- 1) to study the causes of RH-conflict;
- 2) to analyze the effect of this phenomenon on the pregnant women's health state and its complications;
- 3) to examine the prevention methods and to analyze the effectiveness of available drugs.

First of all, it is important to know what the RH-factor conflict during pregnancy is, and what RH- factor is in general. This phenomenon refers to a specific protein located on the surface of red blood cells presented in almost all people who are considered to be Rh-positive, and only 15% of population don't have such manifestations, and they are Rh-negative.

In fact, the Rh factor is only one of the immunological properties of blood, and doesn't affect human health. Blood with a positive Rh-factor is considered to be more strong. This property of blood was discovered by two scientists:

Landsteiner and Wiener in 1940 during the study of rhesus monkeys, which gave the name to this phenomenon.

It should be mentioned that positive and negative red blood cells are stuck together when contacting. The same happens during pregnancy in case of Rh-negative mother and Rh-positive fetus. In order to cope with this threat a woman's body begins to produce antibodies, accordingly, they react with the erythrocytes of the fetus and destroy them. This process is called hemolysis.

It is important to find out what manifestations of rhesus conflict are? Unfortunately, there are no external, visible to the naked eye manifestations. All processes in mother's body associated with Rh-conflict are not dangerous for a woman and do not have any symptoms. They can be diagnosed in the fetus during ultrasound research. In this case, accumulated fluid can be seen in the cavities of the fetus, edema; the fetus usually is in an unnatural position: so-called Buddha posture. Besides rhesus-conflict can lead to various complications such as: threat of termination, fetal hypoxia, anemia, gestosis, hemolytic disease, intrauterine fetal death.

As for preventive measures anti-D prophylaxis is considered to be the main way of control of RH-conflict from ancient times till nowadays, which firstly began in Germany and Austria since 1967, and then in the UK.

To prevent RH-conflict during pregnancy antiresus immunoglobulin is used which is an active protein fraction of human plasma and is prescribed once intramuscularly. If a woman is introduced anti-D globulin immediately after child delivery negative red blood cells of the fetus penetrated her blood are destroyed and the factor causing the production of antibodies by the immune system is eliminated.

Antiresus immunoglobulin drugs are used firstly more than 30 years. In recent years the effective antiresus immunoglobulin drugs are produced by many pharmaceutical companies and are available in Russia as well.

Thus, thanks to the modern achievements of immunology and pharmaceutical science there is always the opportunity to endure a strong and healthy baby.



## DRUG ADDICTION

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Drug addiction is a serious problem not only for Russia, but for the whole world. Every year the number of drug addicts is growing, reaching a figure of 820,000 in 2017. This is the number of people registered in medical institutions.

According to statistics from the Ministry of Internal Affairs, about 1.5% of the population of Russia use drugs regularly. Last year, more than 20 tons of heroin, synthetics, psychotropes, drugs of the opium and cannabis groups were withdrawn from circulation.

In Russia, mortality from consumption exceeds the number of deaths, in the European Union 6-8 times - about 90 thousand people die each year (according to statistics from 2016). Worldwide, there are about 190 thousand deaths per year, but this figure can be safely increased several times – in some countries, statistics are not kept or are very approximate. The total number of drug addicts can reach up to 5% of the world's population and reach up to 250 million people: this is the population of a large country.

Mortality from addiction causes

1) Overdose. Excess dose occurs 1) by chance, and a person dies from the failure of vital organs.

2) Violent death. Drug addicts belong to socially vulnerable groups, and very often become victims of their own.

3) HIV. 50% of patients received HIV through dirty needles.

4) Suicide.

There are two types of people who are dependent on drugs:

1) People who have a positive relationship – they are looking for pleasure, fun, euphoria, energy, etc. They use psychoactive drugs for this.

2) People who have a negative relationship – they use psychoactive drugs to get rid of depression, unpleasant feelings, difficulties in communication, etc. Psychoactive help to solve this problem, and people use it to relieve it, and that is why many people do not treat drug addiction.

### **Withdrawal syndrome**

The use of certain drugs is accompanied by the emergence of addiction. This is due to the specific effects of such drugs on the nervous system. Withdrawal syndrome with drug use is a dangerous condition that requires seeking medical attention. Patients lose control of themselves, can harm others.

#### **Signs of withdrawal syndrome**

1) General malaise and aching joints. Weakness and arousal. The patient's psyche is unstable. Such signs are especially pronounced in heroin addicts.

2) Dizziness and nausea – are characteristic of dependence on many drugs.

3) Visual and auditory hallucinations after stopping long-term drug use. Such symptoms often cause the death of opium addicts.

4) Sleep disturbances occur with the abolition of many drugs that affect the psyche.

5) Excessive drooling and sweating are associated with active stimulation of the corresponding glands against the background of a dysfunction of the central nervous system.

6) With severe malfunctions of the brain, constipation, diarrhea, and intense abdominal pain are recorded.

### **Withdrawal syndrome complications**

Without qualified medical care in most cases the following complications are possible:

1) violation of the heart until the heart attack or a complete stop

2) hallucinations, psychosis

3) cerebral hemorrhage (stroke)

4) seizures can lead to the development of epilepsy

5) renal, hepatic failure

6) cerebral edema

Each of these conditions in the event of further development and the emergence of comorbidities can lead to death.

## SMOKING - EFFECTS ON YOUR BODY

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Everyone knows that smoking is extremely dangerous for health. Nevertheless, the number of smokers throughout the world is constantly growing. Smoking, as such, is known for a very long time. More on the frescoes in the Indian temples depicted holy ascetics, breathing in the smoke of aromatic incense. Smoking pipes were also found during excavations of nobles in Egypt. Scythians had a habit of inhaling the smoke of burning plants. Smoking with the help of pipes was known to the ancient Germans and Galls in the I century BC. e. In the ancient Chinese literature also refers to smoking. But as a filling, not other tobacco was used. Having come to America in 1492, Christopher Columbus and his companions became the first tobacco smokers from Europeans.

Tobacco smoke contains over 70 known cancer-causing chemicals. Highly damaging components of tobacco smoke include: tar, carbon monoxide, oxidizing chemicals, metals, radioactive compounds. In each package unit of tobacco products, there should be warning messages on the health effects caused by smoking. Smoking harms nearly every organ in the body, causing many diseases and reducing health in general. Nicotine is the addictive drug in tobacco smoke that causes people who smoke to continue to smoke.

Smoking cigarettes affects lung health. Cigarettes are responsible for a substantial increase in the risk of developing lung cancer. Smoking cigarettes also presents a greater risk of developing and dying from chronic obstructive pulmonary disorder (COPD). Cigarettes are also linked to developing emphysema and chronic bronchitis. They can also trigger or exacerbate an asthma attack.

Smoking is the main cause of coronary artery disease and other cardiovascular diseases. After smoking each cigarette, the heart begins to work in a speeded-up mode, as a result, the heart of a smoking person makes 12-15 thousand cuts more than a non-smoking person, which leads to premature wear of your

motor. The direct link between smoking and diseases such as myocardial infarction, coronary heart disease, hypertension has been scientifically proven.

Smoking cigarettes can damage a female's reproductive system and make it more difficult to get pregnant.

It can do a serious harm both to a woman and to her baby. Prematurity, miscarriage and stillbirth are the most dangerous implications of an expectant mother's smoking. Even if such a mother's baby looks relatively healthy, he will probably suffer from various diseases in future. Children of smoking parents are more allergic, more amenable to infections, more likely to have asthma attacks. Moreover, they often suffer from developmental delays and have intellectual problems, such as bad memory, distracted attention and others. In males the higher the risk of erectile dysfunction.

People who smoke regularly have a 30–40 percent higher risk of developing type 2 diabetes than those who do not.

Smoking cigarettes can cause eye problems, including a greater risk of cataracts and age-related macular degeneration. Other vision problems related to smoking include: dry eyes, glaucoma, diabetic retinopathy.

Smoking increases your risk for osteoporosis, a condition in which bones become weak and more likely to break.

Since smoking affects your entire body, it follows that smoking can cause a wide range of cancers, in various parts of your body including: Lungs, Trachea, Bronchus, Esophagus, Oral Cavity, etc.

The effects of tobacco smoke on the immune system include: greater susceptibility to infections such as pneumonia and influenza, more severe and longer-lasting illnesses.

Healthy teeth can last a person for life. Many smokers have unsatisfactory dental health, because smoking has many negative effects, such as bad breath, the appearance of dark plaque on the teeth, deterioration in taste and smell. Smoking cigarettes leads to dehydration of the palate and cheeks, causes recession (lowering the level) of the gums and the formation of an adhesive film on the teeth, which contributes to the fixation of plaque and the rapid development of caries.

What can be dangerous smoking for your skin? Chronic hypoxia and narrowing of the lumen of the vessels lead to a violation of the blood supply of the dermis of the smoker, as a result of which it loses nutrients and oxygen. The skin takes on a grayish appearance, it becomes dehydrated, it looks peaky, doesn't. Due to the loss of elasticity increases the number of facial wrinkles, there are other negative consequences of smoking.

Smokers endanger not only themselves but also the people around them. In medicine there was even a term "Passive Smoking". In the body of non-Smoking people after staying in a smoky and unventilated room, a significant concentration of nicotine is determined. The health problems caused due to smoking in public places/offices would result in additional financial burden on the exchequer to divert its resources in medical facilities to combat such problems.

## **TREATMENT OF CHRONIC HEPATITIS B IN SUB-SAHARAN AFRICA: 1-YEAR RESULTS OF A PILOT PROGRAM IN ETHIOPIA**

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It is important to mention briefly that despite an effective vaccine and potent antiviral drugs, the number of HBV-related deaths has increased by 33% between 1990 and 2013. Indeed, in 2015, viral hepatitis claimed more lives than human immunodeficiency virus (HIV).

In sub-Saharan Africa, treatment for viral hepatitis is rarely available in the public sector. Patients with CHB are left untreated and physicians are left to merely follow the natural course of the disease and provide palliative care.

In 2016, the World Health Organization (WHO) published the Global Health Sector Strategy of Viral Hepatitis and set an ambitious goal of eliminating viral hepatitis as a public health threat by 2030. However, to date, few African countries have developed national action plans for viral hepatitis, and only one published study – the PROLIFICA study in The Gambia – has reported results of HBV treatment on the continent. Consequently, there is a lack of local data to direct guidelines and promote implementation. Herein, we present results from one of the first and largest public treatment programs for hepatitis B in sub-Saharan Africa. Many of the barriers to treatment in Ethiopia, such as lack of diagnostic facilities, absence of public funding, and restrictions on antiviral drugs, are shared by most low-income countries; therefore, we believe that our findings can be relevant in the global scaling-up of antiviral treatment of CHB.

The scene is set in Ethiopia, where the author presents the 1-year results of the pilot CHB treatment program.

The authors tell us about the methods used at a public hospital in Addis Ababa, CHB patients were treated with ten of ovir disoproxil fumarate based on simplified eligibility criteria. Baseline assessment included liver function tests, viral markers, and transient elastography (Fibroscan).

The authors outline that full diagnostic examination, also laboratory tests, including transient elastography. At the first visit, the following laboratory tests were conducted: Medical diagnostic rapid tests: HBsAg, HIV (further tests were not conducted in patients who were found to have HBsAg negative or HIV positive).

The authors assert that these patients would usually receive symptom-directed therapy such as diuretics for ascites/edema; however, within our simplified setup, we did not systematically perform endoscopic treatment of esophageal varices or other more advanced procedures.

The article contains the following facts: patients without signs or symptoms of advanced liver disease were appointed to a physician after 3 months when the viral load result would usually be available. The decision to start therapy was made by a physician using the predefined criteria given below; otherwise, the follow-up was nurse led. Those who started antiviral therapy were followed-up after 2 and 4 weeks, and thereafter 3-monthly.

