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Year of futurism: Who and how will move the science of the future

Abstract: Today, world science is in a paradoxical position. On the one hand, the word "science" itself constantly, out of place and out of place, is heard in the mouths of politicians, journalists, entrepreneurs and even scientists themselves. Today, even religious sectarians, in addition to using modern means of communication, they often call their "teachings" as "scientific". On the other hand, it is hard to deny that since the 1970s there were no fundamental breakthrough directions in world science. In essence, everything that is considered "the latest achievement", "the most advanced technology", was developed, first as experimental developments, then as separate copies, and then as mass production for the mass consumer, was created back in the 19th and first half of the 20th century. The study subject was the historical evolution of scientific thought. The study object was the scientific environment and scientific thought in the time frame. The study purpose was to search for patterns in the development of scientific thought in the regional and historical aspect. To achieve the study purpose and solve the tasks, historical, comparative, and logical methods were used. In the study course, the author used the works of foreign and Russian researchers, scientists, politicians and philosophers. The author concludes that the crisis of world science is a crisis of Western science. For many reasons, the countries of the modern West are in a state of gradual, but increasingly visible retreat from the leading positions in science and technology. Today, the countries of the global East are less and less dependent on Western technologies and are gradually beginning to take the vanguard positions in the world science of the post-Western world in the middle of the 21st century.

Keywords: science, future, futurism, scientific discoveries, evolution of science.

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Год футуризма: кто и как двинет науку будущего

Аннотация: В наши дни мировая наука находится в парадоксальном положении. С одной стороны, само по себе слово «наука» постоянно, к месту и не месту, звучит в устах политиков, журналистов, предпринимателей и даже самих ученых. Сегодня даже религиозные сектанты, помимо использования современных средств коммуникации, часто свои «учения» именуют «научными». С

другой стороны, трудно отрицать, что с 1970-х гг. принципиальных прорывных направлений в мировой науке не произошло. В сущности, все, что считается «самым последним достижением», «самой передовой технологией», было разработано, сначала как опытные разработки, потом как отдельные экземпляры, а потом как массовое производство для массового потребителя, было создано еще в XIX и первой половине XX века. Предметом исследования стало историческая эволюция научной мысли. Объектом исследования была научная среда и научная мысль во временном контуре. Целью исследования был поиск закономерностей развития научной мысли в региональном и историческом аспекте. Для достижения поставленной цели и решения задач в ходе исследования использовались исторический, сравнительный, логический методы. В ходе исследования автором были использованы труды зарубежных и российских исследователей, учёных, политических деятелей и философов. Автор приходит к выводу, что кризис мировой науки представляет собой кризис именно западной науки. В силу многих причин страны современного Запада находятся в состоянии постепенного, но все более зримого отступления с передовых позиций в науке и технике. На сегодня страны глобального Востока все меньше зависят от западных технологий и постепенно сами начинают выходить на авангардные позиции в мировой науке постзападного мира середины XXI века.

Ключевые слова: наука, будущее, футуризм, научные открытия, эволюция науки.

Introduction

Today, world science is in a paradoxical position. On the one hand, the word "science" itself constantly, out of place and out of place, is heard in the mouths of politicians, journalists, entrepreneurs and even scientists themselves. Today, even religious sectarians, in addition to using modern means of communication, they often call their "teachings" as "scientific". On the other hand, it is hard to deny that since the 1970s there were no fundamental breakthrough directions in world science. In essence, everything that is considered "the latest achievement", "the most advanced technology", was developed, first as experimental developments, then as separate copies, and then as mass production for the mass consumer, was created back in the 19th and the first half of the 20th century. century.

The study subject was the historical evolution of scientific thought.

The study object was the scientific environment and scientific thought in the time frame.

The study purpose was to search for patterns in the development of scientific thought in the regional and historical aspect.

Based on the study purpose, the following tasks were set:

- analyse the development of science over the past 200 years in a geographical and temporal context;
- assess the trends in the development of world science at the present stage of development of history;
- characterise the peculiarities of the development of Soviet and Russian science.

To achieve the purpose and solve the tasks, historical, comparative, and logical methods were used.

In the study course, the works of foreign and Russian researchers, scientists, politicians, and philosophers were used.

The results of the study

1

The century before last was the time of the creation of the great universal, "classical" sciences. Darwin's theory was in biology, the periodic table was in chemistry, Marxism was in in the social sciences, the development of Newton's theory was in physics. It seemed that science was about to explain everything, and at the same time that almost everything had already been discovered. It is no coincidence that when the young Max Planck told his supervisor, Professor Philipp von Jolly, that he would like to study physics, he said: "Young man, why are you ruining yourself! Everything is already open in physics" (*Sklyarenko, n.d.*). However, Planck turned out to be stubborn, and seriously took up physics, becoming the creator of quantum theory.

Technological progress was even more revealing. To make it clear what changes have taken place in the life of one generation, it should recall, e.g., Leo Tolstoy's life. He lived from 1828 to 1910. When he saw the light, there were no railways in the world yet because, in fact, the first railway, opened in London in 1825, was still experimental, and the regular movement of passenger trains began in England in 1830. The shipping service had just begun. So far, there were no "real" steamships, there were only sailing ships that also had a steam engine, and there were several dozen more of them in the world. Mostly they traveled along the seas and rivers under sail or on oars. There was no telegraph, no photography, no typewriters, no safety razors. When Tolstoy's life was approaching sunset, he could see the first planes and submarines with his own eyes, he himself photographed, filmed by cameramen, and his voice was recorded on a phonograph. Finally, the heroine of his work, Anna Karenina, threw herself under a steam locomotive. In his younger years, Leo Tolstoy fought in the Caucasus, the exact maps of which had not yet been drawn up, and by the time of his death there were no "blank spots" on the entire globe.

In the 19th century, the word "scientist" began to mean not just an educated person, but a professionally engaged in science. The "philosopher" concept began to mean just a scientist of one of the branches of science. The world looked at the future with optimism, believing that science can improve the life of all mankind for the better. If something impeded development, then it was considered surmountable with the help of scientific methods of management. Even war seemed to be a phenomenon that would soon disappear due to the improvement of human morality, human fear of the threat of mass destruction, and also because of economic inexpediency. So, in 1913, a book by the prominent British economist Norman Angell, The Great Illusion, was published, dedicated to proving the impossibility of war between Germany and Great Britain, since both of these countries are too dependent on each other in economy. In August 1914, the 5th edition of this book was published.

However, even then there were skeptics, especially among science fiction writers, who drew attention to that the development of technology did not at all improve human nature. An indicator of technological progress was the emergence of a special genre – science fiction literature. However, in other literary genres, the scientist appears as a literary character. It could be either a comical absent-minded eccentric, or a gloomy maniac, a brilliant villain scientist who tried to seize power over the world. Science fiction writers really foresaw a lot, and their foresight

was explained by the fact that they could give a qualified scientific forecast not only thanks to their knowledge of technology and cold calculation, but also to the intuition of the artist.

2

And yet, at the end of the 19th century, the crisis of the classical sciences began. It all started with great discoveries in physics. There is a well-known ironic poem by Russian physicists, dedicated to how a wonderful, almost completely known physics, suddenly became a collection of inexplicable phenomena:

This world was shrouded in darkness,
Let there be light! And here comes Newton.
But Satan did not wait long for revenge.
Einstein came, and everything was as before.

In fact, at the end of the century, one after another, great discoveries in physics went. In 1895, Wilhelm Roentgen discovered rays, which have since become known as x-rays. In 1896, French physicist Henri Becquerel discovered that uranium salt lying next to a packaged photographic plate caused it to turn black. The study of this penetrating uranium radiation, together with Pierre and Marie Curie, led to the discovery of radioactivity. Thus began the atomic era in human history. Soon, Joseph Thomson in 1897 discovered the electron and measured the ratio of its charge to mass. In 1898, physicists Pierre and Maria Skłodowska-Curie, while studying the mineral uraninite, recorded its too high level of radiation. Assuming the presence of unknown more active substances in the mineral, scientists discovered two new radioactive elements – polonium and radium. Ernest Rutherford discovered alpha and beta rays in 1899. In 1900, the German physicist Max Planck (1858-1947) proposed a new (completely inconsistent with classical concepts) approach: to consider the energy of electromagnetic radiation as a discrete quantity that can be transmitted only in separate, albeit very small, portions – quanta. On the basis of this ingenious conjecture, the scientist not only obtained the equation for thermal radiation, but it formed the basis of quantum theory. In 1905, Albert Einstein delivered three reports in which he refuted Newton's theory of the time and space immutability. Thus, the theory of relativity was born. Finally, in 1911 he developed his own so-called planetary model. Until now, Rutherford's model of the atom explains almost all the experimental data obtained during experiments in atomic physics.

