INFINITE TALENT

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ABSTRACT

Underestimated by his contemporaries, but a person, who became a source of many brilliant ideas for followers of his talent and civic courage – that is Mikhail Lomonosov seen from today. And there are reasons for it, mentioned by the author of this biographical article.

Keywords: history of science, Lomonosov, natural science, physics, chemistry, navigation, academy, university.

Background. *The first Russian academician as a part of St. Petersburg Academy of Sciences, a natural scientist of world importance, a poet, an artist, a researcher in the field of humanities, an educator, an initiator of Moscow University, Mikhail Lomonosov was born on the 19 (8 Old Style) November 1711. This fact was recorded in the village Denisovka (formerly known Mishaninskaya; in common – «on the bog») of Kuroostrovskaya district of Kholmogorsky county of Arkhangelogorodskaya province (now the village Lomonosovo). The future luminary of science appeared in the family of coast-dweller peasant. His father belonged to peasants, who were free from serfdom, did not belong to a landowner, owned communal lands and carried state feudal obligations. And this fact played a certain role in the fate of a boy with a high learning capacity.*

Objective. *The objective of the author is to investigate life and work of a prominent Russian scientist Mikhail Lomonosov.*

Methods. *The author uses general scientific methods, historical-retrospective analysis.*

Results.

Walking a thousand miles

The coast-dweller folk calendar had a special date to start learning to read and to write – Naumov Day or Intelligent Day (December 14), with the onset of adolescence when child's parents for the first time gave him an alphabet and studied letters with him. Lomonosov was taught to read by his mother, a daughter of a local deacon, and after her death he could continue his education with the help of villagers: clerk S. Kolchin, P. Dudin, S. Sabelnikov, I. Shubniy, whose son was subsequently arranged by Lomonosov to Academy of Fine Arts and became a famous sculptor Fedot Shubin. At first, he read everything he could get: some church Slavonic books, ancient religious books of old coast-dweller believers and printed materials of Peter's time: decrees, military reports, leaflets, splints. In 12-14 years the boy could write and rewrite religious books competently and clearly. Through his neighbors Dudins he managed to get «Arithmetic» of L. F. Magnitsky, «Grammar» of M. G. Smotritsky and «Rhymed Psalter» in syllabic verse of S. Polotsky (secular name of S. E. Petrovsky-Sitnianovich, who was a mentor of tsar's children at Zaikonospassky monastery). The «Arithmetic» in addition to encyclopedic knowledge of physics and mathematics at the time cited basic astronomy, geodesy, navigation, mechanics, building art and commerce. «Grammar» consisted of a Slavic orthography, etymology, syntax and prosody, designed to learn versification.

The stepmother did not like his book lessons. The boy had to read and learn on his own in secluded and empty places, enduring cold and cold. At home, the teenager could not gain knowledge in school. The status of a peasant's son did not allow to take Mikhail to verbal school at Kholmogorsky bishop's house (at the beginning of XIX century transformed into a seminary).

With 10 year old a boy helped his father in the fishing industry and in remote and dangerous traveling on vessels with the state and private baggage of the Northern Dvina River across White and Barents seas and along the Siberian coast of the Arctic Ocean, acquired good nautical skills. In the family he was the only son, he was supposed to inherit his father's business. But Lomonosov, seeking to have an education, borrowed 3 rubles from the neighbor, received with the help of fellow countrymen a passport from Kholmogorsky office and joined a tailwind luge caravan with fish, in October 1730 secretly from his father, not relying on his consent, went to walk 1,100 versts (1200 km) to Moscow. At the end of December of the same year, he successfully reached the goal.

At first, the young man learned in mathematics and navigation school, which was housed in the Sukharev Tower. But there was no high school. Then Mikhail in the middle of 1731 entered Slavonic-Greek-Latin Academy («Spassky School») at Zaikonospassky monastery, the first higher education institution of general education in Moscow, where graduates of Kyiv-Mohyla Theological Academy taught. In 1814 it was transformed into Moscow Theological Academy and moved to Trinity-Sergius Lavra (Orthodox Monastery), now located in the town of Sergiyev Posad, Moscow region. The Academy accepted only men of noble birth, and he had to pass himself off as a son of a Kholmogorsky nobleman. When the deception was revealed, teachers, given the desire for knowledge, talent and skills of the young man, gave him the opportunity to complete his training.