The authors outline the following laboratory tests were performed during follow-up (tests in parenthesis were only performed in patients on treatment): 3-monthly: complete blood count, ALT, AST, (creatinine, HIV rapid test) 6-monthly: HBsAg, HBV viral load Blood tests were performed using commercially available kits and assays. HBsAg was detected on-site using a WHO-approved rapid diagnostic test (Determine, Alere Inc., USA). HIV testing was done in accordance with the National algorithm, i.e., using a WHO-approved rapid test kit (HIV 1+2 Antibody Colloidal Gold [KHB], Shanghai Kehua Bio-engineering co., China) for screening, and another rapid test kit (HIV 1/2 STAT-PAK, Chembio Diagnostics, USA) for confirmation.

The authors come to the conclusion that the main focus at each visit was adherence counseling (including pill count) and monitoring for side effects.

## **ZUR GESCHICHTE DER PNEUMOLOGIE**

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Am Anfang betrachten wir die Bedeutung des Begriffs. Die Pneumologie (griechisch πνευμονολογία „die Lungen[heil]kunde“, von πνεύμων „die Lunge“ [aus πνεύμα „der Atem, Geist“] und λόγος „die Lehre, Wissenschaft“) oder Pneumonologie oder Pulmonologie oder Pulmologie (von lateinisch pulmo „die Lunge“) gilt als eine Teildisziplin der Inneren Medizin. Die deutsche Bezeichnung für diese Teildisziplin lautet Lungenheilkunde.

Sie beschäftigt sich hauptsächlich mit den Atemwegen und deren Erkrankungen. Die Pneumologie umfasst die Prophylaxe, Erkennung und konservative Behandlung der Krankheiten der Lunge, der Bronchien, des Mittelfells (Mediastinums) und der Pleura. Die Thoraxchirurgie ist eng mit der Pneumologie verknüpft. Sie umfasst alle operativen Eingriffe, z. B. bei Lungenkrebs, inklusive Strahlen- und Chemotherapie.

Der Schwerpunkt Pneumologie bietet ambulante und stationäre Betreuung von Patienten mit unterschiedlichen Lungenerkrankungen. Die Pneumologen sind für interdisziplinäre, chirurgischen Indikationsstellungen und intensivmedizinische Basisversorgung verantwortlich.

Die Pneumologen (Lungenärzte) sind Spezialisten für Erkrankungen der Atmungsorgane. Sie behandeln alle Erkrankungen der Atemwege, Bronchien, Lunge und Pleura. Dazu zählen unter anderem Asthma bronchiale, Lungenentzündung, Lungenkrebs, Lungentuberkulose, Rippenfellentzündung sowie die akute und chronische Bronchitis.

Jetzt gehen wir näher die Geschichte der Pneumologie (Pulmonologie) an. So können wir uns deutlich die Entwicklung dieses Faches zu einer modernen Pneumologie vorzustellen. Das Fachgebiet der Pneumologie (Pulmonologie) wurde ca. 2 Jahrtausende stark vernachlässigt. Der Beginn der modernen Pneumologie (Pulmonologie) wurde auf den Beginn des 19. Jahrhunderts festgelegt. Der Ursprung der Lungenheilkunde ist der Tuberkulosebekämpfung zuzuschreiben.

Die Wissenschaft der Pneumologie (Pulmonologie) hat sich aufgrund der Verbesserung der diagnostischen Methoden weiterentwickelt. Um die Mitte des 18. Jahrhunderts wurde die Methode des Lungenklopfens in die Medizin eingeführt.

Etwas später und zwar im 19. Jahrhundert – eine Möglichkeit, mit einem bestimmten Schlauch auf die Lunge zu hören – ein Stethoskop. Diese Methoden ermöglichten es, verschiedene Prozesse in der Lunge zu erkennen, die es ermöglichten, Krankheiten wie Lungenentzündung, Bronchitis, Lungenabszess, Tuberkulose, Pleuritis und andere zu beschreiben.

Am Ende des 19. Jahrhunderts wurden viele Viren mit Infektionskrankheiten identifiziert. Aus diesem Grund begannen die Ärzte, Lungenerkrankungen aktiv zu erforschen. Robert Koch gilt als Verursacher der Tuberkulose beschrieben. Louis Pasteur beschrieb Pneumokokken und begründete die Rolle des Ausbruchs der Pneumonie.

Der Französische Arzt René Théophile Hyacinthe Laënnec gilt als der Erfinder des Stethoskops. Er entwickelte 1819 eine Klassifikation von

Erkrankungen der Lunge, der Bronchien und der Pleura und beschrieb das Lungenemphysem, wobei die Gründe für seine Entstehung vorgeschlagen wurden. Laënnec hat neben Leopold Auenbrugger, dem Entdecker der Perkussion, den Grund zu der exakten physikalischen Diagnostik der Krankheiten der Brustorgane gelegt und dadurch die Fortschritte der Medizin auf diesem Gebiet angebahnt.

Im Jahre 1839 veröffentlichte G. I. Sokolsky eine Monographie mit dem Titel „Untersuchung der pathologischen Eigenschaften der Lunge und ihrer angrenzenden Gewebe“.

Bekannt sind auch die Werke von S. P. Botkin, G.A. Zacharyin und andere über die Pathologie der Lunge. Gleichzeitig entwickelte sich die Theorie der Lungenpathologie. K. Rokitansky (1842) beschrieb die Stadien der Lungenentzündung im Detail.

Am Ende des 19. Jahrhunderts wurden Röntgenstrahlen entdeckt. Sie ermöglichten es, das Verständnis von Bronchien- und Lungenerkrankungen zu erweitern. Die neuesten Methoden der Röntgenforschung zu Lungenerkrankungen in Form der Computertomographie halfen den Ort und die Art der Veränderungen im Lungengewebe zu bestimmen.

Ein weiterer Erfolg bei der Entwicklung der Diagnostik in der Pulmonologie war die Einführung endoskopischer Behandlungs- und Forschungsmethoden. Dank spezieller Bronchoskope ist es heute möglich, den Zustand der Schleimhaut detailliert zu untersuchen und gegebenenfalls den Körper zu entfernen oder dadurch ein Medikament in Bezug auf die Bronchien einzuführen.

Einen großen Einfluss auf die Entwicklung der Pulmonologie hatte die Schaffung und Verbesserung von Funktionsstudien der Lunge, wie Spirographie, Pneumotachographie, Untersuchung der Diffusionskapazität, Atmungsmechanik usw.

Heutzutage gehören Asthma, GOPD, Lungenkrebs und Lungenentzündung zu den Volkskrankheiten. In den kommenden Jahrzehnten prophezeien die Fachleute einen weiteren Anstieg dieser Erkrankungen aufgrund des fortschreitenden Alters.

## **CANCER: METHODS OF PREVENTION AND TREATMENT**

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Cancer is a general term for a large group of diseases that can affect any part of the body. Other terms are used to designate them: malignant tumors and neoplasms. A characteristic symptom of cancer is the rapid formation of abnormal cells that grow beyond their normal boundaries and are able to penetrate into nearby parts of the body and spread to other organs. The latter process is called metastasis. Metastases are one of the main causes of cancer death.

Cancer is one of the leading causes of death in the world; so, in 2018, 9.6 million people died from this disease.

The most common types of cancer are: lung cancer (2.09 million deaths); breast cancer (2.09 million cases); colon and rectal cancer (1.80 million cases); prostate cancer (1.28 million cases); skin cancer (non-melanoma) (1.04 million cases); gastric cancer (1.03 million cases).

Cancer occurs as a result of the transformation of normal cells into tumor cells during a multi-stage process, during which the precancerous lesion turns into a malignant tumor. These changes occur as a result of interactions between human genetic factors and three categories of external factors, including: physical carcinogens, such as ultraviolet and ionizing radiation; chemical carcinogens such as asbestos, tobacco smoke components, aflatoxins (food pollutants) and arsenic (drinking water pollutant); biological carcinogens, such as infections caused by certain viruses, bacteria or parasites.

The main risk factors for cancer in the world are tobacco use, alcohol use, unhealthy diet and lack of physical activity; they are also the main four common risk factors for other non-communicable diseases.

Currently, 30–50% of cancers can be prevented by avoiding risk factors and implementing appropriate prevention strategies based on evidence. In addition, the burden of cancer can be reduced by early detection of cancer and management of patients who develop cancer. With early diagnosis and appropriate treatment, there is a high likelihood of curing many types of cancer.

To prevent cancer, people can do the following: actively avoid the risk factors listed above; vaccinate against infections caused by HPV and the hepatitis B virus; deal with hazards in the workplace; reduce exposure to ultraviolet radiation; reduce the effects of ionizing radiation (in the workplace or in the process of medical diagnostic imaging).

With early detection of cancer, the probability of positive results with effective treatment is high, the probability of survival increases, the incidence and cost of treatment are reduced. Early detection of cancer and the absence of delays in providing care can lead to significant improvements in the lives of patients.

The goals of screening are to identify people with impairments that suggest certain cancers or precancer, and to quickly direct such people to diagnose and treat. The effectiveness of screening programs in identifying certain types of cancer is ensured by the use of appropriate tests, their effective use, linking with other stages of the screening process and quality control. As a rule, a screening program is a far more complex health intervention than early diagnosis.

Examples of screening methods: visual inspection with acetic acid (VIA) to detect cervical cancer in low-income countries; HPV testing for cervical cancer; PAP test – cytological examination for cervical cancer in countries with medium and high income levels; and breast cancer screening in countries with highly developed or relatively advanced health care systems.

Correct diagnosis is important for the proper and effective treatment, as each type of cancer requires a special treatment regimen covering one or more methods, such as surgery, radiation therapy and / or chemotherapy. An important first step is the definition of treatment goals and palliative care; Health services must be comprehensive and people-centered. The main goal is to cure cancer or significantly prolong life. Another important goal is to improve the quality of life of the patient. This can be achieved through supportive care or palliative care and psychological support.

Some of the most common types of cancer, such as breast cancer, cervical cancer, oral cancer and colon cancer, have high treatment efficiencies provided they are detected early and treated using advanced practical methods.

Some types of cancer, even those in which cancer cells spread to other parts of the body, such as testicular seminoma, leukemia and lymphomas in children, have high rates of treatment efficacy while ensuring proper treatment.

## **HEMATOPOIETIC CELL TRANSPLANTATION**

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Hematopoietic cell transplantation (also called bone marrow transplantation or stem cell transplantation), is a type of treatment for cancer (and a few other conditions as well). A review of the normal function of the bone marrow will help in the understanding of stem cell transplantation.

Hematopoietic stem cell function – Bone marrow is the soft, spongy area in the center of some of the larger bones of the body. The marrow produces all of the different cells that make up the blood, such as red blood cells, white blood cells (of many different types), and platelets. All of the cells of the immune system are also made in the bone marrow. All of these cells develop from a type of cell found in the bone marrow, called a hematopoietic stem cell.

Hematopoietic cell transplantation – Some of the most effective treatments for cancer, such as chemotherapy and radiation, are toxic to the bone marrow. In general, the higher the dose, the more toxic the effects on the bone marrow. There are two main types of hematopoietic cell transplantation: autologous and allogeneic.

Autologous transplant – In autologous transplantation, your own hematopoietic stem cells are removed before the high dose chemotherapy or radiation is given, and they are then frozen for storage and later use. After your chemotherapy or radiation is complete, the harvested cells are thawed and returned to you.

Allogeneic transplant – In allogeneic transplantation, the hematopoietic stem cells come from a donor, ideally a brother or sister with a similar genetic makeup. If you do not have a suitably matched sibling, an unrelated person with a similar genetic makeup may be used. Under some circumstances, a parent or child who is only half-matched can also be used; this is termed a haploidentical transplant. In other circumstances, umbilical cord blood may be used in an umbilical cord blood transplant.

