

# MIKHAIL LOMONOSOV (TO HONOR THE 300TH ANNIVERSARY OF HIS BIRTH)

“What is more useful to mankind for mutual exchange of their profusion, what is safer for those sailing in the sea, what is more needed for those traveling to different countries, how to know the location of places, the flow of rivers, distances to cities, size, abundance and proximity of different lands, customs, habits, and governments of different people? These things are clearly shown by geography that subjects the universal amplitude to an indivisible regard”.

*Mikhail Lomonosov. Works, Vol. 4, 1898. p. 267*

Among the many “geographical” celebrations of the last decade, the 300th anniversary of the great Russian scientist, philosopher, poet, and painter, Mikhail Lomonosov, is perhaps the most important. He lived a relatively short but bright life of a scientist of encyclopedic knowledge and was a brilliant representative of the Enlightenment in Russia. In our country, this period was marked by the emergence of a new type of culture associated with strengthening the role of secular elements, development of exact and natural sciences, education, the arts, glorification of man-the-creator. As in Western Europe, rationalism dominated in Russia. In society, advanced and progressive forces possessed over it, believing in the limitless possibilities of humans in knowledge and transformation of nature. Of course, there was a growing interest in geography, travel, and expeditions. Figuratively speaking, the world has become more actively involved in the exploration of the world.

M.V. Lomonosov became the leader of this social movement in the middle of the 18th century. It is known that then, the axis of the imaginary geography of Europe had shifted from the opposing poles “South-

North”, where the role of a backward and savage side was assigned to the “North”, to the opposing poles “West-East”<sup>1</sup>. A protest against imposed patterns and formulae invented in Western Europe and determining Russia’s place in the backyard of Europe can be considered, to some extent, as the historical mission of M.V. Lomonosov<sup>2</sup>. He demonstrated the absolute synchronicity of scientific thought in Russia and Europe through his entire life and his contribution to the world’s development of various sciences. The epoch of Enlightenment became the cradle for men of genius and all-round scholars in different countries and Russia was no exception in this respect. It is incorrect to assume that now, the life and public and scientific activities of M.V. Lomonosov have a purely historical value. To confirm this, it is not necessary to refer to the fundamentals of chemistry, physics, and mining that he created. In order to understand the insight

<sup>1</sup> Wolf L. Inventing Eastern Europe: Map of civilization in the minds of the Enlightenment. Moscow: Novoev Literaturnoe Obozrenie, 2003. 560 p.

<sup>2</sup> Chudinov, I.A. Lomonosov and “Russia and the West” relations problems, The Republic of Science – the field of competition and cooperation. Bulletin Intl. Inst. of Management. Arkhangelsk. 2003. № 3–4. <http://lomonosov.pomorsu.ru/pdf/articles/04.pdf>

of the scholar, it is necessary to look at the “Lomonosov’s Geography” and to his spoken or written words on the development of Siberia and the Arctic, on the need of “augmentation of the Russian people” as the main goal of the state, on medical care for the population, on land settlement through immigration (the Russian expanses are “futile without inhabitants”), on the development of agriculture, and on many other issues that, to this day, are important for our country.

**A brief biography.** Many of the origins of different character traits, skills, and knowledge of M.V. Lomonosov can be found in his ancestry and the natural and social environment of the first years of his life. He was born on Nov. 19 (or Nov. 8, Old Style), 1711, in the village Denisovka near the settlement Kholmogory (Arkhangelsk region) into a peasant family of a coast-dweller, Vasylyi Lomonosov, engaged in maritime fishing on his own boats. The Lomonosov’s mother, who died very early, was a daughter of a deacon. There is extremely scanty information about his first years of life: voyages with his father to the sea, taking literacy lessons from his mother, reading “Grammar” by Smotritsky, the “Arithmetic” by Magnitsky, and “Poetic Book of Psalms”, by Simeon of Polotsk.

M.V. Lomonosov left for Moscow in December 1730, with the blessing of his father. Impersonating a nobleman’s son, in January 1731, he entered the Moscow Slavic-Greek-Latin Academy in Zaikonospassky monastery. He studied there for about 5 years where he learned Latin language and was introduced to the “science” of that time. In 1735, among the most distinguished students, he was sent to St. Petersburg to enroll in the Academic University. In 1736, three of the talented pupils, including M.V. Lomonosov, were sent to Germany by the Academy of Sciences to study mathematics, physics, philosophy, chemistry, and metallurgy. Abroad, M.V. Lomonosov spent 5 years in Marburg and in Freiberg. In 1740, in Marburg, he married Elizabeth Christine Tsilh, the daughter of a member of the City Council.