All these great discoveries, made over just a few years, caused a crisis in philosophy, since the divisibility of the atom (recall that in Greek means "indivisible") overturned the idea that all matter consists, like bricks, of atoms. Now the matter seems to have disappeared. The result was a revival of idealistic and completely irrationalistic ideas in philosophy, mysticism flourished among the bohemian cultural figures and there was a "return" to religion.

Following this, in 1930, Paul Dirac put forward the antiparticle's theory. In 1934, Irene and Frédéric Joliot-Curie obtained artificial radioactivity. In 1939, the German physicist Otto Hahn discovered the atom fission. Now the manufacture of an atomic bomb has become technically possible.

Starting in physics, radical scientific discoveries that undermined classical scientific concepts continued. In 1922, after analysing the system of 10 world equations of Einstein's general theory of relativity, the Russian scientist Alexander Aleksandrovich Fridman (1882-1925) came to a

fundamental conclusion about the expanding Universe (the so-called "Big Bang" theory). He was the first to abandon the postulate of the stationarity of the Universe.

As a result of all these new scientific discoveries, the scientific picture of the world, which was so clear and definite back in 1890, has disappeared. Now biology is not developing according to Darwin, and the most significant discoveries of biology in the 20th century, such as the discovery of DNA or cloning, can in no way be explained by Darwinism. Periodic table of Mendeleev "does not work" for two-dimensional space.

3.

The First World War became an indicator of both the incredible growth of the scientific and technological power of mankind, and the human mind limitations. The war sharply spurred the development of science, first of all, applied research, which gives a quick practical result. Note that the end of the First World War immediately caused preparations for the Second, then the Second World War passed, and the Cold War began. All this was accompanied by rapid scientific and technological growth. Unfortunately, in the 20th century, war remained the mother of progress.

To illustrate the speed of the emergence of technical innovations, it can give the following examples. In 1914, when the First World War broke out, in the belligerent states, cavalry with sabers and pikes still made up a significant part of the troops, carrier pigeons were used for communication, and radio communications were taking their first steps, there were several dozen wooden planes in the warring countries. In 1945, three decades later, when World War II ended, nuclear weapons had already been used, the number of aircraft used by the participants in the war was in the tens of thousands, there was worldwide radio broadcasting, and television programmes were already being broadcast. Alas, this was technical progress and it could not look differently in the then social, economic, political, and cultural conditions.

However, in the 1950s-70s, in conditions when the threat of a nuclear collision that threatened the death of all mankind, the confrontation between the superpowers took on a calmer character, the scientific and technological revolution (STR) unfolded in the world. In fact, it is now that the vast theoretical knowledge of scientists has become available to the majority of peaceful people. The second half of the last century gave rise to mass motorization, when in the leading industrial countries, the number of private cars owned almost equaled the number of inhabitants. Civil aviation has become something familiar to most of the inhabitants of the planet. Television entered the life (and began to largely determine the life) of most of the inhabitants of the Earth. Finally, at the end of the last century, the computer revolution that continues to this day begins.

Nevertheless, it soon became clear that the rapid growth of material consumption caused environmental problems. Back in the first half of the 20th century, scientists and politicians talked a lot about the "conquest of nature", poets sang chimney smoke over factories and big city noise. Now humanity faces a real threat, along with the possibility of death in a nuclear war, and the danger of suffocation in their own waste.

4.

After the 1989-91 fall of the socialist system, the West suddenly lost the enemy whose confrontation was the source of the development of the Western system. The stagnation of world science started in the 1970s gradually turned into a crisis. The crisis does not mean a complete decline, and it is no coincidence that most scientists, as well as historians of science and philosophers, believe that a new period in the history of science began – post-non-classical – since the 1970s. The prefix "post" means the end of something old, but it is not yet possible to speak of something new formulated. The characteristic features of post-non-classical science are the widespread use of computers, the inability to solve a number of scientific problems without the complex use of knowledge from various scientific disciplines, without taking into account the place and role of man in the systems under study (*Kokhanovsky et al., 2003, p. 140*). Since the objects of research are increasingly becoming systems that were impossible to experiment with, the most important tool for research activities was mathematical modelling. On the other hand, a mathematical model is not even an empirical fact. However, a clear slowdown in scientific and technological progress has looked quite obvious since the 1970s. However, in the 21st century, science has become the main productive force of human society. Moreover, science has become a social activity.

Any human activity always sets a specific purpose, even if not formulated in the form of a theory. Set the purpose for itself, humanity is developing all the possibilities, ways, rules, methods, and means of achieving it. Knowledge is acquired by a person at any age and in all types of activities, including study, social communication, politics, material production, art, and everyday life. In science, the purpose of human activity is to increase previously acquired knowledge. Thus, the main product of scientific activity is the acquisition of knowledge. It can be said that science is at once the acquisition, production, and implementation of knowledge.

Science, as already noted, has firmly established itself in all spheres of society since the 19th century. Moreover, over the past century and a half, science has not without reason laid claim to the role of the main determinant of the suitability of certain standards of social life. The 19th-century classical positivism philosophy generally proceeded from the fact that science and scientific activity occupied the place in the life of society that had previously been occupied by religion. The concepts of "scientific", "advanced", "progressive" have become necessary for the promotion of any kind of product, political ideology and even, surprisingly at first glance, an artistic product. Indeed, if advertising proclaims the emergence of a "new" trend in art, then this trend and its creators can count on public recognition. Recall that a century ago, new areas of art called themselves "avant-garde", "modernist" (i.e., "modern"), opposing themselves to the "obsolete" classics.

In almost all developed countries of the world, the main directions of scientific research are directly organised and financed by governments. In some countries, spending on science, excluding spending on education, is a very significant part of public spending. It is significant that in Japan, according to the data of the Higher School of Economics, direct spending on science is over 3% of the gross national product (*Ratay, 2017*). Approximately the same share of public spending on science was in the USSR in the 1960s, Yuri Gagarin's time, space flights, exploration of Antarctica and diving into the Mariana Trench. Spending on science has increased significantly in Russia, and is growing rapidly in China, South Korea, and the United States (*Ratay, 2017*).

Science as a social institution includes many hundreds of thousands of specially trained scientists. There are even more teachers of educational institutions of various directions who train these scientists in the world. Research workers have already become a prominent and influential social group with their own corporate interests, which they are ready to defend by various means, including political ones. At the same time, numerous technical personnel of scientific institutions are associated with scientists – laboratory assistants, secretaries, programmers, etc., up to cleaners and cloakroom attendants. As one can see, the positivists of the century before last are not so far from the truth when they predicted that the scientific community would acquire the features of a social class claiming to be the leading force of society.

At the beginning of the 21st century, the concept of the "creative class" really appeared, first put forward by the American philosopher and sociologist Richard Florida (*Surguladze, 2018*). In his opinion, the main factor in the successful economic development of society in the new century is the "creative" creative elite. Among the professions that representatives of the creative class have, according to R. Florida, one can highlight journalists, including bloggers, electronic media workers, and PR technology specialists, etc. In general, "creatives" are workers based on knowledge of a high-tech economy that requires creative thinking and the ability to solve problems in an unconventional way. However, since it has become fashionable to consider oneself as belonging to the "creacliat" and, at the same time, heightened ambitions rather than real creative abilities are more characteristic of representatives of this self-proclaimed class, in Russia and in many other countries this word quickly acquired a negative contemptuous connotation. Nevertheless, there is no doubt that it was creative individuals who have always determined the development of mankind, and in modern conditions, the servants of science become the driving forces of the existence of society.

A huge role in the development of creative personalities is played by the system of specialists training. It is about the system. Science must constantly receive "fresh" scientific personnel, otherwise stagnation in science and technology is inevitable. It is no coincidence that after the Second World War, the American authorities in West Germany performed an educational reform, largely doing away with the old, rather complex, but very effective German education system. The calculation was made that the training of specialists in the "field of everything" would not allow Germany to re-create a great science that could strengthen the country and thereby challenge the United States.

5.

As, in 2023, "Nature", the most authoritative scientific journal in the world, published since 1869 in the UK, on the pages of which almost all the major scientific discoveries of the last century and a half were presented, reported that modern scientists have stopped making major discoveries that can change the course of history. To explain if the innovativeness of science decreases over time, the researchers studied 45 million scientific papers written since 1945, and measured their impact five years after publication. By the impact, they understood the frequency of citation in other articles and the level of innovation. It found that the work impact gradually decreased in all fields: between 1945 and 2019, the decrease in new research was 91.9% in the social sciences and 100% in the physical sciences, and the last significant invention was the

Google page ranking algorithm, coined in 1999 and changed the way people use the Internet (*Major scientific discoveries…, 2023*).