The physician will determine whether allogeneic or autologous transplantation is best, based on many factors, such as the underlying disease, age, overall health, and availability of a suitable donor. This is a complex decision that often also involves your viewpoints, because the different forms of transplantation carry different risks. As a general rule, autologous transplantation is associated with fewer serious side effects, since you are given cells from your own body. However, an autologous transplant may be less effective than an allogeneic transplant in treating certain kinds of cancer. There are many possible choices for an allogeneic hematopoietic stem cell donor. Matched donor – to help minimize the problems that can be caused by the expected immune response, a donor who has similar genetic makeup to you is preferred. Your cells will seem “less foreign” to the transplanted donor cells. Siblings (i.e, brothers and sisters who share the same parents as you) are typically the only members of your family who can be fully matched at the critical genes called the human leukocyte antigen or HLA genes. Each sibling has a one in four chance of sharing the same set of HLA genes with you; these characteristics are critical for your body to accept the graft. Parents, children, and relatives almost never carry identical sets of HLA genes since there are many different genes and they do not share the same parents. When the intensive chemotherapy and/or radiation is complete, the patient will be given an infusion of the harvested bone marrow or peripheral blood stem cells. The infusion is given through an intravenous (IV) line, usually the central line. The

infusion usually takes about an hour, and usually causes no pain. If you cannot receive blood products due to religious or other reasons this should be discussed with the transplant team prior to transplantation.

The hematopoietic stem cells find their way to the bone marrow, where they will reestablish normal production of blood cells; this process is called engraftment. Determining when engraftment has occurred is important because it is used to determine when it is safe for you to go home and/or reduce isolation procedures. Medications that stimulate the bone marrow to produce white and red cells may be used routinely or when engraftment is slower than expected. Engraftment is measured by performing daily blood cell counts. Neutrophils are a type of white blood cell that are a marker of engraftment; the absolute neutrophil count (ANC) must be at least 500 for three days in a row to say that engraftment has occurred. This can occur as soon as 10 days after transplant, although 15 to 20 days is common for patients who are given bone marrow or peripheral blood cells. Umbilical cord blood recipients usually require between 21 and 35 days for neutrophil engraftment. Platelet counts are also used to determine when engraftment has occurred. The platelet count must be between 20,000 and 50,000 (without a recent platelet transfusion). This usually occurs at the same time or soon after neutrophil engraftment, but can take as long as eight weeks and even longer in some instances for people who are given umbilical cord blood.

## **FAMILY PLANNING**

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Now in your body there are about a million different reactions of formation and decomposition of substances. All these reactions-the decomposition and transformation of substances – are controlled by different systems and primarily by your genes, which are in chromosomes.

The functioning of the human body primarily depends on proteins. They perform in each of your cell functions, many of which nothing but proteins cannot perform. For example, only hemoglobin can carry oxygen through your body. Thanks to fibrinogen, the blood will curdle quickly. Serotonin, the so-called

“pleasure hormone”, affects, in fact, not only our mood. But also-narrows blood vessels and maintains body temperature. And it has a protein nature.

Proteins control the workings of the heart, respiratory, nervous systems and are synthesized by genes, during the so-called protein biosynthesis. Based on the information in the genes, ribosomes collect protein from a variety of amino acid particles. They are put together in a strictly defined order, forming a single unit – protein.

It should be added that proteins in the body are not synthesized in a single instance. The nature of the reinsured, and is in one area of genetic information – a few hundred times. And if the site of hereditary information is changed? If there's an error? Mutation? So, ribosomes-smart collectors-will go through this area a few hundred times and form a hundred or more wrong proteins. Of course, there are repair systems that correct errors in the genome. But if there are too many errors, this system fails. And the wrong proteins appear.

In addition to the appearance and some character traits, children transmitted a tendency to certain diseases, disorders, features. There are cases when parents do not suffer from the disease, and the child is born sick. This is called “autosomal recessive inheritance”. This happens when patients accumulate in the family in one generation. A person who has one normal and one defective gene is called a mutant gene carrier. With this type of inheritance, the family member who received mutant genes from both parents is ill. All other family members are healthy, even those who carry the gene. According to who, about 1.5 million newborns are born each year with serious congenital malformations, chromosomal and genetic diseases. But it is possible to determine the probability of parents carrying genes for hereditary diseases and to conduct an early diagnosis of these diseases before the birth of a child. Medical and genetic counselling provides significant assistance in this regard.

Medical and genetic counseling is one of the types of specialized assistance to the population, aimed primarily at preventing the appearance in the family of children with hereditary pathology. To this end, the prognosis of the birth in this family of a child with a hereditary disease is made, parents are explained the probability of this event, advice is given on the prevention of the birth of a sick child, modern methods of preclinical diagnosis and therapy.

It is necessary to examine relatives to clarify the diagnosis. This helps to determine the type of inheritance, to clarify the diagnosis of the disease in the unborn child. In addition, the analysis of clinical manifestations in different family members makes it possible to assume the nature of the course of the pathological process in a particular person.

In this case, specialized methods are used: clinical and genealogical, cytogenetic, biochemical, molecular genetic. In the case of a high probability of giving birth to a sick child, parents are advised to either abstain from childbirth, or give advice regarding treatment.

## **DIE WIRKUNG DER MORGENGYMNASTIK AUF DEN MENSCHLICHEN KÖRPER**

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In der modernen Gesellschaft erfährt eine Person eine Reihe von nachteiligen Faktoren: emotionaler Stress, Informationsüberflutung und schlechte Umweltbedingungen. Diese Faktoren werden sehr oft mit Bewegungsmangel verbunden. Unerwünschte Umweltfaktoren und ein sitzender Lebensstil wirken sich negativ auf den Körper aus, beeinträchtigen seine normalen Funktionen und tragen zur Entwicklung verschiedener Krankheiten bei.

Unter solchen Bedingungen ist es sehr wichtig, einen Komplex verschiedener Mittel einzusetzen, die zur Erhaltung und Stärkung der Gesundheit des Körpers beitragen.

Eine der Aktivitäten, die sich positiv auf die Gesundheit des Körpers auswirkt, ist die morgendliche Hygienegymnastik.

Belastung am Morgen – ein Komplex von körperlichen Übungen, die nach dem Schlaf jeden Tag durchgeführt werden.

Alle Menschen kann man darauf teilen, wer Morgengymnastik macht, wer sie nicht macht. Jene, wer keine Morgengymnastik macht, finden die Masse der Gründe und der Ausreden, ist mit Bezugnahme auf den Zeitmangel und die Notwendigkeit in der Eile, sich oft auf die Arbeit zu versammeln. Andere behaupten, dass die Morgengymnastik ihnen aufzuwachen hilft und die Energie für ganzen nächsten Tag zu bekommen.

Für Morgengymnastik ist es 15 Minuten genug. In dieser Zeit muss man die einfachen Übungen machen – gebogen zu werden, zu springen, festgezogen zu werden, die Schwünge die Hände und die Beine zu machen usw. Man muss am Morgen die komplizierten Übungen mit der großen Belastung nicht machen. Die Morgengymnastik wird den Nutzen dem Organismus bringen und wird Ihnen zulassen, sich auf die Arbeit mit der guten Stimmung zu begeben.

Für die Mehrheit der Stadtbevölkerung ist die Morgengymnastik oft die einzige speziell organisierte Übung.

Morgenhygienische Gymnastik ist eine der häufigsten körperlichen Übungen. Das Aufladen besteht aus einer Reihe von körperlichen Übungen mit

mäßiger Belastung, die die Hauptskelettmuskeln abdecken. In der Regel nach dem Schlaf erfolgt die Aufladung des Körpers und erhöht die grundlegenden Lebensprozesse (Blutkreislauf, Atmung, Stoffwechsel usw.). Das Aufladen mobilisiert die Aufmerksamkeit der Schüler, verbessert die Disziplin.

Menschen, die systematisch mit dem Aufladen beschäftigt sind, verbessern Schlaf, Appetit, allgemeines Wohlbefinden und steigern die Effizienz. Systematisch durchgeführte Ladungen sind ein gutes Mittel zur Gesundheitsförderung. Das Aufladen ist für alle Menschen von Kindern bis ins hohe Alter von Nutzen.

Körperliche Belastungsübungen – einfach und für Menschen mit unterschiedlicher körperlicher Fitness und unterschiedlichen Gesundheitsbedingungen verfügbar – werden nach einem bestimmten Plan unter Berücksichtigung von Alter, Geschlecht, Gesundheitszustand und Art der Arbeit ausgewählt.

Zusätzlich zu den Gymnastikübungen kann mäßiges Joggen (Joggen) oder ein nicht mühsames Kreuz in die Übungen einbezogen werden.

Der Ladevorgang sollte in einem gut belüfteten Raum und, wenn die Umstände dies erlauben, im Freien erfolgen. Es ist notwendig, Übungen in der Kleidung durchzuführen, die die Bewegung nicht behindern.

Nach dem Laden werden Wasservorgänge empfohlen – Nasswischen, Waschen, Duschen, Baden im Sommer. Beim Aufladen ist es erforderlich, den Gesundheitszustand und die richtige Atmung während des Trainings zu überwachen.

Morgendliche Übungen machen es einfach, die Immunität zu verbessern, ARVI zu vermeiden, Lebhaftigkeit und positive Stimmung zu beschwören.

## **HYGIENISCHE ASPEKTE DER RICHTIGEN ERNÄHRUNG**

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Die Gesundheit beginnt mit der richtigen Ernährung. Richtige Ernährung ist eine Gesamtheit von natürlichen und gesunden Lebensmitteln, die dem Körper zugutekommen.

Richtige Ernährung ist die Grundlage für die Gesundheit. Es ist Obst, Gemüse, Fleisch und verschiedene Milchprodukte. Gemüse und Früchte enthalten die notwendigen Vitamine und Ballaststoffe des Körpers. Fleisch enthält Protein, Fisch – Phosphor, Milchprodukte – Kalzium. Deshalb ist die richtige Ernährung für jede Person so notwendig.

Jeden Tag müssen die Menschen etwas essen. In Deutschland gibt es ein Sprichwort: „Du bist, was du isst“. Ob es so ist, entscheidet jeder für sich selbst. Die Menschen nehmen Mahlzeiten ein, um weniger Probleme mit der Gesundheit zu haben.

Verschiedene Näschiereien, Fastfood sind immer beliebt. Jugendliche essen mehr Fast Food als Schulkinder und diese mehr als Vorschulkinder. Das Angebot ist vielfältig: von Pommes frites und Hamburgern bis zur Pizza in allen verschiedenen Variationen. Es gibt gesüßte Erfrischungsgetränke wie Limonade, Cola. Sie sind lecker und schmackhaft. Viele dieser Gerichte enthalten aber eine Menge Fett und Kalorien. Im besten Fall muss man auf Fastfood verzichten. Wenn es zu schwer ist, muss man eine Alternative finden. Hamburger aus Vollkornbrötchen, Pommes frites aus dem Backofen mit bunter Rohkost, Salat und Frikadellen und Gemüse, Pizza aus Vollkornmehl sind vielmals leckerer und gesunder.

Richtig zu essen ist nicht immer leicht. Die Verdauungskrankheiten sind heute ein wichtiges Problem für die Ärzte.

Meist ist eine falsche Nahrung die Ursache von Krankheiten: Aufstoß, Bauchschmerzen, Durchfall, Erbrechen, Übelkeit, Verstopfung. Es gibt chronische Gastritis, Magengeschwüre, Magen- und Dickdarmkrebs und natürlich Übergewicht. Eine Milliarde Menschen leiden von dieser Krankheit. Und die steigende Tendenz bleibt.