In 1741 (according to other data, in January 1742), M.V. Lomonosov returned to Russia and was appointed Assistant Professor at the Academy of Sciences of the physics class and, in August 1745, he became the first Russian to be elected to the post of Professor (Academician) of chemistry. In 1745, he began to give public lectures in Russian. In 1748, he actively participated in meetings of the History Department of the Historical Assembly, and he spoke against the dominance of foreigners in the Academy and against the “Norman theory” of creation of the Russian state. In the same year, the Russia’s first chemical research laboratory was built for M.V. Lomonosov. In 1749, at a solemn meeting of the Academy of Sciences, he gave “The word of Praise for Empress Elizabeth” where, among other things, he spoke of the outstanding role of geography in the development of the Russian state. After that he established a good rapport with Elizabeth’s favorite, Count Shuvalov. With the support of the latter, in 1755, at the initiative of M. V. Lomonosov, Moscow State University was founded. In 1758, M.V. Lomonosov was charged with “looking over” the Geography Department, Historical Assembly, the University, and the Academic Gymnasium. In 1759, he engaged in founding a gymnasium defending again the rights of the lower classes to education. In 1763, he was elected a member of the Russian Academy of Arts. Later in life, he was elected an honorary member of the Stockholm (1760) and Bologna (1764) Academies of Sciences. Shortly before his death, he was visited by the Empress Catherine. M.V. Lomonosov died on April 5, 1765, and was buried in the Lazarevskoye cemetery of the Alexander Nevsky Monastery in St. Petersburg.

Nearing the 300th anniversary of M.V. Lomonosov’s birth, a number of sites have been created; these sites focus attention on the activities of M.V. Lomonosov and contain new data about his background and contributions to various disciplines (e.g., [http://www.erlib.com/Евгений\\_Лебедев/Ломоносов/34;](http://www.erlib.com/Евгений_Лебедев/Ломоносов/34;)

<http://m-lomonosov.ru/index287e-2.php?page=7&offset=1>; <http://www.lomonosovmv.ru/>; <http://feb-web.ru/feb/lomonos/>). There is also a virtual library of works of the scientist (<http://www.rvb.ru/18vek/lomonosov/>). The more we are moving away from the time of M.V. Lomonosov, the clearer and deeper we understand the greatness of this historical figure and his importance in the development of the national science, including geography<sup>3</sup>.

**Place of geography in the range of interests of M.V. Lomonosov.** We know in great detail the daily routine in years at the end of his life. His work schedule was tight. He was present, almost daily, at the Academy, and the last 7 years of life, in its Geography Department.

We will draw attention to the years that represented a concentrated essence of interest of M.V. Lomonosov in geography and to determination of its place in the sciences. Appeal to such a synthetic science as geography, after decades of studies in chemistry, physics, and geology, was a natural development as the scientist was looking for ways to explain the world: performed experiments to identify physical and chemical properties of the environment, studied the qualitative and quantitative characteristics of natural materials creating devices to help him in this activities. And if, before his election as Director of the Geography Department, all of his encyclopedic work had not had a strong core, then in the last years of his life, M.V. Lomonosov found a meaningful purpose, i.e., the geographical study of the nature, resources, economy, and population of Russia. The following section presents main phases of the last years of the scientist's life from "geographical position".

In 1758, M.V. Lomonosov carried a heavy scientific-organizational and teaching load: He managed the gymnasium, the university,

the Historical Assembly, and the Geography Department (all at the St. Petersburg Academy of Sciences). The same year, he developed a plan to create a comprehensive "atlas" of Russia where he intended to enter physical geography, economic, and geographic data collected during special expeditions and surveys. Questionnaires were distributed to all regions of the Russian Empire.

In 1759, inspired by plans for further expeditions for the geographical study of the country, he wrote, "The Arguments about the Great Accuracy of the Sea Route". There, the scientist described instruments he invented for determining longitude and latitude. In this paper, M. V. Lomonosov proposed to organize an international Nautical Academy. He first, in the history of navigation, expressed the ideas that seas unite countries geographically rather than separate them and that it is necessary, in support of this statement, to jointly develop and study them.