The journal researchers identified several reasons that could affect the slowdown in the pace of innovation. The first is the narrowing of scientific fields, focusing only on a specific area. Such an approach, according to experts, undoubtedly provides a deeper understanding of specialization, but does not contribute to the breadth of views, since breakthroughs mainly occurred when people relied on different knowledge from several sources. The second reason is the modern research culture, which encourages scientists to worry more about the number of published articles than about their quality (*Major scientific discoveries…, 2023*). Scientific criteria are evaluated by citation rating. However, daring skeptics who refute established scientific ideas are simply not published, and therefore not quoted. As a result, the scientific community remains completely unaware of the very existence of new original scientific ideas. Scientific activity in the West and in Russia in recent decades is most often reduced to the search for grants for those studies that are in demand.

However, there are deeper reasons as well. There is a crisis of the scientific paradigm. Scientists again, as in the early 20th century, found themselves in a situation where the old proven methods of research do not work, and classical theories cannot explain anything. In addition, there is strong skepticism among scientists themselves as to whether their work is beneficial to humanity. After Hiroshima and Chernobyl, a kind of fear arose among not only scientists, but also ordinary people before the development of science.

Nature journal's scientists did not indicate another reason for the scientific and technological stagnation that continues to this day, caused by the crisis of fundamental sciences. Just from the beginning of the 1970s, the process of transferring entire industries to "warm" countries having an abundance of raw materials, cheap labour in the absence of any trade unions began.

Initially, this process was welcomed. It was believed that any "dirty" industrial production would be transferred from Western countries, which would turn from the "workshops of the world" into the "design bureau" of the world. Under the new economic conditions, some countries will be turned into raw material quarry countries, where raw materials will be extracted, and assembly shop countries, where these raw materials will be processed. The Western countries reserved for themselves the role of design bureaus and scientific centers in which science would develop.

However, real life was more complicated than logically verified theoretical schemes. As production began to leave for China and the countries of Southeast Asia, the West suddenly lost its creative possibilities. Production was gone and development was gone, too. As evidence, the following example can be cited. In 1973-74, the only American orbital station "Skylab" was operating. Considering its work unprofitable in a financial sense, the US authorities closed the project to create orbital stations. Thousands of specialists were fired, training of new personnel was stopped. However, already one decade later, the United States decided to return to creating orbital stations. Nevertheless, it suddenly became clear that in just one decade the former specialists had lost their qualifications, there were no young personnel, and the technical documentation was outdated. Attempts to create a new station were unsuccessful, although these attempts took many years and funds were spent that significantly exceeded the cost of Skylab.

The Americans had to finance the construction of the International Space Station (ISS), based on Soviet developments used in the construction of the Salyut and Mir stations. Thus, the slogan "cadres decide everything" fits perfectly with science.

It is still too early to talk about a complete suspension of technological progress. Progress in Western countries has taken a one-sided direction because development occurs mainly only in information and computer technologies. However, this development is unlikely to last long. The quality of education in Western countries since the end of the last century began to decline depressingly. The spread of functional illiteracy of the masses, when a person is able to read only signs and comics, the disappearance of the culture of reading and systemic thinking, the general decline in the qualifications of people does not at all contribute not only to further development, but in general to the preservation of the previous level of development of science. The masses educated by social networks in modern conditions cannot even more or less maintain the developed complex technical systems of the 20th century in order. The decline in the mental and managerial qualities of the entire Western elite can no longer be denied. This is a fact visible to all observers.

There is another reason for the crisis of modern Western science.

After the USSR and the socialist system collapse, the global market relations triumph led to a significant reduction in spending on fundamental scientific research, which does not promise quick profits. The Western World used a simple scheme: if it needs to solve some complex scientific problem, it could simply lure educated emigrants, who were always ready to sell the long-term achievements of colleagues from their country for a small amount, into its laboratories and universities. In 1930-40s century, the United States very effectively used the German science achievements, using the knowledge of emigrants from Germany. In the second half of the 20th century, the United States managed to lure tens of thousands of scientists from Western European countries. However, the United States and also some other Western countries did a particularly large harvest of foreign brains after the USSR collapse.

However, it was precisely this circumstance that led to the fact that in the United States and other Western countries they stopped developing the education system. Indeed, why spend huge sums of money for long-term training of a specialist if he can be hired cheaply abroad? For several decades now, in modern Western countries, they have been intensively introducing an education system that trains only simple performers who do not ask complex philosophical questions. However, this does not in any way contribute to the development of the type of scientists who "move" science. As a result, Western countries have largely undermined their own education system, and suddenly found out that all the cream from foreign science has already been skimmed off and there is nowhere else to recruit foreign specialists. It turned out such a phenomenon, not uncommon in the history of science, as the presence of remarkable scientific discoveries made by foreigners, which cannot be implemented in their own country due to the lack of their own specialists. All this could not but cause a crisis in Western science.

It should clarify that the crisis of Western science is been taken. A number of non-Western countries, such as China, India, Iran, Saudi Arabia on the contrary, are rapidly developing their science. Already, China is able to produce scientific research that has become inaccessible to most scientific research institutions in the West. However, for the time being, it would be premature to talk about a complete transfer of scientific development to these countries.

6.

Is there any national feature in the development of world science, based on which researcher can more or less logically determine the countries that will be leaders in scientific progress in the coming decades? This question can be answered in the affirmative.

In different historical epochs and different countries there are peculiarities of scientific knowledge. This is not at all due to differences between different nations and races. It is also impossible to exaggerate in the development of science in the country the features of its socio-economic system and political regime. There is such a thing as the "spirit of the people". This is not a metaphysical concept. This is the name of the most characteristic features of the people, which are expressed in their culture and language. At the same time, the "spirit of the people" is often aimed at understanding the meaning of their existence, at fulfilling a certain mission in the world. Systematised generalisation of national self-consciousness and awareness of this mission is called "national idea".

As an individual thinks about what he lives in this world for, what he can get from this world and what he can give him, so nations think about their idea, their path and their mission on their home planet. Naturally, each nation has its own national idea. Of course, in different historical eras and national ideas can change. Most often, the national idea can be expressed in a simple slogan. Thus, the ancient Romans expressed their idea in the Pax Romana concept ("Roman world"). It meant a social and political order that united the entire known then inhabited world into a single state with common laws and a single authority, which ended all wars (*Lebedeva, 2016*). Another Roman concept of Rome was the word "greatness", or "maiestas" in Latin, an attribute of the greatness of the gods of the Roman people, or "maiestas populi" in Latin, and its rulers. Throughout all stages of the history of Rome, for showing disrespect to them, i.e., "insult to majesty", or "crimen laesae maiestatis" in Latin, was supposed to be the death penalty. A single and indivisible power ("Imperium"), according to Roman ideas, together with the "maiestas" belonged to one people, who exercised this power in elections, in legislation, in the supreme court, in deciding war and peace. This is where the "empire" concept comes from. And it was the concepts of "Roman peace" and "greatness" that inspired the Roman centurions to move with their legionnaires deep into Britain, or the Sahara, creating an empire.

Rome did not fall after several centuries of decline because the barbarians "suddenly" became strong. The primordial Roman qualities that made this people the creator of the state simply disappeared. Pax Romana was replaced by another – "panem et circenses", i.e., "bread and circuses"! As the Roman poet Decimus Juvenal wrote at the beginning of the 2nd century: "Rome that once / Distributed everything: legions, and power, and bunches of lictors, / Now is restrained and only dreams of two things: / Bread and circuses!" (*Satire 10, 2007*). The great state idea disappeared, replaced by state social security, therefore, the Romans with their customs also disappeared, and Rome perished (*Lebedeva, 2016*).

The national idea of Spain had its own unique features. For 800 years (from 711 to 1492), the Christian states of the Iberian Peninsula fought against the Moors (Muslims). It is difficult to find examples of such persistence in the defense of one's native country in world history. Perhaps only the struggle of Rus against the nomads of the Wild Field, and even the resistance of the Montenegrins to the Turkish conquest, can be compared with the Spanish feat (*Lebedev,*

2006). In this struggle, the national idea of Spain was formed, consisting in the Reconquista, i.e., the "reconquest" of the former Christian lands.