In September 1731 his passport expired, and since that time Lomonosov was considered as a fugitive. From his father, angry at his son willfulness, he got no financial assistance, but «fugitive», receiving a salary 3 kopecks a day, eating bread and kvas, enduring ridicule, still did not give up his studies. Using the books of academic libraries, he diligently studied politics, rhetoric, philosophy, and received extensive training in ancient languages, particularly Latin, on which scientific papers were written. And he mastered the language in such a way, that later he was recognized as one of the best Latin scholar in Europe.

To complete the education Lomonosov in 1734 was sent to Kiev-Mohyla Theological Academy, which was considered as a pinnacle of Russian educational vertical. But not finding the lectures on physics and philosophy, which he sought, the student returned back to Moscow.

His special theological education lasted five years, but Lomonosov did not become a cleric. In 1735, as the most distinguished, he was sent to St. Petersburg for admission to the University of the Russian Academy of

Sciences, and in autumn 1736 he was sent to Germany to study natural history, physics, mathematics (geometry and trigonometry), chemistry, mechanics (hydraulics and hydraulic engineering), mining and metallurgy. In Russia great importance was given to the development of mining and metallurgy. It was not possible to invite scientists, metallurgists, who know physics and chemistry, from overseas. It was decided to train our specialists.

Foreign universities

Lomonosov first studied at the University of Marburg under a physicist and philosopher, an honorary member of St. Petersburg Academy of Sciences H. Wolf, and then since July 1739 in Freiberg under a chemist and metallurgist I. F. Henkel, where he acquired knowledge in mineralogy, mining organization, the structure of crystals.

The student attended in Marburg lectures on physics, philosophy, literature, history, geography, and began to collect personal library. Years of stay at Wolf had left their mark, they gave him a good workout for thinking. In the paper «On the transformation of a solid body to a liquid body, depending on the movement of prior fluid» and «On the difference between mixed bodies, composed of corpuscles in the clutch», written there in the years 1738-1739, he chose his way into science.

Lomonosov learned quickly German, French and Hungarian. In the study on his own initiative of the German grammar and poetry, he realized that the Russian grammar and poetry need to be changed. Syllabic versification, based on the ordered number of syllables (in lines must be the same number of syllables, there is a periodic repetition of syllables) and used primarily in languages with a permanent accent, was not distinct in expressiveness. He used a musical tonic metre with ordered arrangement of stressed and unstressed syllables in a verse (stresses are recurrent), on strong place were exclusively or predominantly stressed syllables, on weak – unstressed.

His fancy for poetry was reflected in two of his works in German, sent to St. Petersburg Academy of Sciences: translation of odes of a frenchman M. Fenelon and «Ode to the victory over Turks and Tatars on the capture of Khotin in 1739». In it Lomonosov praised Russian people, described the importance of peace for people of his country. In his «Letter on rules of Russian versification» (published in 1778), received from Freiberg with an ode, he developed the ideas expressed earlier by V. K. Trediakovsky. He substantiated a system of tonic (later named syllabic-tonic) versification theoretically: «Russian poetry should be written on natural property of our language, and the things, that are very unusual in other languages, should not be taken».

In Saxon mines Lomonosov observed the natural movement of air in winter and summer in mines, geological exploration, mine surveying and smelting business, he focused more on practice, which was before my eyes. He was attracted by global problems of knowledge concerning the foundation of things. It was hard to find mutual understanding with Henkel, standing on backward, reactionary positions in science. In 1740, he quarreled with him, and without permission from St. Petersburg Academy of Sciences left Freiburg. After wanderings with adventures (due to two meters tall, in Prussia a broad athlete was forcibly recruited into the army, but escaped from the fortress of Wesel) on German and Dutch cities weathered in sciences Mikhail returned to Marburg, where he began to study algebra, intending to apply it to theoretical chemistry and physics.