Das Problem der gesunden Ernährung ist heutzutage eines der aktuellsten. Unsere körperliche Gesundheit, Staatenimmunität, Langlebigkeit, geistige Harmonie sind im direkten Zusammenhang mit Problemen der gesunden Ernährung.

Um dieses Problem zu beheben, müssen Sie die Regeln einer guten Ernährung beachten:

1. Essen Sie 5 Mal am Tag.
2. Trinken Sie jeden Tag 6–8 Gläser Wasser.
3. Lassen Sie sich während des Essens nicht ablenken.
4. Essen Sie abwechslungsreich.
5. Essen Sie frische Lebensmittel zur gleichen Zeit.
6. Kauen Sie sorgfältig, beeilen Sie sich nicht zu schlucken.
7. Essen Sie keine fettigen, salzigen und stark gewürzten Speisen.
8. Essen Sie nicht zu viel.
9. Vergessen Sie nicht, das Frühstück am Morgen zu essen.
- 10 Essen Sie Gemüse und Obst.
11. Missbrauchen Sie die Süßigkeiten nicht.
12. Essen Sie zwei Stunden vor dem Schlafengehen.



Diese einfachen Regeln helfen Ihnen das Risiko von chronischen Krankheiten reduzieren, das Gewicht normalisieren und immer guter Laune sein.

Den richtigen Verdauungsprozess beeinflusst eine gesunde Kost. Und die Menschen müssen richtig essen. Leider ist das sehr schwer, aber wichtig, um kräftig und gesund zu sein und lange Zeit ohne Krankheiten zu leben.

Essen Sie richtig! Immerhin ist die richtige Ernährung der Schlüssel zur Gesundheitsförderung.

## **EPILEPSY**

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Epilepsy is a chronic disease of the brain characterized by recurring unprovoked seizures with various clinical manifestations. During an epileptic seizure, various disorders of the motor, sensory, mental, mental and autonomic functions can occur. These disorders are due to excessive neuronal discharges in the gray matter of the cerebral cortex.

Conventionally, all forms of epilepsy can be divided into two large groups: epilepsy with hereditary genetic predisposition and acquired epilepsy. The development of a single seizure is not evidence of the presence of epilepsy. There are statistics indicating that about 10% of the population suffered a convulsive seizure at least once in their lives. For the diagnosis of epilepsy, two things are key: the development of repeated attacks and the development of spontaneous unprovoked attacks. The exception is reflex epilepsy attacks.

Epilepsy most often begins in childhood. One of the main causes of the disease is the disruption of the activity of genes responsible for the work of sodium, potassium, hydrogen and chlorine channels in the nerve cell. As a result of these deviations, the polarization of the nerve cell membrane is disturbed, and the activity of the neuroglia cells changes. As a result, neuronal cells dramatically increase their activity. Thus, epilepsy is caused by genetic changes that lead to an increase in the activity of the nerve cell and surrounding cells – neuroglia cells.

But there are other types of epilepsy that are associated with specific genes and have monogenic inheritance. The specific gene and the specific problem

associated with the disruption of the activity of this gene lead to the disease. But in most of these cases, epilepsy is polygenic, that is, its development requires a combination of changes in gene activity, which leads to the phenomenon of hyperexcitability of the cerebral cortex and the development of epileptic seizures. In 60–70% of cases, epilepsy develops during childhood. By age categories, the disease is divided into several groups: infant epilepsy appears in the first year of life; childhood epilepsy develops up to 6 years; adolescent epilepsy appears at the age of 12-14 years. The disease begins its development depending on when the activity of a group of certain genes changes. In Russia, 0.5–1% of the total child population suffers from epilepsy. Different forms of epilepsy occur in different ways. Some children's forms occur with a gross violation of the development of the child. The earlier the development of epilepsy and the later it is diagnosed, the worse the prognosis for the development of the child.

Each epileptic syndrome is unique, but has its own characteristic clinical features. Based on the clinical manifestations of seizures, one of the classifications of epilepsy has been constructed. Epilepsy is associated with the problem of “paroxysmal brain”. The brain in epilepsy works differently: it periodically without any provocateurs can generate discharges of the strongest activity, which manifest themselves as seizures. A person can be born with a predisposition, that is, with a predisposition to this disease. In the future, the influence of various factors can realize this predisposition.

One example of when a predisposition to epilepsy is detected is febrile seizures, that is, seizures in children that occur in high fever. The presence of such convulsions does not mean that the child will necessarily have epilepsy. But it was revealed that in some children with febrile convulsions the activity of the hippocampus is changed – a part of the brain that can take a significant part in the development of impulse paroxysmal activity. And this group of children has a higher risk of developing epileptic syndrome than children who have never had a seizure at high temperature.

Epilepsy is rarely fatal. But there is the concept of status epilepticus – a condition in which epileptic seizures are repeated one after another. At the time of epileptic status may develop severe complications. Improper care to the patient during an attack can also lead to an unfavorable outcome. The attack occurs suddenly, and the fall of the patient can lead to sticking of the tongue and asphyxia – stop breathing. There is a myth that in severe attacks you need to shove something in a person's mouth, but this can lead to injury to the teeth and tongue and be an additional cause of asphyxiation.

To help a person during an attack, you just need to turn him on his side and remove the surrounding objects, which can be the cause of injury.

## SECTION 6. ENGINEERING TECHNOLOGY

### LIGHT INTERFERENCE: FROM THEORY TO PRACTICE

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The paper deals with the theoretical material concerning light interference mechanisms and the implementation of light interference for the definite purposes.

Interference of light is a common phenomenon that can be explained classically by the superposition of waves. Deeper understanding of light interference requires knowledge of wave-particle duality of light which is due to quantum mechanics.

According to the principle of superposition, two or more propagating waves of the same type are on the same point. As the result the amplitude at that point is equal to the vector sum of the amplitudes of the waves. If top positions of two or more waves reach the same point, then the amplitude is the sum of the individual amplitudes – this is constructive interference. If a top point of one wave meets a trough of another wave, then the amplitude is equal to the difference in the individual amplitudes – this is known as destructive interference.

If constructive interference occurs when the phase difference between the waves is an even multiple of  $\pi$  ( $180^\circ$ ), then destructive interference occurs in the case when the difference is an odd multiple of  $\pi$ . If the difference between the phases is intermediate between these two extremes, then the magnitude of the displacement of the summed waves lies between the minimum and maximum values.

Let's consider the following example. If two identical stones are dropped into a still pool of water at different locations, each stone generates a circular wave propagating outwards from the point where the stone was dropped. When the two waves overlap, the net displacement at a particular point is the sum of the displacements of the individual waves. At some points, these will be in phase, and will produce a maximum displacement. In other places, the waves will be in anti-phase, and there will be no net displacement at these points. Thus, parts of the surface will be stationary. Among prime examples of light interference there are the famous double-slit experiment, laser speckle, anti-reflective coatings and interferometers. Traditionally the classical wave model is necessary to understand optical interference,

which is based on the Huygens–Fresnel principle.

The fact is, interferons are anti-viral cytokines that have been widely used clinically, especially against Hepatitis B virus and Hepatitis C virus. The discovery of interferons is comparable to that of antibiotics, and may in fact be even more important. The fact is bacteria can be removed by filtering whereas viruses cannot. Interferon attracted worldwide attention after its discovery by Isaacs and Lindeman in 1957, but initially researchers were only able to verify its existence and function and were unable to obtain enough amounts for further research and clinical applications. In 1986, 29 years after the discovery of interferon, the development of genetic engineering enabled the production of large quantities of high-quality interferon. This allowed spreading wide application in both research and clinical settings, which ushered in a new era for interferon. A major breakthrough in interferon research occurred in 2003 when two labs independently reported the discovery of a third type of interferon, IFN- $\lambda$  with its three subtypes. These new interferons were later proven to have anti-viral effects, and were thus formally classified as type III interferons. Just seven years later, type III interferons were applied clinically for the first time when type III interferon drugs developed by two companies, BMS and Zymo Genetics, had entered phase three of clinical trial. In January 2013, a new type of interferon, IFNL4, was reported and soon a new upsurge in interferon research was produced.

Mentioning about properties and classification of interferons it can be said that interferons are a family of autocrine and paracrine cytokines secreted by host cells in response to pathogens, especially viruses.

Later interferon has been utilized as an anti-viral drug for more than 20 years, but it has consistently exhibited limited anti-cancer effects. Because of this, the mechanisms are worth investigating in order to build a better foundation for potential use of emerging innovative interferons to treat cancer in clinical settings.

Basically, there's still much to be done on interferon signaling, for example, the interaction of interferon-induced JAK/STAT signaling with other pathways in different cell types or in mature cancer cells/cancer stem cells. On one hand, efforts should be made to identify new interferon-induced genes and noncoding RNAs such as miRNAs and long non-coding RNA. On the other hand, continued studies are needed on the function of currently known ISGs and on finding the most clinically relevant genes among all ISGs for cancer therapy.

As for clinical application of interferon, mechanisms behind side effects and cancer cell resistance are also the key issues. Due to the massive use of interferon in adjuvant therapy, the signaling that takes effect should draw more attention. Last but not least, recombinant interferons with different binding pattern towards classic receptors are expected. Naturally it could help to seek for new receptors or distinguishing which current receptor plays a more important role in mediating anti-cancer activity of interferon.

Nowadays, interference mechanisms are used not only in physics and physical experiments, but also in medicine, as well as in manufacturing. Thus, without the use of interference, it is impossible to develop the smallest chips. The production of such

processors is based on chemical interactions of atoms that were subject to the photoelectric effect. The theory of interference allows us learning that light has minima and maxima in its phase difference. Then, in the production of increasingly new and high-tech nano-processors, it is necessary to take into account and calculate all these mechanisms.

## **DER WERT VON INFORMATIONEN IM UNTERNEHMEN**

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Der Fokus des vorliegenden Vortrags liegt darauf, Information als zu schützenden Wert zu betrachten. Die Nutzerinformation stellt einen wichtigen wirtschaftlichen Wert dar. Es wird im Vortrag auf die Besonderheit dieser Informationen eingegangen.

Die zentrale Bedeutung von Informationen in Unternehmensabläufen ist folgt: „Die Information ist kein Ding, das man anfassen, hören, riechen, schmecken oder sonst wie sinnlich erfassen kann“. Um das ungreifbare Ding „Information“ zu speichern und zu verarbeiten werden technische Systeme benötigt. Dazu gehört die Informationstechnik oder kurz „IT“ in Form von Computern, Hardware.

Diese Computersysteme – egal ob das Smartphone, Tablet, Notebook, Desktop Serversysteme – können wahlweise im Fachhandel, beim Elektronik-Discounter oder gar im Supermarkt erworben werden. Diese Computer sind jedoch erst durch die auf ihnen gespeicherten und verarbeiteten Informationen individuell und dadurch wertvoll. Diese einzelnen Computer werden heute durch Netzwerke zur Datenübertragung und durch Speichersysteme zur zentralen Ablage von Informationen ergänzt. Dies gilt vor allem in größeren Verbänden zur Informationsverarbeitung, wie sie in heutigen Wirtschaftsunternehmen gegeben sind.

Genau wie Computer sind diese Netze und Speicher ebenso ohne die Informationen käuflich zu erwerben. Sie erhalten erst durch die auf ihnen gespeicherten Informationen an Wert. Die „Information“ ohne die sie speichernde Hardware zeigt sich nichts. Aber wie wird etwas bearbeitet das nicht greifbar ist?

Je nach Sinn und Art der zu verarbeitenden Informationen kann die Software in Form von Standardanwendungen oder von eigens entwickelten, sehr spezifischen Programmen geschehen. Ohne die verarbeiteten Informationen ist jedoch jede Software „nur“ ein Teil der Maschine zur Automatisierung von Abläufen.