During the Reconquista, not only a single state was finally formed, but also the nation itself with its unique cultural features and the very national character of the Spaniards (*Lebedev, 2006*). The 16th century in world history was the Spanish century. It is no exaggeration to say that at that time Spain ruled half the world. It was the Spanish king, aka the German emperor, Charles V, looking at the globe with joy, found out that the sun did not set over his possessions. It was the Spanish ships under the command of F. Magellan who were the first in the world to circumnavigate the globe. In the western hemisphere, after the discoveries of Columbus, the Spanish conquistadors, the total number of which did not exceed five thousand people, conquered and mastered all of present-day Latin America, as well as about half of the current United States, in just a few decades. The Spaniards also took possession of vast territories of North Africa and ruled in the Mediterranean. The Spaniards penetrated into southeast Asia, conquering the Philippines and starting trade with China. In Europe, the Spaniards in the 16th century ruled most of Italy, the Netherlands. In addition, the Spanish king was also Emperor of Germany, i.e., the "Holy Roman Empire" or First Reich. Finally, in 1580-1640, Spain was united with Portugal through a dynastic union. As a result, the Spanish (and at the same time Portuguese) king also controlled vast Portuguese possessions – Brazil, Angola, Mozambique, Ceylon, Indonesia, Malaysia, Formosa (Taiwan), and a number of cities in India (*Lebedev, 2006*). The political flowering of Spain coincided with the flowering of culture. However, this century was fleeting and soon gave way to the three hundred years of the decline of Spain, which gradually rolled down to the position of a second-rate country.

The national idea of Great Britain is expressed in the slogan, which arose based on the two-line refrain of a patriotic song "Rule the waves" of 1740: "Rule, Britannia! Rule the waves: Britons never shall be slaves". Through a variety of methods, including piracy, the slave trade and the drug trade, the British brought about the Industrial Revolution (*Lebedeva, 2016*). In the mid-19th century, England was the "workshop of the world" and accounted for about 50% of the world's industrial production. The English military and merchant fleet dominated all seas and sailed across all latitudes. All this made England the mistress of the seas. British goods from sewing needles to steel ships were sold all over the world. English scouts, sailors, pirates, missionaries, merchants, and soldiers operated on all seas and all continents. Using their technological advantage, the British created by conquest the largest colonial empire in history, covering a quarter of the globe. The English way of life was irresistible to many young Europeans, as well as to the English-educated non-Europeans in the colonies. The British pound sterling was the main world currency. English has spread across all continents (*Lebedev, 2007*). It was in England back in 1660 that the Royal Society of London for Improving Natural Knowledge was created, an association of scientists engaged in applied research that exists to this day, which can be proven through experiments and experiments. It is no coincidence that the motto of the Society is the Latin phrase "nullius in verba". In world science, the British were represented by many names. Scientists in English laboratories made a huge number of great scientific discoveries.

However, as the collapse of the British Empire and the transformation of Great Britain from a superpower into a wealthy, but far from the dominant country in the world, the very

concept of "British scientists" acquired an ironic connotation. In post-imperial England, spending on science was sharply reduced, a very large number of scientists from the British Isles moved to the United States. Interestingly, the "brain drain" concept was first used to describe the emigration of scientists from the UK in the 1960s, when statisticians found that the annual number of emigrating scientists is equal to the annual graduates of all British universities. As a result, directly at home, English scientists began to deal with all sorts of minor topics. As a result, the meme "British scientists" appeared to refer to scientists engaged in scientific research, which can be considered absurd.

France has experienced several national ideas. In the Middle Ages, France was considered "the eldest daughter of the Catholic Church". Most of the participants in the Crusades came from France. Many prominent medieval philosophers, theologians, and popes of Rome were French by birth. During the 1789-1794 French Revolution, the national idea of France was the triad "Liberté, Égalité, Fraternité". Administrative buildings in France are still decorated with this motto. President de Gaulle, having come to power in 1958, during a period of severe crisis and the collapse of the colonial empire, spoke of his program in the following way: "France has a global responsibility. This is my whole philosophy" (*Gaulle, 2003*). The goal of his reign was to restore the "greatness of France" through an independent foreign policy. In the words of de Gaulle, "France devoid of greatness ceases to be France" (*Gaulle, 2003*). However, the France of the century is an ordinary well-fed and self-satisfied country in which 45% of the population is non-French, devoid of a national idea and historical prospects.

According to A. Blok, in Germany, the "gloomy German genius" was expressed in the "Song of the Germans", better known by the first line – "Germany, Germany is above everything / above everything in the world" ("Deutschland, Deutschland über alles, über alles in der Welt"). Germany, having overestimated its strength, twice in the 20th century tried to become "above everything in the world", to conquer the whole world. In both cases, the result was a complete military rout. One must pay tribute to the German national qualities – discipline, diligence, organisation, striving for education, and respect for scientists. Thanks to these qualities, the Germans managed to raise their country from the ruins after 1945. In the future, Germany managed to overcome the split, uniting into one state. However, now Germany does not have any inspiring idea, and it cannot offer any idea to the world. Thank God, they do not want to fight anymore. Even in the German military units in Afghanistan, most soldiers are Albanian mercenaries from Kosovo. Germany no longer thinks about "living space" in the East, as it itself is slowly turning into a living space for hundreds of thousands of immigrants and refugees from all over the world (*Lebedeva, 2016*).

In the United States, due to the historical development of the country, the "American Exceptionalism" concept has become widespread. From the point of view of many Americans, their country is superior to all other peoples and countries due to financial, military and cultural power. The belief in its superiority over all countries and peoples has become an integral part of the American identity. The life ideals of US citizens have been called the "American Dream". Americans have a very high opinion of the role of their country in the world – America is a "Shining City on a Hill", proudly towering over suffering humanity President R. Reagan (1981-1989) in one of his speeches even called America "the last and best hope of mankind". Few Americans questioned this categorical statement. In addition to their stable political institutions

and constitutions that have not changed for over 200 years, for Americans, a pride source is also the impact on the world of popular culture. It is no coincidence that American national heroes, for the most part, have become characters created in Hollywood. The Americans are also proud of their scientific and technological achievements (it is no coincidence that the United States reacted so painfully to the Soviet satellite). However, as the "melting pot" that mixed immigrants from different countries into one nation stopped working, and multiculturalism replaced it (a policy aimed at preserving and developing cultural differences in a single country and in the world as a whole), the nation became fall apart. As a result, American society has become a collection of minorities – racial, ethnic, confessional, and so on. sexual inclusive. After that, only a single citizenship and economic system ("the patriotism of the dollar") began to unite Americans. The display of patriotism in the United States often comes down to such beautiful symbolic acts as the permanent display of the Stars and Stripes and the singing of the national anthem. These activities have become so ritualistic that they increasingly resemble the routine of religious worship. All this is quite suitable for a country founded by immigrants who often did not know English and the history of the United States, but by constantly flying the flag they showed that they are real Americans (*Lebedeva, 2016*).

In the past, Russian people have never liked to express patriotic feelings with arrogant words about the greatness of the country, theatrical gestures such as raising flags and constantly singing the anthem. The great Russian teacher Vasily Sukhomlinsky wrote: "Patriotism is the most bashful and delicate feeling. Take care of the holy words, do not shout about love for the Motherland at all crossroads. It is better to work silently for the sake of her good and power. (*Pushkareva, 2012*).

The Russian national idea began to take shape during the period of overcoming the Horde yoke and the formation of a centralized Moscow state in the 15th century. This time coincided with the death of Byzantium. The fall of Byzantium in 1453 produced a huge shock for the then Russian people. Russia remained the only independent Orthodox country in the world. All other Orthodox countries were dominated by "Latins" (Catholics) and "Hagarians" (Muslims). The awareness of their country as the last stronghold of Orthodoxy in the world left an indelible imprint on the thought and deeds of all Russian people of that era. At the same time, the very rise of the Moscow kingdom, from the point of view of the people of that era, became possible precisely thanks to firmness in religious matters. Moscow has now replaced both the old Rome, in which the popes placed themselves above the whole Church, and the receding Constantinople. The learned monk from Pskov Philotheus wrote about 1510 in his letters to Vasily III: "... As if the whole Christian kingdom had come to the end and descended into the one kingdom of our sovereign, according to the prophetic books, that is, the Romean kingdom. Two ubo Romes fell, and the third stands, and the fourth will not be" (*Gutsulyak, 2015*).