German yoke and death sentence

On his return from abroad via the Russian envoy in 1741, Lomonosov, numbered a student, translated into Russian scientific articles, wrote work «Physical-chemical arguments about compliance of silver and mercury» and «Elements of mathematical chemistry». The last work was a basis of his future physical-chemical studies in which he was among the first to introduce to chemistry measure, weight, number, and was among the experimenters, who used a microscope in chemical experiments. The program article stated: «Who wants to go deeper into the study of chemical truths, must learn the mechanics. But many reject the possibility of putting in the foundation of chemistry principles of mechanics and to make it an exact science, but these people are lost in the darkness of hidden properties and do not always know how to find the laws of mechanics in the changes of mixed bodies, as some theorists without any preliminary experiments, abuse their leisure for fabrications of empty and false theories, overloading literature with them. If those in the brain of whom chaos reigns on a bulk of ill-considered experiments, did not disdain to learn the sacred laws of geometry, then, of course, they would go deeper into the recesses of nature».

In January 1742 Lomonosov was appointed an adjunct (assistant professor) of the St. Petersburg Academy of Sciences in physical class. Attaching great importance to the development of Russian metallurgical industry, he immediately wrote a guidance «First fundamentals of metallurgy and mining» (in the form of a book the text was published in 1763, and at that time a huge circulation – 1225 copies). It describes the occurrence of ores, how ancient people found metals, describes ores and minerals in their external features, properties of different metals and methods for their deriving, as well as safety and sanitation rules for mining. He first showed the physical conditions of «free» movement of air of different temperatures in mines and used the results of this analysis to processes occurring in mines and furnaces operating without forced blast. Today, these conditions are a basis for the theory and calculation of natural ventilation of air in the area of industrial premises.

In 1742 his scientific works were published «The experience of the theory of non-sensitive particles of bodies and all reasons for particular qualities», «Physical reflections on the causes of heat and cold» and training program for students studying rocks. He continued to be engaged in the issues of linguistics

and a year later published «A compendium to the rhetoric for the benefit of lovers of mealy works».

In St. Petersburg Academy of Sciences a difficult situation took place. Foreigners, attracted by large privileges and jobs, took all key positions and were supported by Head of Chancellery (director) I. D. Schumacher, who directed not only economic, but also scientific and academic affairs and many issues depended on him in the structure of the Academy. To conduct research on metals, the analysis of ores, minerals and salts a laboratory was required, but without a struggle it was not possible to get it. In 1743, a conflict of Lomonosov with Veinsgeim left tragic consequences. A complaint was sent to the authorities on «unworthy misconduct» and frequent quarrels and fights with the Germans. He was arrested, sentenced to death and imprisoned in the prison of Peter-Paul fortress with an extremely harsh regime, where he was kept under guard for eight months, until mid-January 1744, when he was pardoned by the Empress Elizabeth. The whole year Mikhail remained without salaries. In response to requests for subsidies for food and medication he was given 80 rubles.

In June 1745, Lomonosov presented a thesis «On a metallic luster», thanks to which after the departure of the German I. G. Gmelin he was the first Russian elected to the post of Professor (Academician) of chemistry as a part of St. Petersburg Academy of Sciences. The following year he published a translation of a summary of «Experimental Physics» of Wolf and again the first gave public lectures on physics in Russian at the same time, marking the beginning of Russian scientific terminology.

Time to determine laws

In the years 1746-1748, at the insistence of the scientist on Vasilyevsky Island Russia's first chemical research laboratory of the Academy was built (a one-storey building with an area of 150 m^2 and a height of 5 m), where he conducted various experiments for more than ten years.

He consistently developed the corpuscular theory and atomistic understanding of the structure of matter, justified a law of conservation of matter and motion. He developed especially intensively and comprehensively his hypothesis on the relationship between the properties of atoms, bodies and all natural phenomena. This period refers to the chemical analysis of salts, ores and other species, sent to the Academy from different institutions, works to improve optical instruments, study of thermal phenomena and gaseous states of bodies, features of chemical solutions.

According to the mechanical theory of heat, the latter is an internal, invisible movement of particles, which comprise a body. It points to the need for extremely low temperatures (predicted presence of an absolute zero in nature), gives an approximate output of Boyle's law and provides for mandatory deviations from the law.

Scientists first artificially received cold, in which the mercury froze. Then he formulated basic provisions of the kinetic theory of gases and conducted experiments on the burning of oxidizable metals in a closed vessel, subjecting the verification of assessment of the English physicist and chemist Boyle, who claimed that during chemical reactions the mass of material increases due to penetration of fiery matter (phlogiston) through the glass. Taking a few sealed vials with lead, copper, and other filings, Mikhail calcined substances, which were closed, and weighed them (accuracy and completeness of the weighing a long time remained unsurpassed). Weight of vials remained unchanged, and oxides of metals were heavier than initial metals. This meant that Boyle's opinion was false. So Lomonosov in 1748 discovered the law of immutability of the total weight of the substance in chemical changes and the law of conservation of matter.