Der Wert der Information entsteht erst durch die Anwendung der nachvollziehbaren, wiederholbaren und kostengünstigen Automatisierung dieser Abläufe. Diese Abläufe entstehen selten zufällig. Sie stellen die Firmenabläufe und Geschäftsprozesse dar, die es verlässlich im Sinne eines gegebenen Unternehmenszieles auszuführen gilt.

Unabhängig davon, ob in den Abläufen Dinge produziert oder Dienste geleistet werden, unterstützen sie am Ende das Ziel des Unternehmens: das Geld zu verdienen.

Es gibt verschiedene Arten der Informationen, die im Unternehmen verwendet werden. Allgemeine spezifische Informationen kann man im Unternehmen zur Analyse anwenden, um auf eine fundierte Entscheidung weiter zu kommen. Diese Art der Informationen hilft verschiedene Business-Strategien zu planen.

Die wissenschaftlich-populäre Informationen sind Informationen aus Fachzeitschriften, verschiedene Veröffentlichungen und populäre Publikationen wie Zeitschriften. Wenn man über Business-Management und Strategien wissen will, sucht man daraus die Informationen über das Geschäft. Dort werden nebenbei wissenschaftliche Informationen Daten der früheren Untersuchungen und etablierte Theorien über Unternehmen dargestellt.

Die Primär-Sekundäre Informationen sind die Informationen für primäre Tagebücher wie Zeitschriften, direkte Interviews, Audio- und Videoaufnahmen und andere. Die sekundären Informationsquellen sind die Auszüge aus Interviews, die Anthologien, Biografien usw.

## **VERIFICATION OF DIVISIBILITY OF SUPERLONG NUMBER BY SHORT PRIME NUMBERS**

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It is known that the arithmetic operations performed by the computer in limited number of discharges don't always allow to receive an exact result. Moreover, we are limited to the size of numerals we can work with. And what should be done if we need to perform arithmetic operations with very large numbers?

My task was to develop the program which was capable to carry out by means of the computer arithmetic operations (addition, subtraction, multiplication, division, exponentiation, elementary functions) over numbers which digit capacity exceeds length of a machine word of this computer. In other words, to create such data type which can store real numbers of unlimited length and carry out with them basic arithmetic operations.

Long numbers are applied in the following areas:

1. Drawing up the code for processors (microcontrollers) of low digit capacity;
2. Cryptography. The majority of systems of signing and data encryption use integer numerals on module  $m$  where  $m$  is a very large natural number;
3. Mathematical and financial software;
4. Sports programming.

The first question that needs to be answered is how after all to present and store super long numbers? The class of big integers contains the BASE field, a base radix – 1,000,000,000. The super long number will be stored in a vector form. The vector is a data structure which is already model of a dynamic array. The vector is similar to a dynamic array, but the vector can change the size independently.

Then I decided to think about the storage of numbers, I wondered where it was necessary to store the sign of number. For this purpose, I created a variable which accepts value 1 if the number is negative (it is faced by minus) or 0 (if before it minus is not necessary).

At first in a class of super long numbers I implemented an opportunity to compare numbers. It is the main operation on the basis of which the others are implemented.

The operations of addition, subtraction and multiplication were implemented by a school method "in a column".

The operation of division is a little more difficult, here it is necessary to select quotient binary search. For this purpose, the operation of "shift" of number to the right was used which allowed us to get access to discharges consistently.

The function of division with remainder was also applied. The user enters super long number, enters a prime number, the remainder of division is compared to zero. If the remainder is nonzero, then number is not divided without the remainder.

## REVOLUTIONARY TECHNOLOGY WEB 3.0

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What is Web 3.0 is still an open question, since a precise definition has not yet been formed. People give different definitions based on what area they belong to. The blockchain effect on Web 3.0 is still evolving, but some details are clearer now than ever.

Just like historical periods, at the time of its inception, Web 1.0 was not called that. The World Wide Web was a collection of static websites that loaded information without interactive content. And then 2.0 appeared, and few people remember the minimum interfaces and speeds of 16 kb / s. Faster internet speeds paved the way for interactive content. The global exchange of information spawned the growth of “social networks”. Youtube, Wikipedia, Flickr and Facebook gave voices to ordinary people and became a vehicle for like-minded people.

The emergence of the blockchain gave rise to a movement that is intended to change the entire technology industry. Cryptanarchists and blockchain enthusiasts call this new phenomenon the Internet 3.0. In the future, this phenomenon should lead to the demise of all existing business models. Generally speaking, the reason for this will be that the new technology will allow to decentralize the Internet space, so that corporations will have to say goodbye to total control and monopoly ownership.

Currently, the Web 3.0 ecosystem has already 3,000 different cryptocurrencies and more than 900 decentralized applications. Moreover, behind each application and blockchain project there is a professional team that can number up to 50 people. And even despite the fact that the cryptocurrency sector is at an early stage of development, the market capitalization exceeded at one point \$ 800 billion.

It is easy to foresee the near future, in which crypto-oriented smartphones, VPN services, decentralized storages and cryptocurrency wallets will be widely popular. The future without the need for networks and cellular providers who collect and analyze our information. If we can get away from technology dystopia



in the style of Black Mirror, we will need such solutions. In general, Web 3.0 offers a number of advantages:

- Lack of a central point of control: the middleman is removed from the chain of operations. No government or private structure will be able to destroy the site – individual individuals will not be able to control others.

- Data Ownership: End users will have complete control over the data and security provided by encryption.

- Reducing the number of hacks and leaks: since the data will be decentralized and distributed, hackers will need to disable the entire network.

- Compatibility: applications will be simple to customize and universal, they can be run on a smartphone, TV, in the car, on a microwave oven or smart sensors.

- Services without interventions: closing accounts and services will happen much less often – there will be no single point of failure. The data will be stored and distributed across a distributed network to ensure the availability of multiple backups, and to protect even against the physical destruction of the media.

As Web 2.0 did not immediately buried Web 1.0, the transition to version 3.0 takes time to create, as well as integration with existing online systems. Web 3.0 is a revolution in motion, and we have passed the point of no return, and we can only wait and watch innovations.

## **EVOLUTION OF VIDEO GAMES**

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The history of video games has more than 60 years. The first games WERE primitive, but it was they who set the vector for the development of the entire gaming industry.

The hi-graphic 3D video games that we play today are certainly a result of inventions in the past. Most of the people play them, but they don't know what has enabled them to enjoy such entertaining technology. There have been several ups and downs in the evolution of video games, and their advancements were not quick, as there were many challenges involved in making them better.

The evolution of video games is directly related to the progress in the field of “game iron”. And in the initial stage this concerned, first of all, game consoles, since PCs became available to most users much later. Let's take a look at how everything started and what long way video games went through to become what they are now.

The purpose of this study is to determine how games evolved for the period from 1967 to 2019 and to determine the role of video games in the modern media sphere.

The main tasks are: to follow the development of technologies for creating video games and to determine the role of video games in the modern media sphere.

The term video game has evolved over the decades from a purely technical definition to a general concept defining a new class of interactive entertainment. Technically, for a product to be a video game, there must be a video signal transmitted to a cathode ray tube (CRT) that creates a rasterized image on a screen.

In 1967, developers at Sanders Associates, Inc., led by Ralph Baer, invented a prototype multiplayer, multi-program video game system that could be played on a television. It was known as “The Brown Box”. Baer, who’s sometimes referred to as Father of Video Games, licensed his device to Magnavox, which sold the system to consumers as the Odyssey, the first video game home console, in 1972. Over the next few years, the primitive Odyssey console would commercially fizzle and die out. Yet, one of the Odyssey’s 28 games was the inspiration for Atari’s Pong, the first arcade video game, which the company released in 1972. In 1975, Atari released a home version of Pong, which was as successful as its arcade counterpart.

In 1977, Atari released the Atari 2600 (also known as the Video Computer System), a home console that featured joysticks and interchangeable game cartridges that played multi-colored games, effectively kicking off the second generation of the video game consoles.

In the year 1980, many other video games were invented which were more interesting than the earlier ones; such as defender, battle zone, and even the most famous “pacman”. In 1985, game consoles lost their share among the public, as there were advanced PC and hand-held unit games available in the market. Later, a company known as Nintendo Entertainment System (NES) created the animated characters “Mario” and “Luigi”, which became well-known in the game “Super Mario Bros”. This is one of the bestselling games ever in history, and made Mario a cultural icon around the world. According to a survey conducted in 1991, children were able to identify “Mario” more than the legendary “mickey mouse”.

As this technology evolved in the early 1990s, several action and first-person shooting games were bought into the scene, like “Wolfenstein 3D” and “Doom”. Looking at the popularity of such games, the companies decided on providing free 'demo' game versions to the public. During these years, computers became well suited for handling such 3D games. The “doom” game had certainly set a standard for action shooting games along with good 3D graphics. In the mid-1990s, video games leaped to the Big Screen with the release of the Super Mario

Bros. live-action movie in 1993, followed by Street Fighter and Mortal Kombat over the next two years. This game also proved to be famous among the masses and equaled the fame of “doom”. Such games gave the developers an idea of introducing a multi-player facility in similar games. As we see in today's action games, the multi-player facility has become very common.

Nowadays, there are many advanced 3D games available in several genres, such as shooting, sports, puzzles, action, horror, racing, etc. These games also include a high-quality surround sound and highly advanced graphics, and can be played on advanced gadgets such as the “PS3” and “Xbox 360”.

Video games have long been a part of modern culture: in many countries they are already officially recognized as art. E-Sports are gaining popularity and according to analysts' forecasts, the audience of spectators, as well as the financial turnover of this industry, will already exceed standard sports by 2025. From this it follows that the popularity of video games will only increase, and their further evolution will lead to the emergence of new genres, as well as a qualitative leap that will make games indistinguishable from reality.

## **MUSIC VIDEOS AS A MEANS OF COMMUNICATION WITH AUDIENCE**

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The widespread distribution of both music and advertising videos attracts the attention of virtually all groups of people defined by with different socio-demographic status, interests and life experience. At the same time, a full understanding of the impact of music videos on the audience cannot be assessed without specifying the concept of a music video.

The music video can be defended as a short video of no more than 60 seconds, accompanied by a musical composition, with the plot constructed in accordance with the meaning of the song. This video may have advertising character.

The first music video appeared in 1926, when the performance of Bob Witt and Saya Berg was recorded on tape. For a long time, music videos were just that,

and it was nothing more than a taped performance of a song. In addition, the name “the video clip” was not applied to these records. The first person, who called his performance “music video”, was Big Bopper. His video “Chantilly Lace” was the first music clip. At the same time, the Queen can be considered as the creators of the first clip in the history. Their video “Bohemian Rhapsody” was one of the most innovative idea of the past century. This video recorded on a videotape is considered iconic. Its features are the use of simple special effects and the change of scenes.

Distribution of video clips occurred through television broadcasting. The growth of the popularity of videos contributed to the opening on August 21, 1981 of the MTV channel, main task of which was to broadcast music videos. Today, the main means of distributing video clips is the Internet. Important changes in promoting clips and expanding their audience have been associated since the launch of the YouTube platform in 2005. In the same year, the first viral video appeared. This video able to spread independently, without the participation of programmers and optimizers. To date, the YouTube is a leader in the popularization of video clips. Despite the fact that the videos are mainly the product of the work of musical artists, their use in various advertisement, public relations, and the work of video bloggers has become ubiquitous. Often this is due to the great influence, which video clips have on the audience.

For example, the introduction of various signs and symbols in the video referring to a particular work of art or a historical event increases the interest of the audience. The video clip of the Canadian musical group Arcade Fire to the song “Signs of Life” is kind of reminiscence. So, the sign of Our oboros (a snake biting its own tail) is interpreted as an alternation of life and death, creation and destruction. In this clip, the symbolism does not complement the video sequence, but becomes its basis: the storyline of the clip is a reference to the X-Files series.