As one can see, "Holy Rus" and "Third Rome" are the basic concepts of the Russian national idea in the 15-17th centuries, up to the Petrine era. It should note that England has the epithet "Old Marry England", France is "La belle France", and Italy is called "Dolce Italia". Rus was Holy. This denotes the most important moral and ethical ideal for a Russian person, which must be striven for. The ideal promises neither the comforts of life, nor bright beauty, nor sweetness. And of course, the very concept of "Holy Rus" did not mean that Rus should be

"above everything". Therefore, the ideal of Holy Rus was, not to bring some great truth to other peoples, but to save it ourselves. (*Lebedeva, 2016*).

7.

What is the relation of the metaphysical concepts of "folk spirit" and "national idea" to science and culture? They are most directly related. In fact, the reality is the national character of each people, but it has an impact on the national style of philosophising and artistic creativity. The national cultural code is already laid down in the collective consciousness and even the subconscious of the nation. Was it by chance that the rough, clear outlines of the helmets of the German knights of the Teutonic Order were so similar to the outlines of the German tank turrets of World War II?

The national idea inspires deeds, great or small, noble or vile; character determines the characteristics of scientific thought. Along with individual philosophising, there is also a national version of philosophising, which completely coincides with the national style of scientific thinking. Indeed, although philosophy makes extensive use of abstractions, it nevertheless has a pronounced "national face". And philosophy also remains national, even if the philosopher tries to be "above" the problems of his country and people, e.g., when he speaks about the problems of cognition or the natural science concepts. Already by the way he speaks, one can understand what creative heritage one relies on, what philosophical tradition he belongs to. In essence, the origin of the philosopher can be determined by the nature of the presentation of philosophical thoughts.

The ancient Romans were quite practical people. Roman philosophy was only interested in such topics as the state, the citizen, the best state system. It was in Rome that law was created, which in its main features underlies all modern legal systems. However, in art, the Romans borrowed Greek designs. Note that most of the monuments of Greek sculpture that have come down to our time are Roman copies. However, the Romans masterfully developed the Greek cultural heritage they inherited. On an imperial scale, the Romans built roads, bridges, aqueducts, many of which still function to his day. It is interesting that much of what is considered the achievements of modern civilization in the field of comfort was known to the Romans. Already a friend of Emperor Augustus, the famous patron of the arts, Gaius Cylnius Maecenas built in Rome a bath with artificially heated water. The Roman state was a complete welfare society, and with a mass culture.

Spain has brought to the world a great variety of works of art. Actually, the novel in its classical literary form was created in Spain. Spain had a huge impact on the development of theatrical art. Spanish painting, architecture, and music have always been successful. Spanish philosophy also enjoyed enormous influence. The names of José Ortega y Gasset, Miguel de Unamuno, Javier Subiri are among the most prominent thinkers in Europe. However, in science and technologies, Spanish names are almost absent. And the reason is precisely in the peculiarities of the national spirit. Science and industry have traditionally been underestimated in Spain. The warrior and priest have always been considered higher than the scholars. At the same time, in Spain and Latin America, scientists (Los Científicos) meant in general all people of intellectual professions. As a result, in the Catholic conservative country with strong aristocratic prejudices, of which Don Quixote is a symbol, the dull bourgeois accumulation of

money and experimentation was despised. The outstanding philosopher Miguel de Unamuno expressed the attitude of the Spaniards towards science in this way: "Yes, let them [other peoples of Europe] invent" (¡Que inventen ellos!). And in our time, spending on science in Spain is five times less than the European average.

The same qualities are inherent in the Latin American peoples, who also created great national cultures, but are completely invisible in science.

British philosophy and science have their own features. Even in the Middle Ages, the originality of English thought was determined: an emphasis on theories of knowledge and dislike for abstract theories. It is no coincidence that it was the Englishman William of Ockham who, back in the 14th century, expressed the famous rule, which is still called "Occam's Razor": "Entities should not be multiplied beyond necessity." In 16th-century England, Francis Bacon pioneered philosophical empiricism and proclaimed practice to be the criterion of truth. It is no coincidence that British scientists are especially famous in natural and technical sciences. It is also significant that it was England that became the birthplace of classical economics. The social and political problems of the country led British thinkers to the development of the Theory of the Social Contract – a theory that was not at all revolutionary in nature and aimed at resolving the problems of society and the state through mutual compromises in England. It is significant that it was in England that Thomas More wrote Utopia, the first work on a classless society. However, in England they never tried to create a new society on the basis of a predetermined speculative theory. Competition, struggle for existence, natural class inequality while striving to smooth out contradictions within the existing system – these philosophical postulates had a huge impact on all British thought. It is no coincidence that the Russian philosopher N. Ya. Danilevsky noticed that the Theory of Darwinism could have arisen only in England (*Lebedev, 2013*).

Among the individual traits of an English scientist, one can highlight that he is almost always a gentleman for whom science is just a hobby. It is no coincidence that British scientists were famous for their dislike of theory, preferring to work in laboratories.

French scientists also made a huge contribution to the exact, natural and technical sciences. Note that the very word "engineer" came to us from the French language, in which this word "ingénieur" is the same root as the word "genius" (génie). French philosophers have always been interested in the problems of man and society, and it is no coincidence that so many trends in art and political theories came from France. French philosophers do not hide their political predilections (engagement) and often speak on a wide variety of political and cultural issues. The popularity of many French philosophers is often explained by their engagement, and only then by their philosophical works. French scientists have also always been bold in their judgments. At the same time, French scientists were not always distinguished by the pedantry that is so characteristic of German scientists, which sometimes led to the loss of primacy by the French in their own scientific schools. Finally, French scientists, like philosophers, were also politically engaged. This, by the way, leads not only many scientists to the ranks of members of various parties. It is known that the geographer Jacques Elise-Reclus was an anarchist, the physicists Paul Langevin and Frederic Joliot-Curie were members of the French Communist Party. Political activity brought many scientists problems. So, in 1793, during the French Revolution, the famous astronomer was executed, and the first elected mayor of Paris, Jean-Sylvain Bailly, in the next

1794, the physicist Antoine Lavoisier was executed on the guillotine. The judge who sentenced him to death said: "The Republic does not need scientists" (*Chernyak, 1989*). In 1961, Jean Bastien-Thierry, one of the creators of French rocket technology, was shot for participating in the assassination attempt on President de Gaulle. Similarly, political engagement was shown by figures of French culture. The outstanding poets Louis Aragon and Paul Eluard, the artist Pablo Picasso were communists. However, the great writers Louis-Ferdinand Celine and Pierre Drieux la Rochelle were politically fascists and collaborated with the German occupiers during World War II.

Germany since the Middle Ages, from the epoch of creating tower clocks and gunpowder, has been the engine of European science. Among the main features of German science, which allowed it to occupy a leading position in the world for several centuries, one can highlight a special attitude towards work, science and education. This is largely a legacy of the spread of the Lutheran religion. For Lutherans, work is not at all the fulfillment of an obligation, not the earning of money, but a vocation (beruf), the fulfillment of a religious duty. True, in fairness it should be noted that the German attitude to work includes the qualitative implementation of all, including the most criminal orders of the authorities. The German scientific style, like philosophy, is also thorough, pedantic and profound. German scientists have always gravitated towards pure science, which, given their national character and adherence to "order" (Ordnung) in everything, has led to significant advances in the fundamental sciences. True, the desire for abstract theories often led scientists to the fact that they were ready to serve science under any government and in any country, if they were not prevented from working. In Germany, as early as the 13th century, tower clocks were created, and around 1445, Johannes Gutenberg created movable type printing. The period from the mid-19th to the mid-20th centuries was the German epoch in science generally. Most of the scientific theories and technical discoveries that have changed the life of mankind over the past century and a half came from Germany. In this country there was a very favorable atmosphere for doing science. There were universities with a solid centuries-old history, which developed their own scientific schools. The prestige of a scientist has always been on top.

German philosophy, represented by a wonderful constellation of names, is also distinguished by its thoroughness, the desire to cover all aspects of being with thought, and heaviness. German philosophers made several grandiose revolutions in the sphere of human thought, affecting literally all aspects of the existence of nature and man. Kant, Hegel, Marx, Nietzsche were neither rulers of peoples nor generals, but they changed the life of all mankind. Another thing is that it was precisely the desire for grandiose theoretical systems that led German philosophy to periodic crises, when it discovered that not all problems had been solved at all. In addition, the ideological heritage of any thinker can always be interpreted in different ways, as a result of which, when studying German philosophy, difficulties always arise in interpreting various provisions and definitions.

In the United States, the national mentality was reflected in science and art especially brightly. On the one hand, America, as a young country, not burdened by old traditions, was initially open to the creation of all sorts of innovations. At the same time, the practicality of the Americans also led to the fact that they gave the world a lot of things of practical value, be it a Colt revolver, a Whitney cotton gin, an Elias Howe sewing machine, a Maxim machine gun.