The latter law is one of the fundamental laws of nature. Mikhail Lomonosov unveiled it in 1760 in his thesis «Discourse on hardness and liquid of bodies», gathering a lot of additional material in support of his point of view and the projection of results of research on the laws of conservation of energy and motion, which, he believed, become the axioms of natural science. The scientist wrote: «If some matter disappears somewhere, then it will multiply elsewhere ... This universal natural law extends in the sense of motion rule, because a body moving another with own power, loses the same amount of weight, which it transfers to another, that gets the movement from it».

The law of conservation of mass in general was formulated later by the French chemist Antoine-Laurent Lavoisier in 1789. He says: «the mass (weight) of substances before a chemical reaction is equal to the mass (weight) of the substances after the reaction». In the era of the use of nuclear reactions the law acquired a different wording: «The amount of matter mass of the system and weight, equivalent to power received or transferred to the same system, is constant».

At the end of XIX century scientists recognized the laws of conservation of energy (in the nature it does not arise out of nothing and does not disappear, but can only move from one form to another), quantity of motion, impulse, electric charge. It turned out that Ohm's law for the active branch (generalized law) and the second Kirchhoff's law resulted from the law of conservation of electric power, and the first Kirchhoff's law – the law of conservation of electric charges.

The corpuscular theory of heat and the elastic force of air of Lomonosov, based on atomistic representations, began to spread in 110-120 years in the 60-ies of the XIX century and coincides with the modern views on the heat as the chaotic motion of particles in the body.

In the theory of solutions Lomonosov also consistently pursued the corpuscular point of view. He studied the phenomena of crystallization from solutions, the solubility dependence of the temperature. He divided solutions, in the formation of which heat is released and to produce which heat must be consumed.

Chemical lab had become a place where the scientist in the 50s of the XVIII century engaged in mosaic. In mosaic the art intertwined with stained glass chemistry, optics and technology. In order to understand the mysteries of ancient mosaics, he performed thousands of trial melting of glass of different sorts, developed ways to build a solid mosaic from glass pieces and provided artistic merit for produced products.

Lyrics near physics

In the autumn 1748 36-year-old Lomonosov noticed the first signs of illness due to eroded health. He was not able to work many weeks. Having recovered, he wrote tragedies «Tamira and Selim» and «Demofont». The first edition of his poems was published in 1751. Pioneer work of the poet was based on the traditions of Russian culture and folklore. Appearing as a creator of Russian odes, he gave this traditional genre a civil sounding in the world literature. Com-

mendable in its intended purpose, the ode became a means of propaganda of achievements of scientific thought and social-patriotic ideas. Lomonosov played an important role in the development of many different poetic genres: he was interested in message, idyll, epigram, epic, scientific and philosophical lyrics, epic poem.

The theoretical justification for poetic practice of Lomonosov were philological writings «A brief guide to eloquence …», «Russian grammar» (the first scientific, had a normative character, withstood 14 editions), «On the quality of a poet, consideration» and «Introduction of the benefits of church books in the Russian language» written in the years 1747-1758. He argued that the purity of style depends on a thorough study of Russian grammar and live speech. The use of different grammatical forms or variants of one form is associated with different styles of the literary language. Some are possible in a bookish way of speaking, others – in colloquial speech or vernacular. He summarized all three points: in Russian literary language from the Church Slavonic language should remain just that is clear and lives in the language; from literary sources things should be preserved that people mastered during centuries of practice and also vocabulary, which is convenient to express abstract concepts; the main part of the Russian literary language, its fundamental principle should be written and spoken language of the people.

Now he is regarded as a poet. He has to justify that he spends time on physics and chemistry.

In March 1751 the scientist was awarded the rank of 6th class. Table of Ranks established 14 classes (1st – the highest). In the years 1752-1753 he gave the students the course «Introduction to the true physical chemistry», accompanied by demonstration experiments and practical lessons. Lomonosov combined into one harmonious whole all of physics and chemistry based on atomic and molecular representations.