Often, video clips have a strong influence on the political or cultural situation in the country, drawing attention to actual social problems. In his video clip “This Is America” Childish Gambino touched on a lot of problem of modern America, such as racism, suicide, weapons carrying, insanity on social networks. There are many references to events in history of USA, phenomena of pop culture and the Bible in this video. So, in one of the scenes, Glover moves strangely, grimaces a lot. His pose repeats the movements of the famous comic of the 19<sup>th</sup> century Jim Crow, a black tramp incapable to learn, but very funny.

It is also important that videos can educate the audience. These videos are based on real events. For example, the video shot by The Carters at the Louvre. The action of the clip takes place against the background of many famous paintings, such as “Portrait of Madame Recamier” by Jacques-Louis David, “Mona Lisa” by Leonardo Da Vinci. Closer to the end in the frame for a moment, appears “Portrait of a Black Woman” by Marie Benoit – one of several exhibits of the Louvre, in which afro-american are not slaves. Written six years after the abolition of slavery, the picture became a symbol of freedom, the emancipation of women and racial rights.

Thus, videos as a way of communication with the audience emerged in the early 20th century and acquired a worldwide reach after the emergence of music channels and the Internet. Music videos, possessing qualities of context and multi-functionality, are involved not only in promoting the activities of the artist, but also in raising interest in a variety of social problems, in the political and economic situation in the country. Educational videos, based on real events can serve as an effective means of disseminating knowledge and cultural values.

## **INFORMATION SECURITY AT REMOTE BANKING SERVICE**

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Remote banking service, which is about is closely related to information technology, improve the competitiveness of the banks and allows it to attract new customers. Despite the variety and reliability of modern security tools, they do not guarantee the absence of risk when performing banking operations.

Famous forms of RBS are operations with bank cards. One point of view regarding the concept of “bank card” does not exist. A bank card can be defined as a means of managing or disposing of the funds of its holder in order to pay for goods and services, as well as to receive cash and currency. Due to the versatility and ease of use, bank cards are used everywhere – in the areas of retail services, banking and budget.

In Russia there are the following types of bank cards:

- 1) Settlement (debit). Designed for operations with the funds of the card holder in his bank account;
- 2) Credit. Used to perform transactions with funds provided by the credit institution to the cardholder;
- 3) Prepaid Designed to perform transactions with electronic money.

It should be noted that bank cards do not support operations with electronic money, but are a tool for managing a bank account, that is, they provide an opportunity to manage only ordinary money that has a non-cash form.

In recent years, there has been a tendency to increase the number of issuer (issue) of bank cards. Thus, the number of payment and credit cards issued by

credit organizations has grown from 100 million units in 2008 to more than 270 million in 2019 that is, more than doubled. At the same time, a large share of them falls on payment cards – about 87%, while on credit cards – 12.9%. The main reasons for this are the convenience of using cards for customers (for example, receiving an inappropriate loan), development of technological infrastructure, expanding the functionality of ATMs and profits for banks – banks charge a percentage or fee on the amount of money when conducting various card transactions (for example, when servicing client of another bank using an ATM).

For making transactions with a bank card, the appropriate equipment is used – ATMs, cashless payment terminals – and software. Obviously, there is a risk of equipment failure, malfunction, and fraud. In this case, the card user may lose own money, while the bank may face a decrease in business reputation.

Therefore, it is conditionally possible to distinguish the following risk groups when using bank cards:

- 1) Risks associated with servicing bank cards with the help of appropriate hardware and software;
- 2) Risks associated with the activities of the card issuing bank;
- 3) Risks associated with the activities of fraudsters.

The first group covers such risks as:

- failure (breakdown) of equipment serving a bank card;
- failure in the banking information system;
- user error when working with equipment;
- failure of communication systems.

These are risks associated mainly with the refusal or termination of customer service for technical reasons or for reasons related to human factors, that is, errors of the customer himself. The manifestation of client's errors when working with equipment can be blocking the card and the funds placed on it, if the PIN code is entered incorrectly several times and the code word is not known. This type of problem, as a rule, the client solves by contacting the employees of the bank.

The second group of risks include:

- intentional concealment of the facts of transactions and transactions;
- violation of the agreement on the use of a bank card;
- inadequate organization of the bank information system;
- use of ineffective security tools.

Such risks most often arise when using the services of small banks, which either do not have the means to acquire reliable and secure information systems, or are engaged in illegal activities in order to earn profits or serve the interests of specific individuals or organizations. A large number of such banks became the reason for the start of the so-called “cleaning of the banking sector” by the Central Bank of the Russian Federation. These activities led to a decrease in the total number of banks operating in the Russian Federation, from 2013 to 2019 approximately doubled.

The third group of risks includes the actions of fraudsters, aimed mainly at obtaining confidential information about the victim, which is usually used to steal money from a bank card. Most often, fraud is carried out using ATMs.

In turn, the risks of the third group can be divided into two subgroups – social and technological.

The first subgroup includes types of fraud based on the use of the human factor. All forms of this group of fraud are related to the misrepresentation of the victim, as a result of which the victim gives out confidential information. The types of social fraud include:

1) Fraud on the phone. This is done by making contact with a potential victim using a mobile connection that is, using a phone call or SMS. The fraudster impersonates himself as a bank employee or an employee of another organization and, under various pretexts, tries to force the victim to obtain confidential information or transfer funds to a bank account or mobile phone number;

2) Phishing is characterized by the creation of websites on the Internet that resemble the official websites of banks or other organizations. At the same time, they in various ways, for example, by sending mass e-mails of letters and messages on social networks, distribute links to this site. Messages require confidential information. Phishing has variations:

- spearphishing – fraudsters preselect a certain group of people for themselves on any grounds and attack this group;

- twinphishing – sent fake letters vneschne similar to these letters banks;

- smishing – characterized by an attempt to obtain information via SMS ;

- vishing – characterized by an attempt to obtain information through the emulation of a call from the call center of the bank;

- whalephishing – potential victims are senior managers and / or company management. Before each attack, fraudsters collect a large amount of personal information about a potential victim, which increases the likelihood of phishing success.

The second subgroup includes fraudulent transactions using special technical tools and programs. These include:

1) "Lebanese loop". Fraudsters set in the card slot of the ATM or payment terminal technical device, which is often referred to as "Lebanese loop" blocking insert the card, thus making it impossible to extract it after the service end of the session. With the help of cheating or pre-installed other devices (for example, a patch plate on a keyboard, a micro camera, etc.), the PIN will be recognized by the rightful owner. As soon as the cardholder leaves the ATM or the payment terminal, the fraudsters remove the device from the ATM with the card in it.

2) Skimming. It involves the use of multiple devices to obtain confidential information. These devices may include: a skimmer – a device for reading data from a magnetic strip of a bank card, a fake keyboard for entering the PIN-code of the victim, a hidden camera – for fixing the PIN-code entered. Malware embedded in an ATM can also be used. There are the following types of screaming:

– fraud using an ATM, payment terminal or door lock at the entrance to the 24-hour self-service area for customers;

– fraud in organizations working in the field of trade or services. In this case, with the help of special equipment, employees of these organizations in order to commit fraudulent actions copy the data from the magnetic strip of the client's card when they take it from the client to pay for goods (services), ensuring that the card is not in the owner's sight.

Now consider the list of measures that will prevent the considered risks. These measures are intended to be respected by both banks and their customers.

To minimize the risks of the first group, the management of the bank should pay close attention to the selection of employees in the IT department. This contributes to reducing the number of vulnerabilities in the information system, as highly skilled, experienced employees make less mistakes. You also need to buy high-quality modern equipment to reduce the likelihood of damage for a certain time period. The presence of employees who will teach customers to use the equipment, minimizes the risk of errors when working with him.

In order not to face the adverse effects of illegal or undesirable bank activities for the client, the client should use the services of large banks. To do this, you need to familiarize yourself with such information as: the rating of the Central Bank of reliable banks, the ratings of the rating agencies of the bank, customer reviews, the amount of equity capital of the bank, the number of customers.

Measures to reduce the risk of fraud on the part of the client are:

- following all recommendations of the bank when using banking services;
- not disclosing confidential information about a bank card;
- ensuring the storage conditions of a bank card, which exclude the possibility of losing it or falling into the hands of outsiders;

Visual inspection of banking equipment for the presence of foreign devices.

Measures to reduce the risk of fraud on the part of the bank are:

- development and compliance with information security strategies;
- continuous improvement of existing security and risk management systems;
- following the recommendations of international payment systems in the field of risk management;
- informing customers about fraud schemes.

Let us consider in more detail the content of an information security strategy. Information security strategy is a document containing a set of measures ensuring the protection of information. In addition to measures, the document should contain: goals and objectives of information security, the main security threats, objects of protection, the procedure for revising the strategy, a description of the system of coordinated activities for the management and management of information security of the bank, etc.

The objects of protection can be:

- confidential information (for example, commercial and bank secrecy);



– regulations and procedures for the collection, storage and transmission of information;

– information infrastructure, including information processing, storage and analysis systems, hardware and software for its transmission, storage, processing and display, including information exchange channels and telecommunications, information protection systems and tools.

Measures to protect information in the bank:

– staff training in information security;

– requiring staff to comply with safety measures;

– granting access rights to information systems based on acting roles , in accordance with the principle of the minimum necessary level of access;

– use of antivirus software and installation of updates for all software;

– transfer of confidential information only in encrypted form using encryption algorithms;

– use of electronic digital signature to confirm the authorship of documents.

The development of information technology has led to the creation of remote banking services. Bank cards are firmly established in our lives, but this has created many risks and problems associated with their use. To avoid the occurrence of the above risks, it is necessary to take measures to minimize them. At the same time, measures must be taken by banks and their customers.

## **THE REVIEW OF AGILE FRAMEWORKS**

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Today we can hardly imagine any sphere of business without the information technologies, especially if this business is directly connected with it, for example, software design and development. Nowadays, software products have become so voluminous and complicated that we have to use new project approaches to manage them. One of this tools is Agile development methodology.

Agile software development is an approach to software development under which requirements and solutions evolve through the collaborative effort on self-organizing and cross-functional teams and their customers.

By itself, Agile is not a standard, but it proclaims the principles of project management, software design and architecture, process optimization. Some developers consider Agile a style of thinking and even a lifestyle.

This class began its development in the 70s of the XX century by the publication of the American scientist William W. Royce “Managing the Development of Large Software Systems”. In this document, Royce criticized the coherent development system that was very common at the time. But, the term Agile was popularized, in this context, only in 2001 by the Manifesto for Agile Software Development. This document proclaims basic principles of Agile software development, such as:

- Individuals and interactions are over processes and tools;
- Working software are over comprehensive documentation;
- Customer collaboration are over contract negotiation;
- Responding to change are over following a plan.
- That is, while there is value in the items on the right, we value the items on the left more.

All methodologies based on Agile integrate the fact that software development is conducted not as the whole product and not in stages, but in separate blocks (user stories) that are filled in by the customer, and then all stories are sorted by the project manager in order of their development priority. The product is not released as the whole, but by versions with new functionality, and the customer at the end of each iteration thinks what to do with the project next.

There are a broad range of software development frameworks, including Extreme Programming (XP), Scrum, Kanban, Dynamic Systems Development Method (DSDM), Feature-Driven Development (FDD), Lean etc.

Scrum is a standard developed in 1986, is considered the most structured Agile method. It is based on sprints (iterations), during which a certain number of tasks are performed.