Finally, the Americans have always been distinguished by their ability to quickly assess the practical impact of an invention. So, the typewriter and the car were created in Europe, but only in the USA Christopher Sholes made the typewriter mass, and Henry Ford turned the car from a toy of the rich into a mass mode of transport. The personal computer was created in the USSR, i.e., the Soviet inventor A.A. Gorokhov received a patent for a personal computer back in 1968, but in the USA, it was Steve Jobs who was recognised as the founder of the era of communication technologies. At the same time, neither the personal computer itself, nor the graphical interface, nor the computer mouse were created by Jobs. However, along with his companion Stephen Wozniak, he created a successful, simple and user-friendly version of the personal computer. Not only in business, but also in general when spreading an innovation, simplicity, convenience and accessibility are sometimes more important than the invention itself.

And yet, it was precisely the emphasis on the practical benefits of the invention that repeatedly led the United States to the fact that the fundamental sciences in this country were never held in high esteem, and they were mainly engaged in by immigrant scientists. In the United States, it has traditionally been common to treat scientists as funny eccentrics. There was even the word "egghead" (egghead), denoting a distracted wise guy cut off from the real world. In the 1940s and 1950s, a militant anti-intellectual atmosphere dominated the wealthy United States. Scientists, especially if their discoveries did not promise immediate profit, were subjected not only to ridicule, but also to accusations that their unnecessary research and experiments cost the country too much literally, in dollars. Finally, it must be considered that those times were McCarthyism epoch, i.e., the fight against "anti-American activities", which could include literally everything that did not fit into generally accepted standards of behaviour.

In the American system of higher education, there has always been a very sharp disparity between the universities for the elite, where Nobel laureates teach and all the conditions for studying, and the many schools for the "ordinary" ones, whose curricula do not differ much from those of secondary schools. In addition, very numerous educational institutions for various ethnic, racial and confessional minorities had and have their own specifics in the United States.

The anti-intellectual atmosphere of the American hinterland with low spending on science and education led to lower requirements for applicants and gave many indulgences during their studies, as a result, sometimes university graduates could write their own name with spelling errors.

On the other hand, a very specific type of "science" like "Hamburgelology" was created, the teaching of which took place in specialised "universities" like Hamburger University. Actually, these "universities" as corporate training centers for the restaurant business exist to this day. Hamburger University programmes are recognised as institutions of higher and secondary education in the US and the UK. University departments are open in Tokyo, London, Sydney, Illinois, Munich, Sao Paulo, and Shanghai. Students receive education in various specialties in the field of restaurant business management to work as restaurant directors, as well as middle and senior managers in the company (*The "Hamburger University" …, 2018*). However, it should agree, nevertheless, given the importance of training specialists in public catering, it would be too bold to call their training a university course, and "hamburghology" a science.

An event that literally overnight changed the attitude of the American elite to the problems of national education was the launch of the Soviet satellite on October 4, 1957 (*Malkov et al.,*

1987). The fact that the Russians were the first to explore space 12 years after World War II was perceived in the US ruling circles as a direct consequence of the lag in education (*Malkov et al., 1987*). Already on September 2, 1958, a special federal law was adopted, which directly declared higher education to be the most important source of growth in the country's military-technical potential. This law initiated large-scale regular funding of higher education by the federal government (*Malkov et al., 1987*). After Gagarin's flight to the United States, for the first time in history, they were forced to admit the weakness of their education system in comparison with a foreign one, in this case the Soviet one. In the respectable American magazine "Time" in the issue of November 17, 1961, a panic article "What Ivan Knows That Johnny Does Not" appeared. In this article, the author, Professor A. Trace found that 45% of Soviet seventh-graders who study English know English literature much better than their American peers. He elaborated on the serious teaching of history in Russia (*Trace, 1961*). The American elite has concluded, and the level of funding for education in the United States has skyrocketed. It should note that even today Americans have a reputation as the most uneducated people among the peoples of developed countries. In the United States, according to Gallup polls, about a third believe that it is possible to influence the material world with the help of thought, about 40% of Americans believe in ghosts, and 20% believe that in principle it is possible to talk with the dead. (*Why do people…, 2016*).

Basically, in the USA, the attitude towards science achievements reduces to the words: "show how this thing works, and you do not have to explain why it works". In the United States, they are used to the fact that if a fundamental problem arises, then you can always hire scientists abroad. Hence the attitude to the scientist. If a German scientist is a professor, a French one is a politically active figure, an English one is a gentleman, then an American scientist is a businessman producing a special kind of goods (*Lebedev, 2014*). For American leaders, the attitude towards scientific activity remains pragmatic. So, after USSR collapse, the Americans, having decided that the Russians were finished, and other countries could not resist America, curtailed space research and many promising developments. The appearance in Russia at the beginning of the 21st century of hypersonic aircraft and weapons systems that have no analogues in the United States caused a panic in the West comparable to the appearance of the Soviet satellite and the beginning of space flights.

In the arts, Americans have become masters of the application of various technical innovations. It is known that Mark Twain wrote his novel "The Adventures of Huckleberry Finn" on a typewriter. Americans immediately appreciated the importance of cinema, which resulted in the emergence of Hollywood. This refers not only to a specific area of Los Angeles, but also the general name of the entire American entertainment industry. By the way, in terms of the number of employees, Hollywood is one of the largest employers in the United States. Americans often say (some with admiration, some with indignation) that America was created by Hollywood. The heroes created by Hollywood have long been perceived both in the United States and in the world as "their" national heroes. To a large extent, Hollywood characters define American national identity.

8.

Is there a special Russian scientific style and culture of scientific activity? The outstanding Russian physiologist Ivan Petrovich Pavlov (1849-1936), already at a respectable age, in 1918, delivered a series of lectures entitled "On the Russian Mind". Over the next century, no such studies and comments appeared. It must be admitted that most of the strengths and weaknesses of the "Russian mind", i.e., the Russian national characteristics of scientific and cultural activity, noticed by the great scientist, have hardly changed since that distant time.

Pavlov noted, "What is the Russian mind to be seen in?". Firstly, the scientific Russian mind, participating in the development of Russian science... This mind is to some extent a greenhouse, working in a special environment... This mind is a partial mind, relating to a very small part people, and it could not characterise the entire national mind as a whole... Therefore, it seems to me that I am right if I do not consider the scientific mind in the future. However, then what kind of mind shall I engage in? Obviously, the mass, common life mind that determines the fate of the people... what is worth talking about and characterising, what matters, determining the essence of the future, this, of course, is the mind of the intelligentsia. And its characterisation is interesting, its properties are important" (*Pavlov, 2014*).

Further, I.P. Pavlov noted, "The first property of the mind that I established is the extreme concentration of thought, the desire of thought to think relentlessly, to keep on the issue that is scheduled for resolution, to hold on for days, weeks, months, years, and otherwise, for the rest of your life. How is the Russian mind in this respect? It seems to me that we are not inclined towards concentration, we do not like it, we even have a negative attitude towards it..." (*Pavlov, 2014*).

As proof of this characterisation, which is not very flattering for a domestic scientist, I. P. Pavlov noted: "Let is take our disputes. They are characterised by extreme vagueness; we very soon depart from the main theme. This is our feature ... A topic is put up for discussion, and at first, usually and due to the fact that the task is difficult, there are no hunters to talk. However, now one voice comes forward, and after that everyone already wants to talk, to talk without any sense, without thinking carefully about the topic, without clarifying for themselves whether this complicates the solution of the issue or speeds it up. There are endless lines that take up more time than the main subject, and our conversations snowball. And, in the end, instead of a solution, the issue becomes confusing..." (*Pavlov, 2014*).

From this, I.P. Pavlov made the following conclusion, "Obviously, our recommending features are not concentration, but onslaught, speed, raid. This, obviously, is what we consider a sign of talent; painstaking and perseverance for us do not fit well with the idea of talent. Meanwhile, for a real mind, this thoughtfulness, stopping at one subject is a normal thing..." (*Pavlov, 2014*).

I.P. Pavlov said with regret, "The Russian mind is not tied to facts. He loves words more and operates with them... Russian thought does not at all apply the criticism of the method, i.e., does not at all check the meaning of words, does not go behind the scenes of the word, does not like to look at true reality ... We operate through general provisions, we do not want to know either the measure or the number (*Pavlov, 2014*).