In the same years he received from the Empress Elizabeth as a gift an estate with 211 serfs in the village of Ust-Ruditsa of Koporsky County 64 versts (68,3 km) away from St. Petersburg. He won government approval to build a glass factory and a factory for the purpose of manufacture of multi-colored glass, beads, glazes (colored opaque glass in the form of cubes or platelets) and so on. A number of machines, tools and devices designed by him, were driven by a watermill. Of created on this production, 12-preserved mosaic paintings (including the famous «Battle of Poltava»), five are attributed to him personally. In recognition of the work on the mosaic Lomonosov he was elected in 1763 a member of the Russian Academy of Arts, and a year later, and honorary member of the Academy of Sciences of Bologna (Italy).

In 1753 St. Petersburg Academy of Sciences on the initiative of Lomonosov appealed to the scientific world with a task: «To find a real cause of the electrical power and to make it a true theory». This marked the beginning of the study of electricity and magnetism in Russia at the same time.

University in Moscow

Lomonosov created in 1753 an anemometer for measuring the speed of air and gas flows and in his home laboratory he built a plant similar to a working electrometer model with a scale of the academician physicist G. V. Richman. Nothing prevented him to begin a systematic study of atmospheric electricity and lightning discharges.

At that time, the study of electricity had not gone very far from the observations of the ancient Greeks, who established the ability of amber to attract different light objects after friction. With his experiments Mikhail discovered the electric field in the atmosphere in the absence of storms and proved the electrical nature of lightning. He proposed to apply lightning dischargers for protection of buildings from atmospheric electricity, which are used now.

After the tragic death of Richman during a thunderstorm at a public meeting of the St. Petersburg Academy Lomonosov made «A speech about air phenomena, originating from electric force, with interpretation of many other properties of nature». He presented a truly scientific theory of the origin of atmospheric electricity by the electrification of vapor corpuscles by friction of particles against each other by ascending and descending air currents. Later, he definitely stated that in thunderclouds a strong electric field occurs, generating lightning, and that the charge is distributed over the surface of tiny water droplets in the entire volume of the cloud. These opinions were a specific stage in the development of physics of electricity, as they make their first attempts of quantitative, really measurable approaches to electrical phenomena.

The scientist showed experimentally that under the influence of electricity in the discharged gas glow may arise, laying with this discovery the foundations of the science of electrical phenomena in gases and foundations of electronics. He created the theory of aurora borealis, proving that they are nothing else but electrical discharges in the upper atmosphere and that «it can be artificially manufactured».

Summarizing the interim results of his work in the field of electricity, Lomonosov in 1756 wrote the book «Theory of electricity, developed by a mathematical way», in which he rejected unscientific hypothesis of «electric fluid» and put forward his own theory of electrical phenomena. According to him, there is a common electrical and light phenomena caused by the vibrational motion in the ester, and this is closely related to the basic hypothesis of the atomic structure of bodies. This prediction is now the basis of modern science.

Lomonosov was interested not only in thunderstorms, but in meteorology in general. He was aware of the importance of weather prediction and sought to arrange meteorological stations, designed devices for them and tried using self-recording instruments to explore the upper atmosphere. This was done after his death at the end of XIX century.

«He created the first Russian university, – stated Alexander Pushkin later – it is better to say, he was our first university». In the words of the great poet all is true. Especially if we meticulously assess the chronology of events preceding the university project, analyze archive documents and correspondence of Lomonosov with Shuvalov. But this topic has repeatedly dissected by many of the biographers of the scientist.

However, in design, instrumentation his area of interest was constantly expanding. At Moika in St. Petersburg, where the scientist built a house with the laboratory, masters made telescopes, microscopes, periscopes, nautical and other instruments and tools, using his projects.

Lomonosov devoted considerable attention to the development of geology and mineralogy in Russia and had produced a large number of analyzes of rocks. In the works of the «Word on the birth of metals from the

earth quakes», «About the layers of the Earth», published in 1757 and 1763 respectively, he sought to explain the earth relief with consequences of earthquakes, offered a hypothesis about the origin of volcanic, the origin of ore veins and how to determine their age, argued the organic origin of soil, peat, coal, oil, amber in the distant geological epochs and the existence of the continent at the South Pole of the Earth. He had consistently pursued the idea of permanent regular changes that occur in the Earth's crust, and actually applied the method of evolution, later in the first half of XIX century; it received name «actualism» in geology. He found solutions for decades ahead the development of geological science.