Scrum basic rules are:

- The project team and sponsors create an ordered list of tasks or functions (product backlog).
- Each month, the team pulls the top of the list, which it rates as part of the work for the month. This list of tasks is called the sprint backlog.
- Every day, the team come for the 5-10 minutes meetup (scrum) to inform each other about the state of work and any obstacles.
- Someone is appointed as a scrum master. The task of this person is to help the team and to defend it from any problems.
- The product owner creates and maintains the product backlog.
- The team performs time-grouped monthly sprints within which they develop a monthly volume of a product backlog.

Kanban is an Agile method that allows to streamline tasks of the product development. The Kanban approach is to separate the development into several stages. After determining the stages, they are placed on the Kanban board as columns. Cards with user stories and necessary information are moved along these

columns. Also there are limits on the number of tasks on the stage. This method is often used as a supplement to other Agile frameworks.

XP is a framework that involves the use of traditional software development methods, raising them to an extreme level. J. Shore and S. Warden in the book “The Art of Agile Development” described XP as a weekly software deployment process using parallel phases. At each iteration, the team analyzes, designs and tests many new features.

In the book “Extreme Programming Explained”, twelve basic techniques are defined grouped into four areas:

- Fine-scale feedback (pair programming, planning game, test-driven development, extreme programming practices);
- Continuous process (continuous integration, refactoring or design improvement, small releases);
- Shared understanding (coding standards, collective code ownership, simple design, system metaphor);
- Programmer welfare (sustainable pace).

Scrum and XP are similar in that they use an iterative development approach. Iterations in Scrum and XP differ in their duration and development methods. If in Scrum one iteration can last up to one month, but XP uses short iterations of 1-3 weeks in length.

Many teams believe that implementing technologies (especially, Scrum and XP) is more successful than using individual practices. Unified methodology brings all team members together to find out how selected practices will fit into one methodology. To do this you need to change the way of thinking.

Methodologies are based on agile values and principles, so changes involve collaboration and interaction, software development and response to changes. The transition is facilitated by books and knowledge of agile masters and communities.

## **DIE GESTALTUNG DES MODERNEN STANDORTS DER HANDELSORGANISATION „MEGAFON“**

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MegaFon ist ein russisches Telekommunikationsunternehmen, das Mobilfunkdienste sowie lokale Telefonie, Breitband-Internetzugang, Kabelfernsehen und eine Reihe damit verbundener Dienste anbietet.

Mit einem Kundenstamm von über 100 Millionen Menschen muss das Unternehmen über eine Site verfügen, die für den Benutzer informativ und praktisch ist.

Das Site-Design enthält recht helle Unternehmensfarben – Grün und Lila. Und dies ist nicht nur der Fall, wenn man es aus der Sicht der Semantik betrachtet, es zeigt uns, dass Grün eine entspannende Wirkung hat, und Purpur ist die Farbe der Konzentration. Konzentration betont die Kreativität der Werbung. Daraus können wir schließen, dass Kombinationen von Grün und Lila für den Benutzer der Website komfortabel und einflussreich sind.

Die Zusammenstellung der Hauptseite ist extrem einfach, es gibt dynamisch wechselnde Bilder, wodurch das Webdesign origineller, bunter und jünger wird. Wenn Sie es jedoch von der anderen Seite betrachten, kann dies den Besucher der Website ablenken.

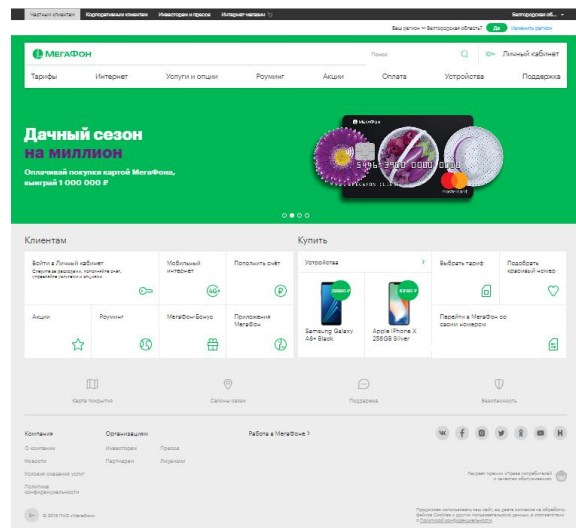


Abbildung 2.1 – Die Website der Handelsorganisation „Megaphone“

Die Seitennavigation ist auch recht einfach und bequem, was zum Hauptziel des Benutzers beiträgt: Informationen über das für ihn interessante Produkt schnell herauszufinden.

Am oberen Rand der Seite befinden sich Schaltflächen wie Privatkunden, Firmenkunden, Investoren und Presse sowie ein Online-Shop und das Auswählen einer Region. Darüber hinaus wird nach den erforderlichen Informationen gesucht und Sie können sich in Ihrem persönlichen Konto anmelden. Das Hauptinformationsmaterial wird durch 8 Schaltflächen angezeigt: Tarife, Internet, Dienste und Optionen, Roaming, Promotions, Zahlung, Geräte und Support.

Standortinformationen werden in Form eines Kartensystems dargestellt, das den aktuellen Trends der modernen Website entspricht. Karten in den Schnittstellen helfen dabei, die "Reaktionsfähigkeit" auf jedem Gerät und jeder Bildschirmgröße zu erreichen. Auf der Website der Handelsorganisation MegaFon

enthalten die Karten spezifische Informationen zu einem bestimmten Produkt. Sie werden auch in kleinen Größen präsentiert, was die Möglichkeit einer informativeren und bequemerer Suche nach den erforderlichen Informationen bietet.

Es ist auch erwähnenswert, dass das Informationsmaterial Fotos enthält, die die Wahrnehmung von Inhalten sättigen.

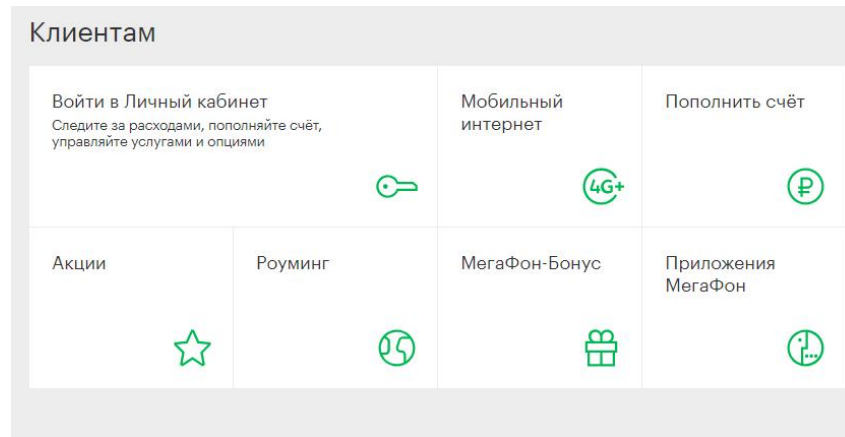


Abbildung 2.2 – ein Beispiel für Karten der Site "Megaphone"

Das Navigationsmenü wird oben horizontal angezeigt. Wenn Sie von einer Seite zur anderen wechseln, müssen Sie nicht zurückgehen, was die Zeit relativ reduziert.

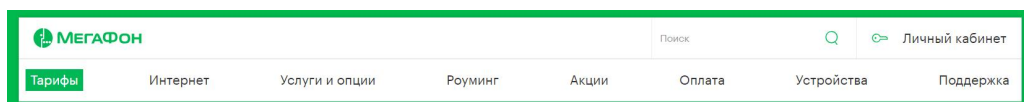


Abbildung 2.3 – Menünavigationsseite "Megaphon"

Am unteren Rand der Seite befinden sich rechtliche Informationen, Details und soziale Schaltflächen. All dies ist leicht wahrnehmbar und lesbar.

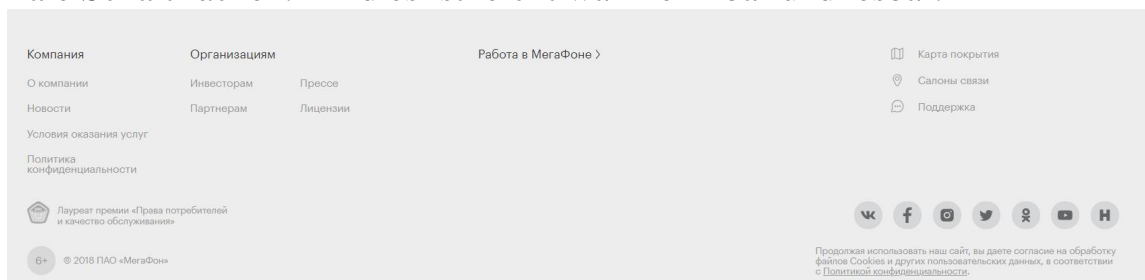


Abbildung 2.4 – Die Fußzeile der Site "Megaphone"

Nach der Analyse der Megafon-Website kamen wir zu dem Schluss, dass diese Webressource den aktuellen Trends moderner Websites entspricht.

## NEW IN IT IN THE AREA OF SOFTWARE DEVELOPMENT

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Now functioning of the modern organization in the conditions of the market economy depends on the effective functioning and development of workflow. Solving the problem of workflow optimization improves the quality of workflow functioning, reduces the current expenses of business processes maintaining and allows to coordinate organization activity.

The development of the organization's workflow includes an assessment of the current state and analysis of the effectiveness of workflow, in which takes quantitative and qualitative indicators.

At the moment there is no universal method of analysis of the state and efficiency of workflow. Different approaches to solving this problem were developed by specialists in different areas of science, such as V. I. Sadovnikov, P. L. Epstein, M. K. Starovoitov, P. A. Fomin, I. V. Usmanov and some other.

V. I. Sadovnikov and P. L. Epstein are developed one method of analyzing the state of the organization workflow. This method of analysis is graphical representation of documentation processes in the organization: from the moment of creation the document before that document is signing, execution and archiving of the document. Advantage of this model is the visibility, the ability to examine the route scheme of document and estimate the volume of the workflow diagram structure. However, the disadvantage of this method is inability to evaluate other quantitative indicators, such as the number of created, signed or revoked documents.

Issues of assessing of the state and efficiency of workflow analysis are considered in articles of I. V. Usmanova. As a method of analysis, she suggested to use the informal models of knowledge representation (semantic networks). In this method, the nodes of the network are concepts and statements that characterize features of work with documents, and these nodes are connected by semantic statements such as "A lot of", "Broken", "Error". The interdependences of productivity indicators of the workflow are based on statements.

The advantage of the semantic network as a means of analyzing the state and efficiency is also visibility, ability to see problems in the workflow processes and

possibility of possibility of taking into account qualitative characteristics of the workflow processes.

However, semantic networks have disadvantages, such as not taking into account all quantitative characteristics of the circulation, the impossibility of a full analysis of the workflow business process due to the size of the model. In addition, it is difficult to modify that model due to changes in the structure of workflow business processes.

Workflow analysis is also possible using method of the declarative description. In the course of the analysis and evaluation of the effectiveness of this method expert (specialist of workflow support service of contract Department) analyzes the effectiveness of workflow management, based on our own professional experience and comprehensive study of qualitative and quantitative indicators.

The advantages of analyzing the workflow efficiency with the help of method of the declarative description:

- Synthesis of expert's experience and intuition during the analysis;
- The possibility of taking into account expert quantitative indicators;
- Comparative speed of obtaining analysis results.

However, the disadvantages of this method are:

- Probably inadequate competence of the expert;
- Subjectivity of this method;
- The complexity of the collecting information;
- The need for highly qualified specialists for the analysis.

The effectiveness of the organization's workflow depends on these quantitative indicators:

- The volume of workflow structure;
- Number of created and sent documents;
- The volume of the document approval structure (number of conciliators);
- The average speed of document signing;
- Proportion of created and maintained documents on a single officer from total number of officers;
- The number of signed documents, their proportion of the total number of documents;
- The number of “erroneous” documents, their proportion of the total number of documents;
- The number of canceled documents, their proportion of the total number of documents.