In fairness, in his speech, I.P. Pavlov himself also demonstrated some features of the Russian mind – a tendency to self-criticism, bordering on self-flagellation. The result of such self-criticism is so characteristic not only for scientists, but also, first of all, for state policy in the

field of science, the desire to follow the "world", i.e., Western, experience. Following Western scientific trends has repeatedly led state leaders to underestimate Russia's own geopolitical, socio-economic, cultural, historical and other interests.

An indicator of a certain indifference to one's own scientific achievement can be the complete oblivion of many Russian scientific discoveries that remained unknown to historians. The names of folk craftsmen who "by eye" created complex engineering structures are forgotten. For example, a lightning rod on the famous Nevyansk tower built in 1721-25 regularly served a quarter of a century before it was discovered by academic science in the world. Officially, the creation of a lightning rod dates back to 1752, when it was demonstrated to the public by the famous American scientist and politician B. Franklin. In 1801. Russian serf Yefim Artamonov created the world's first pedal bicycle, on which he traveled from Nizhny Tagil to Moscow. However, Artamonov remained almost unknown in Russia, and the Frenchmen Michaud and Magi are considered the creators of the bicycle, who coined the word "vélocipède" ("fast-footed") in 1869. In the 1830s, illiterate artisan I. F. Makarov realised the process of converting cast iron into steel for the first time in the world. However, Makarov was not appreciated, and the Englishman Henry Bessemer, patented his method in 1856, received fame as the creator of the steelmaking process. The Russian mathematician Nikolay Lobachevsky became famous only when Western mathematicians Helmholtz, Beltrami, Gauss, etc. paid attention to his works.

In fact, some features of the Russian scientific style demonstrate their effectiveness. For example, some impracticality and dreaminess, paradoxically, led to the fact that it was Russia that became the birthplace of aviation, and it was the Russian man who was the first to rise into space. Indeed, if the creators of aviation and space technology were primarily thinking about the profit that their inventions would personally bring to them, then we, at best, even now flew in somewhat improved balloons.

The list of scientific priorities of Russian scientists is very long. As the researcher of the history of science A. A. Petsko notes, "it is impossible to imagine a world without radio, television, semiconductors (and, consequently, without telephones, the Internet, tablets, computers, microwave ovens and hundreds of thousands of other devices), without liquid crystals (and , therefore, no displays), no tractors, no trams, no internal combustion engines (hence, no cars), no water engine (hence, no hydroelectric power plants), no nuclear, wind and solar power plants, no boreholes (hence, no almost no oil), no airplanes, no helicopters, no parachutes, no air navigation, no incandescent lamps, no arched bridges, no icebreakers, motor ships, metal tankers, no hydrofoils and hovercraft, no equation of rocket propulsion, no liquid-propellant engines (and consequently, without space, space communications, GPS navigators), without film and video editing (practically without cinema and again without television), without weather stations (and, consequently, without weather forecasts). The priority of these discoveries belongs to Russian scientists, but this is only a small part of Russian inventions." (*Petsko, 2012*).

Russia's contribution to world culture is enormous. Iconography, painting, music, literature, theatre, cinema – in all areas of art, people can always see a lot of Russian names (*Petsko, 2012*). And of course, Russian folk art, in which the soul of the people is manifested, has repeatedly conquered the world, and, we believe, will conquer it more than once.

So, what can be seen as a manifestation of the domestic scientific style? It should firstly note that the Russian scientist is a civil servant. It was for official purposes that our scientists were

able to create the discoveries that the country needed at a given historical moment. Since Russia has repeatedly been subjected to aggression in history, the needs of defense were at the basis of all the scientific activity of the country. It should not think that only our peculiarity is manifested in this. The history of mankind is the history of wars, and scientific progress is always initially realized in the military sphere. However, in Russia, with its vast territory, sparse population, and difficult geographical conditions, it is possible to overcome the enemy only with the mobilisation of all the country's capabilities, including the intellectual resource. At the same time, such issues as the cost and, moreover, the possible profit did not confront scientists. As much as the Motherland needs, so much we will give. That is why in Russia they created such unique types of weapons that can serve for many decades – the Mosin rifle or the Kalashnikov assault rifle. Of course, the protection systems created in Russia are also unique, e.g., Zelinsky's gas mask, created back in 1915, has been serving for more than a century and the world has not come up with a replacement for it. If necessary, Russian scientists and engineers could create not only with the highest efficiency, but also with extraordinary speed. One can give such an example. In the spring of 1943, the Soviet military command learned from intelligence that the Germans were planning an offensive with the widespread use of new Tiger tanks with especially powerful armor. Soviet anti-tank guns of 45 caliber were powerless against this armor. Then the scientists and engineers of the Soviet rear within two weeks designed and put into serial production new, more powerful guns of 76 caliber. It was a never-beaten record for rapid development and mass production of a technical product. When the German offensive on the Kursk Bulge began in the summer of 1943, the Tigers were already met by new guns that quickly turned the tanks into fires.

Similarly, in the shortest possible time, Soviet scientists created an atomic bomb. The United States still cannot believe that the Russians made the bomb in four years, spending several tens of times less money on its manufacture. Already in 1953, ahead of the Americans by a year, the USSR tested a hydrogen bomb. Satellites and spacecraft were originally considered solely as a means of delivering nuclear weapons. However, that is why our country is ahead of everyone in space and has not lost leadership so far.

Since most of the scientific problems solved by scientists in Russia are, to one degree or another, related to defense, many of the Russian scientific discoveries remained unknown in the country. Secrecy to the irrational use of intellectual capital (often in various scientific institutions of the country, scientific groups were engaged in solving the same problem, not suspecting anything about each other). The saddest circumstance of secrecy was that the priority of many scientific discoveries in our country was lost due to the fact that nothing was reported about the achievements of science, not only to the general public, but also to the scientific community itself. So, the world's first mobile phone (called "radiophone") was invented by Leonid Ivanovich Kupriyanovich in 1957. "Radiofon", weighing 500 grams, worked on the principle of modern cell phones. Within a radius of up to 30 kilometers, it was connected to the city telephone network on short waves, enabling its owner to talk with any subscriber who has a home telephone. Kupriyanovich's invention was not classified (scientific journals devoted articles to him), but did not arouse interest in the USSR in general. In the US, a similar phone appeared in 1973, 16 years later.

In 1959, for the first time, the idea of creating a prototype of the Internet was proposed to the Soviet government by Colonel Anatoly Ivanovich Kitov, a participant in the Great Patriotic War, a military scientist, who was the creator of the computer center of the Ministry of Defense, and also the author of a dissertation on rocket programming. Anatoly Kitov sent his analytical note to the government of the USSR, in which he proposed to create a unified social system in the country that would unite the computer centers of the USSR into one whole. However, the then Soviet leader N.S. Khrushchev ignored the colonel's proposal. A decade later, in 1969, the ARPANET system was launched in the United States, uniting the computers of the US Department of Defense into a single network. However, the most remarkable quality of Russian scientists can be considered the fact that they, even without being in the public service, for the are distinguished by their awareness of their mission as a citizen of Russia most part. In the 1990s, in the conditions of the complete collapse of industry and a significant cessation of funding for science, many scientists continued to work. They could not receive salaries for months, because of the high cost of imported computers, they could do the most complex calculations with a pencil on paper, as they say, "on their knees".

In addition to the desire of Western campaigns to obtain trained scientific personnel from the former USSR, Western politicians were also going to eliminate the possibility of reviving Russian science (*Lebedev, 2017*). This explains the peculiarities of the policy of the Russian authorities of the times of Gorbachev and Yeltsin in relation to science and education on the advice of Western advisers. Soviet science was deliberately destroyed. The Soviet leadership itself stopped any development of nuclear programmes, closed the projects of the Buran space shuttle and the world's most powerful launch vehicle "Energia", and curtailed funding for many scientific programmes in the defense industry. At the same time, unbearable conditions were deliberately created for the normal functioning of science, when institutes and laboratories were closed, scientists did not receive salaries for months. However, the salaries themselves were simply mockingly minimal. At the same time, frankly hacky "universities" were opened in huge numbers, issuing diplomas, but not giving any knowledge. Militant anti-intellectualism and obscurantism dominated the media. Astrologers and sorcerers flooded the entire television. And at the same time there was propaganda of the structure of scientists in the West. Research workers who were not even paid enough to take the subway to work received tempting free offers in the mail to get a job at some Western firm. And not everyone could resist the temptation. Foreign companies and various foundations have won the right to select candidates from senior students of the country's leading universities. An extensive network of representative offices of foreign universities and corporations has been formed, busy recruiting both the best student youth and more capable specialists. Their activities were actively supported by Western states. There has been a real "transplantation" of a number of scientific schools to the West (*Lebedev, 2017*). According to UNESCO estimates, by the mid-1990s, Russia's losses from the brain drain exceeded $30 billion. But the purchasing power of the dollar at that time was much higher. This includes spending on education and advanced training, lost profits, losses from a decrease in the level of scientific personnel, etc. The total damage to Russia from the "brain drain" amounted to more than one trillion dollars by the beginning of the 21st century, as calculated by the rector of the Russian New University, chairman of the Council of the Association of Non-State Universities of Russia Vladimir Zernov (*Mironin, 2007*). In addition to

a direct move to Western countries, in the context of the development of electronic means of communication, there was also such a phenomenon as an internal brain drain. We are talking about such cases when a specialist lives in Russia, but works in Western or domestic companies on international grants. The loss of the state from this kind of "brain drain" in the zero years was 600-700 million dollars a year (*Mironin, 2007*). However, respectively, the same amount was acquired by Western countries. Retiring, the President of the United States in 1989-2001. Bill Clinton, in his farewell speech, spoke proudly of the country's rapid economic recovery under his leadership. At the same time, he directly linked the successes of the United States with the mass arrival of scientists and intellectuals in general from the former USSR. (*Leskov & Konygina, 2004*).