Taking care of the distribution of education in Russia, the scientist insisted on the creation of a university of European type accessible to all layers of the population and open to persons capable of sciences. In 1755, on his initiative and the project, which he implemented through Count I. I. Shuvalov, president of the Russian Academy of Arts and a favorite of the Empress Elizabeth Moscow University was founded, which became one of the centers of Russian Education and Science and bears now the name of Lomonosov.

On the northern navigation and not only

In 1757 Lomonosov after the appointment as an Adviser of Office of St. Petersburg Academy of Sciences was forced to leave the chemical laboratory and the chemical department. Foreign scholars before him did not care about creating an independent Russian science. He took vigorous steps to eliminate this disadvantage. He paid special attention to university and gymnasium. His opinion concerning elementary and secondary education was presented in the project of gymnasium charter. At the same time he developed a plan of reorganization of management and a detailed draft statute of the Academy. However, in all endeavors, he had to overcome obstacles created by the court and academia. Many of his innovative designs remained unfulfilled or were implemented much later. Thus, the scientist had unsuccessfully sought for publication of scientific papers or academic journal, the organization of St. Petersburg University, which was opened at the end, but more than half a century after his death.

In 1758 Lomonosov was charged «supervision over» the Department of Geography (became head of the Geographical Society), Historical assembly, and since 1760 in his authority were university and gymnasium of St. Petersburg Academy of Sciences. He prepared a procedure for obtaining geographic and economic-geographical data for «Russian Atlas» by organizing expeditions and processing of responses to special questionnaires sent to various locations of the country. He drafted the economic lexicon that was supposed to contain information on agriculture and industrial products of individual provinces, building materials, mining, etc. He developed a plan of a united academic center with the construction of 14 buildings. He was attracted by the idea of creating a scientific institution in Russia, which would be engaged in Oriental studies.

The terms of research interests were formed also with the influence of the coast-dweller past of Lomonosov.

In 1759-1764 years he wrote a work «Discourse on the accuracy of the sea route», «Short description of different trips on northern seas and the indication of possible passage across the Siberian Ocean to Eastern India», «On the northern seafaring in the East across the Siberian ocean», «Thoughts on the origin of icebergs in the northern seas». In them a former fisherman coast-dweller repeatedly stressed political and economic importance of development of the Great Northern Sea Route for Russia. He put forward a draft of this route and pointed out that the movement of vessels in the northern seas depends on currents and wind direction («These things I have noticed all along the coast of Norman (Barents) Sea from the Svyatoy nos to Kildin Island») and that the only way to reach the North Pole lies between islands Grumant (Spitsbergen) and Novaya Zemlya.

In his writings, the scientist proposed a number of new navigational tools and methods for determining longitude and latitude. He cited results of the study of marine polar ice and gave a first classification of them, which is very similar to a modern one. He introduced an idea of fossil ice and proved the existence of a large ice drift, which was confirmed 100 years later in the second half of XIX century. He suggested that icebergs go down from sea cliffs, and ice fields occur in the mouths of large northern rivers. For the first time the issue was raised concerning organization of an international Navigation Academy to address the most important scientific and technical issues of navigation.

Infinite universe

Motivated by patriotism, Lomonosov in 1749 began to study the sources of Russian history. But the systematic research in this direction, he began two years later, gradually gathering original documents «Short Russian chronicle with a genealogy» (contains a list of the main significant events and deeds of knyaz and tsars to the era of Peter I), published in 1760, and «Ancient Russian history from the beginning of the Russian people to the death of Grand Knyaz Yaroslav the First or until 1054» (parts 1 and 2), published in 1766, after his death, and «Description of marksman riots and regimen of Sophia». He recognized a certain role of the masses in the historical process and criticized the views of supporters of Norman theory. Those considered variags as founders of the state in ancient Russia and denied the independent development of the Russian people.

In 1761, Lomonosov wrote a letter to Shuvalov, «On preservation and propagation of the Russian people», in which he opposed the land exploitation, forced and unequal marriages. He proposed a number of legislative and social measures aimed at increasing the population of Russia by increasing the birth rate, to maintain born and bringing foreigners into Russian citizenship.