The method of analysis of workflow efficiency, that built on the basis of quantitative parameters are based on the account of the described indicators in the aggregate. Upon based on this method can be concluded that the rationality of existing workflow business processes, the degree of workload of officials, that method can help speed up documents processing, reduce the number of errors in the processing of documents. The disadvantage of this method is insufficient

workability in organizations. Its application is complicated by the variety of workflow business processes schemes in various organizations.

The method of analytical hierarchy process (AHP) is used to select the best method for workflow efficiency analyzing. The essence of this method is to establish priorities (weights) of the alternatives selected for evaluation by the way of pairwise comparison of selected criteria and alternatives by individual criteria.

The typical thing for the workflow system indicators are used for criteria. The following methods: workflow graphical description, semantic networks, a method of declarative description and analysis efficiency, based on the quantitative parameters of the workflow. Weightiness's of the criteria are determined on the expert evaluation. A specialist of technical support of the workflow is an expert. When matrices of paired comparisons are filled during the application of method of analytical hierarchy process the result of alternatives ranking is obtained.

Thus, four methods of workflow state and efficiency analysis are considered: workflow graphical description, semantic networks, a method of declarative description and analysis efficiency, based on the quantitative parameters of the workflow. Advantages and disadvantages of each method are determined. With the help of the method of analytical hierarchy process determined that the best of all the methods is analysis efficiency, based on the quantitative parameters of the workflow.

## **MODERN PRIMALITY TESTS**

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The main concern of the research is to popularize primality tests and structure the information about prime numbers.

Urgency of the prime numbers issue is of central importance to number theory but also have many applications in other areas within mathematics, including abstract algebra and elementary geometry. Big prime numbers are mostly used in encryption and decryption processes. They are used because factorization is very improbable by hit and trial method in case of prime numbers unless you



know the exact factors. This makes the encryption keys secure and prevent hacking attacks.

A prime number is a positive integer that does not have positive divisors other than 1 and itself. For instance, 2, 3, 5, etc. Other numbers are called composite (or non-prime). While simple to describe and understand, the prime numbers are hidden from us. How we check whether a number is Prime or not? We use primality tests. A primality test is an algorithm for determining whether a number is prime. Primality tests come in two varieties: deterministic and probabilistic.

Let's mention some ideas of deterministic tests:

Deterministic tests determine with absolute certainty whether a number is prime.

1. A Basic Method. A Basic Method is to iterate through all numbers from 2 to square root of  $n$  and for every number check if it divides  $n$ . If any prime is divisible by any numbers then it is composite, and any further tests can be skipped.

2. The sieve of Eratosthenes. This is one of the most efficient ways to find all primes smaller than  $n$ . It does so by crossing out as composite (i.e., not prime) the multiples of each prime starting with the first prime number – 2. This is the sieve's distinction from using trial division to sequentially test each candidate number for divisibility by each prime. You can see an example in the scheme 1.

	<del>2</del>	<del>3</del>	<del>4</del>	<del>5</del>	<del>6</del>	<del>7</del>	<del>8</del>	<del>9</del>	<del>10</del>
11	<del>12</del>	13	<del>14</del>	<del>15</del>	16	17	<del>18</del>	19	<del>20</del>
<del>21</del>	22	23	<del>24</del>	<del>25</del>	26	<del>27</del>	28	29	<del>30</del>
31	<del>32</del>	<del>33</del>	34	<del>35</del>	36	37	<del>38</del>	<del>39</del>	40
41	<del>42</del>	43	<del>44</del>	<del>45</del>	46	47	<del>48</del>	<del>49</del>	50
<del>51</del>	52	53	<del>54</del>	<del>55</del>	56	<del>57</del>	58	59	<del>60</del>
61	<del>62</del>	<del>63</del>	64	<del>65</del>	66	67	68	<del>69</del>	70
71	<del>72</del>	73	<del>74</del>	<del>75</del>	76	<del>77</del>	<del>78</del>	79	<del>80</del>
<del>81</del>	82	83	<del>84</del>	<del>85</del>	86	<del>87</del>	<del>88</del>	89	<del>90</del>
91	<del>92</del>	<del>93</del>	94	<del>95</del>	96	97	<del>98</del>	<del>99</del>	<del>100</del>

Scheme 1. The sieve of Eratosthenes

3. In addition to the mentioned tests that apply to any natural number, some numbers of a special form can be tested for primality more quickly. For example: the Pépin's test for Fermat numbers, the Proth's theorem for Proth numbers, the Lucas–Lehmer test for Mersenne numbers.

- $2^{2^n} + 1$  Fermat numbers: 3, 5, 17, 257, 65537 ...
- $k2^n + 1, k < 2^n$  and odd. Proth numbers: 3, 5, 9, 13, 17, 25, 33, 41, 49, 57, 65 ...
- $2^n - 1$  Mersenne numbers: 1, 3, 7, 15, 31, 63, 127, 255, 511, 1023, 2047 ...

And now let's go on to some ideas of probabilistic tests:

As for probabilistic tests, they can potentially (although with very small probability) falsely identify a composite number as prime. However, they are in general much faster than deterministic tests. There are a number of different probabilistic primality tests. One of the more simple probabilistic primality tests is the Fermat primality test, which is based on Fermat's little theorem and is used in PGP and RSA encryption. The theorem states that, if  $p$  is prime, then for any integer  $a$ , the number  $a^p - a$  is an integer multiple of  $p$ . This method will indicate if  $p$  is a probable prime, but since we're only selecting a single  $a$  value, the possibility of  $p$  being incorrectly identified as a prime is high. We can minimize this probability by repeating the process  $k$  times and selecting  $k$  witnesses. The Miller–Rabin primality test and Solovay–Strassen primality test are more sophisticated variants. Moreover, the Miller–Rabin test is strictly stronger than the Solovay–Strassen test, so it is used more today.

To draw the conclusion, it can be said that primality tests are important not only for modern fields in mathematics but for cryptography as well.

## **SOFTWARE IMPLEMENTATION OF SHELL SORT FOR STRING TYPE OBJECTS**

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The subject of my scientific work is the software implementation of Shell sort for string type objects. The goal of the work is to create a program for sorting objects of string type.

The main tasks of this study are:

- the study of scientific literature and theoretical material necessary to fulfill the purpose of the work;
- development of skills of object-oriented programming in C++;
- implementation of its own string data type;
- implementation of the sorting algorithm by the Shell method for the described data type.

Sorting algorithms are evaluated for speed and memory efficiency:

Time is the main parameter characterizing the speed of the algorithm. It is also called computational complexity.

Memory – some algorithms require additional memory for temporary storage of data.

Optimality – the task of sorting in the general case assumes that the only necessarily available operation for the elements is a comparison.

Standard sorting algorithms are the most common to use. Many prefer them because of ease of implementation and stability. One of the positive qualities of these types of sorting is steadiness, which preserves the mutual arrangement of equal elements.

One of the standard sort method is Insertion sort. Insertion sort iterates, consuming one input element each repetition, and growing a sorted output list. At each iteration, insertion sort removes one element from the input data, finds the location it belongs within the sorted list, and inserts it there. It repeats until no input elements remain.

The Shell sort method is the simplest extension of the insertion method, which is faster by allowing the exchange of places of elements that are far from each other. The only difficulty in the implementation of Shell sort was the optimization of sorting algorithm for your own data type.

New methods were added to the description of the data type for the function operability, among them were string inequality operators, indexation operators and the function of conversion to the symbols array.

The development of your own string data type occupies a large part of the process of implementation of the algorithm. The first stage includes the formulation and analysis of requirements, conceptual development at the logical level. The implementing data type required the ability to work with strings: the possibility of creating them, comparing, copying, indexing, combining them into string arrays, concatenations, and converting them back to character arrays.

The second stage is to implement the data type. The class contains the description of methods and properties necessary for work in this subject area. All class methods are contained in the public access modifier, and properties in the private access modifier.

To implement the project, the integrated development environment VisualStudio 2017 was used. The choice for this product was made in view of an intuitively understandable interface, programming support in C ++, on which this program was written, a convenient debugger and an embedded compiler.

This project has allowed to develop and fix the skills of object-oriented programming in C++; to increase their knowledge in areas such as programming in C, in particular on working with data types, classes and functions; to master the Shell sort algorithm, and learn how to use it to solve practical problems.

## NANOMATERIALS IN MEDICINE

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Nanomaterials are at the leading edge of the rapidly developing field of nanotechnology. Their unique size-dependent properties make these materials superior and indispensable in many areas of human activity.

Nanomaterials have unusual mechanical, optical, electrical and chemical behaviors, they have been widely used in medicine and pharmaceuticals for the sensitive detection of key biological molecules, more precise and safer imaging of diseased tissues, and novel forms of therapeutics etc. In the last two decades, a number of nanoparticle-based therapeutic and diagnostic agents have been developed for the treatment of cancer, diabetes, pain, asthma, allergy, infections, and so on.

The development of synthesis methods of various organic and inorganic nanomaterials, which differ due to morphology, functionality, toxicity, stability, and biological properties, certainly opens a broad route to their practical and innovative applications in medicine and related sciences such as clinical diagnostics and therapies, biomedical analyses, and pharmacology. Their small size and optical properties, and the possibility of surface modification, make different nanomaterials, including nanoparticles, quantum dots, as well as carbon based nanostructures, especially applicable in anticancer therapy, drug delivery systems, bioimaging of cells and tissues, and regeneration of tissues and organs.

Researchers at North Carolina State University are developing a method to deliver cardiac stem cells to damaged heart tissue. They attach nanovesicles that are attracted to an injury to the stem cells to increase the amount of stem cells delivered to an injured tissue.

The scientists at Worcester Polytechnic Institute are using antibodies attached to carbon nanotubes in chips to detect cancer cells in the blood stream. The researchers believe this method could be used in simple lab tests that could provide early detection of cancer cells in the bloodstream.

A test for early detection of kidney damage is being developed. The method uses gold nanorods functionalized to attach to the type of protein generated by damaged kidneys. When protein accumulates on the nanorod the color of the

nanorod shifts. The test is designed to be done quickly and inexpensively for early detection of a problem.

Researchers at the University of Houston are developing a technique to kill bacteria using gold nanoparticles and infrared light. This method may lead to improved cleaning of instruments in hospital settings.

Researchers at the University of Colorado Boulder are investigating the use of quantum dots to treat antibiotic resistant infections.

The unique spectroscopic properties of certain nanomaterials and their specific responses in the presence of biological substances make them very useful for the production of electrodes or sensors used for their detection and monitoring. Finally, some nanomaterials exhibit antimicrobial activity; hence, they can be applied for alternative antimicrobial therapies and treatment.

The successful use of these nanomaterials depends on covering them with different biocompatible substances such as PEG or sodium oleate, liposome-based drug delivery systems, creation of biodegradable and/or biocompatible polymeric nanoparticles, polymeric layer coating with antibodies etc. Coating nanoparticles with natural or biocompatible components reduces their toxicity.

Nanoparticles can also be used as agents in magnetic field hyperthermia cancer treatment due to their magnetic parameters. For example, iron nanoparticles could have paramagnetic or ferromagnetic properties depending on their size. Such properties allow them to remain in a state of constant rotation from one orientation to another in changing magnetic fields. This causes the self-destruction of cancer cells.

There are a lot of issues surrounding the use of nanomaterials in medicine. While several applications of nanomaterials, such as contrast agents and drug delivery systems are well-established, every year new technologies and concepts emerge.

There is lack of experimental data about the emergent properties of these new synthesized nanoscale products and their influence on common processes of the human body.

Due to the knowledge gaps and complexity of the subject, it is difficult to provide complete information about nano instruments for diagnosis, prevention and therapy.