Russian science pogrom was indeed impressive. In the 1960s, Russian-language scientific literature accounted for about 22% of all world scientific literature. At the same time, English-language scientific literature accounted for about 50%, and scientific literature published in all other languages accounted for about 28% (*Nalimov & Mulchenko, 1969*). And in 2002, as the great geophysicist V.N. Strakhov, Russian-language scientific literature accounted for only 3.75% of all scientific literature (*Strakhov, 2007*).

In general, thanks to the dedication of scientists and a number of statesmen, it was possible to prevent the complete collapse of science in Russia. With the advent of the new century, the situation improved. Here we are talking not only about increasing funding for the work of scientists, but also about the fact that government leaders understand the importance of scientific research in the country. When new weapon systems appeared in Russia that had no world analogues, e.g., hypersonic aircraft, the West reacted in the same way as they did to the first satellite. Firstly, they announced that it was impossible, then that it did not matter at all, then that it was their secrets that had been stolen from them, then they nevertheless recognized the Russian championship.

The creation of a vaccine against the covid-19 virus in Russia also provoked strong resistance in the West, because the interests of powerful pharmaceutical companies were threatened. And just like with hypersonics, the Russian vaccine is declared either untested, or ineffective, or even stolen from Western pharmaceutical companies (although in the case of our vaccine, the West had to apologise for the accusation of stealing trade secrets).

However, what are the reasons for the sad fact that great discoveries are made in Russia, but turn them into something concrete in other countries? Basically, the reasons lie in the large size of such a scientific and industrial corporation as the Russian Empire and the USSR. Large organisations often make better management decisions than small ones. However, precisely because of their size, large organisations spend incomparably more time making decisions and executing them. And often the right decision at the time of making can turn into a completely wrong one at the time of execution.

Discussion

The evolution of the scientific world gives rise to many theories of the development of the science of the future. The confrontation between the West and the East in science is becoming more and more obvious. On the one hand, this can be a strong motivator for both parties in scientific development. On the other hand, it may develop new tensions and suspicions of

Western science in the influence of the science of the East, e.g., Russia, India, and China, especially China. In this regard, in the future, more in-depth research is required in such areas as:

1. The problem of compatibility of science of the West and the East in solving common global problems, e.g., confronting viruses, overcoming hunger, the exploration of the Moon and Mars.
2. The problem of trust and efficiency in the creation of global joint scientific projects that will be aimed at creating an information digital community of earthlings.

Conclusion

Thus, the crisis of world science is precisely the crisis of Western science. For many reasons, the countries of the modern West are in a state of gradual, but increasingly visible retreat from the leading positions in science and technology. Today, the countries of the global East are less and less dependent on Western technologies and are gradually beginning to come to the forefront in the world science of the post-Western world in the middle of the 21st century.

References:

Chernyak, E. (1989). Flame of Paris and its reflections. *Science and Life*, *8*, 78-86. (In Russian)

Gaulle, Ch. (2003). *Military memoirs*. [Trans. A.A. Anfilofyev and etc.]. Moscow: AST, Astrel. (In Russian)

Gutsulyak, O. (July 17, 2015). Third Roman temptation. (In Russian). https://proza.ru/2015/07/17/1222

Kokhanovsky, V. P., Zolotukhina, E. V., Leshkevich, T. G., & Fathi, T. B. (2003). *Philosophy for Graduate Students: Textbook* (2nd ed.). Rostov-on-Don: Phoenix. (In Russian)

Lebedev, S. V. (July 18, 2006). Spanish version: 70 years ago, a national uprising began in Spain. (In Russian). https://ruskline.ru/analitika/2006/07/18/ispanskij_variant

Lebedev, S. V. (July 27, 2007). Everything changes even in England, or Anthony Blair's political obituary. (In Russian). https://ruskline.ru/analitika/2007/06/27/vse_menyaetsya_dazhe_v_anglii_ili_politicheskij_nekrolog_ntoni_ble_ru/

Lebedev, S. V. (2013). *Philosophy and traditional applied art of Russia. Textbook for students of higher educational institutions studying in the direction of "Decorative and Applied Arts and Folk Crafts"*. St. Petersburg: High School of Folk Arts. (In Russian)

Lebedev, S. V. (2014). *History and philosophy of science. Textbook for graduate students studying in the direction of scientific training 44.06.01 "Education and Pedagogical Sciences"*. St. Petersburg: High School of Folk Arts. (In Russian)

Lebedev, S. V. (July 12, 2017). Emigration from Russia: Past and Present. (In Russian). https://ruskline.ru/analitika/2017/07/13/emigraciya_iz_rossii/

Lebedeva, G. N. (2016). Patriotism as a national idea. *20th Anniversary Readings at Tsarskoe Selo*, *1*, 12-25. (In Russian)

Leskov, S., & Konygina, N. (April 4, 2004). The return of brains is a single character. (In Russian). http://www.inauka.ru/science/article40684.html

Major scientific discoveries have come to a halt – Nature. (January 5, 2023). Kommersant. (In Russian) https://www.kommersant.uk/articles/krupnye-nauchnye-proryvy-ostanovilis-nature

Malkov, V. L. et al. (Eds.). (1987). *USA history. Volume 4: 1945-1980*. Moscow: Nauka. (In Russian)

Mironin, S. (May 23, 2007). Russia's losses from the brain drain. (In Russian). http://ruskline.ru/monitoring_smi/2007/05/23/poteri_rossii_ot_utechki_mozgov

Nalimov, V. V., & Mulchenko, Z. M. (1969). *Scientometrics. The study of the development of science as an information process*. Moscow: Nauka.

Pavlov, I. I. (January 31, 2014). About the Russian mind. Lecture delivered in May 1918 in Petrograd. (In Russian). http://www.hematology.ru/omni/news/2014/01/31/02.pdf

Petsko, A. A. (2012). *Great Russian achievements. World priorities of the Russian people*. Moscow: Institute of Russian Civilization. (In Russian)

Pushkareva, I. A. (2012). Humanistic ideas in the system of patriotic education of V. A. Sukhomlinsky. *Theory of Education*, *4*(4), 23-26. (In Russian)

Ratay, T. W. (2017). *Spending on science in Russia and the leading countries of the world*. Moscow: Higher School of Economics, Institute for Statistical Research and Economics of Knowledge. (In Russian)

Satire 10. (December 10, 2007). Juvenal. Satires. Book 4. (In Russian). http://ancientrome.ru/antlitr/juvenal/juvenal10.html

Sklyarenko, V. M. (n.d.). Max Planck. (In Russian) https://history.wikireading.ru/176851

Strakhov, V. N. (May 12, 2007). Laws must be followed! Our Time, № 42(216). (In Russian). https://gazetanv.ru/archive/2007/42/765/

Surguladze, V. Sh. (2018). The "creative class" concept by Richard Florida. *Issues of National Strategy*, *6*(51), 202-210. (In Russian)

The "Hamburger University" will appear in Moscow. (October 9, 2018). (In Russian). https://news.rambler.ru/moscow_city/40993998/?utm_content=rnews&utm_medium=read_more&utm_source=copylink

Trace, A. (November 17, 1961). What is Ivan reading? Editorial. Times. (In Russian). https://inosmi.ru/archive2015/20080429/241068.html

Why do people believe in the supernatural? (October 31, 2016). (In Russian). https://www.bbc.com/russian/features-37828393