As for science, at the same time Lomonosov created a «night-watching pipe» (a predecessor of modern optical devices for night observation), a new type of reflective reflector telescope and observed the transit of Venus across the solar disk. The results of his observations, as well as others he commented in his work «The phenomenon of Venus on the Sun, observed in St. Petersburg Academy of Sciences on May, 26, year 1761». In it, he described the apparent spreading of the edge of the solar disk when entering the planet. Hence it is the first time in the history of astronomy he concluded that there is a significant air atmosphere at a nearby planet. Only in 19th century, scientists were able to repeat this experiment. The first among other scientists Mikhail Lomonosov guessed that the surface of the Sun is a fire raging ocean. He suggested that the tails of comets are formed by the action of electrical forces emanating from the Sun. Exploring the sky with his instruments, he defended the idea of an infinite universe, multiple worlds in its depths.

Ideas on the corpuscular structure of matter at the end of the life of a scientist were used to explain the most mysterious phenomenon – gravitation. With developed design, enabling to detect very small changes in the direction and amplitude of its oscillations, he carried out long-term studies of terrestrial gravity. To explain it, Lomonosov introduced a special «gravity matter» with unusual properties. It is weightless, consists of tiny

particles with opacity and inertia. Gravitation is performed due to pushes of particles of this matter.

Many of his thoughts, ideas, initiatives had serious international repercussions. It is no accident that in 1760 Lomonosov was elected an honorary member of the Academy of Sciences of Stockholm (Sweden).

In 50ies years of XVIII century scientist worked hard, but in 1762 he filed a petition for dismissal, and in May 1763 he retired with the rank of State Councilor (civil rank, class 5).

In the summer 1764, he wrote «A Brief History of the behavior of the Academic Office in consideration of researchers and businesses from the beginning of this housing to the present time», which described the adventures of Shumacher and his successor and son-in-law I. I. Taubert. His own proposals that the Academy should be the Russian institution and academics – natural Russians defending the interests of the homeland, are set out in the «New location and establishment of St. Petersburg Imperial Academy of Sciences, filed for the highest consideration and approbation».

In the spring 1765 Lomonosov, accidentally caught a cold, came over again and on the 4th of April at the age of 53 he died. He was buried in the necropolis of XVIII century in the Lazarev cemetery of Alexander Nevsky Lavra (Orthodox Monastery) in St. Petersburg. Immediately after his death, all papers, which were in his house on the orders of Catherine II were sealed by the earl G. G. Orlov. Papers of state significance (most of the archive) were taken by him. But their location has not been revealed until now. Scientific records, which were not interesting for Orlov, were left by «censor» in the public domain and have been preserved to this day.

Lomonosov's contemporaries did not appreciate his ideas and initiatives as a naturalist and knew and learned him more as a poet. Since 1747, except for ceremonial odes, he had to compose by the orders of noblemen verse inscriptions on the illumination and fireworks, on launches of ships, masquerades, to write tragedies.

A blank wall of incomprehension began with St. Petersburg Academy of Sciences. Most of its members treated his views with irritation, since they did not fit into known systems. The difference between original principles hindered to see the depth and innovations of the scientist. Views, accepted by Lomonosov, led him to astounding success. What baffled many scientists at the time (thermal and electric phenomena, chemical processes), he compared to the movement of corpuscles of matter and ether, and developed on this basis atomistic chemistry, kinetic theories of heat and gases, the physics of ether, which in his theory was a bearer of electrical and optical phenomena.

Conclusions. *In the history of the study of life and work of Lomonosov a milestone was marked in 1830 by 75th anniversary of Moscow University. It was remembered that the fundamental role at the foundation belongs to him, the first-class physicist and chemist of his time, the creator of the atomic theory. In the XIX century, the name of Lomonosov was included in many foreign encyclopedias, science and historical and literary reference books.*

The attention was drawn to scientific works of Lomonosov when celebrated the 150th anniversary of the founding of the first Russian chemical laboratory, which, as «revealed» was created by him. A new revival of the study of the life and work of the scientist occurred during the celebration in 1911 of his 200th anniversary and to the 250th anniversary in 1961 a feature film devoted to him was created in the Soviet Union.

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