In 1761, the processing of the geographical questionnaires coming from the regions, began. After analyzing the first, yet incomplete, surveys, he wrote a treatise "On the Preservation and Augmentation of the Russian people", which raised a number of proposals to "increase the population of Russia": to promote fertility, reduce infant mortality, and engage foreigners into the Russian citizenship. This is in absolute compliance with the current problems of Russia in the area of population policy in the 21st century. In May 1761, M.V. Lomonosov discovered the atmosphere on Venus. In the same month, as seen from the examination of his notes, his daily activities included ([http://www.erlib.com/Евгений\\_Лебедев/Ломоносов/34/](http://www.erlib.com/Евгений_Лебедев/Ломоносов/34/)):

«May 29. Was present in the office. Ordered to contact the Chamber Board to expedite the provision of information required for work on a new "Russian atlas".

May 31. Was present in the Office, where signed a decree offering to remind Petersburg and Moscow provincial office

<sup>3</sup> Laverov, N.P. Introduction. In: Happily working for the good of society. In honor of the 300th anniversary of M.V. Lomonosov. Moscow: Zvonitsa-MG, 2010. pp. 3–7.

that they should send to the Academy of Sciences the questionnaires' replies necessary to work on the "Russian atlas"».

In 1762, M.V. Lomonosov published a paper "Summary of Different Trips to the Northern Seas and the Indication of Possible Passage through the Siberian Ocean to Eastern India" that can be considered the first major synthesis of polar geography and geographical description of the Arctic Ocean and the Northern Sea Route.

In 1763, he continued to deal with the Arctic geography and also worked on the geography of the South Pole. The same year Lomonosov published the work "On the Layers of the Earth" where he theoretically showed that there is a continent at the South Pole of the Earth. It will take another 57 years for Antarctica to be officially discovered on January 16, 1820, by the Russian expedition led by Thaddeus Bellingshausen and Mikhail Lazarev who, on the sloops "Vostok" and "Myrnyi", came to the ice shelf, named later after the Bellingshausen, and went around the new continent to the southern polar seas.

In 1764, M.V. Lomonosov wrote an "addition" to the paper "Summary of Different Trips to the Northern seas..." This work was called "On the Northern Navigation to the East in the Siberian Ocean" and was accompanied by a "suggested" instruction for "marine commanding officers". Furthermore, among the key provisions of the paper, there was a statement that became a byword: "Russia's might will grow with Siberia".

And so day after day, year after year. How one can highlight his contribution to geography, especially the geography of Russia, among many achievements of M.V. Lomonosov, including the development of science (physics, chemistry, geology, astronomy), Russian history, literature, and education? Many spoken and written information has been provided over the past two centuries and a half (<http://biographer.ru/biographies/10.html>). In 1952,

the 6th volume of collected works of the scientist was published<sup>4</sup> that contained his work in geography. And to honor his 250th anniversary, several detailed analysis were published, reflecting the activity of M. V. Lomonosov as a geographer, cartographer, and polar explorer<sup>5</sup>. Books and collections of works of M.V. Lomonosov were published for the 300th anniversary of the scientist<sup>6</sup>.

Apparently, March 8, 1758, can be considered the starting point when M.V. Lomonosov was appointed Director of the Geography Department of the St. Petersburg Academy of Sciences. However, as noted by all his biographers, he was involved in geography and its constituent disciplines during all his years at the Academy, i.e., at least from 1747 to 1765. He also can be rightfully considered as one of the founders of such sciences in Russia as meteorology, climatology, glaciology, economic, social, historical, and polar geography<sup>7</sup>.

As in the other disciplines, in geography, M.V. Lomonosov did not confine himself to certain areas of research. As Director of the Geography Department of the St. Petersburg Academy of Sciences, he organized geographical research, designed theory and methodology of science,

<sup>4</sup> Lomonosov, M.V. Complete Works. The USSR Academy of Science. Moscow, Leningrad. Vol. 1, 1950; Vol. 2, 1951; Vol. 3, 1952; Vol. 4, 1955; Vol. 5, 1954; Vol. 6, 1952; Vol. 7, 1952; Vol. 8, 1959; Vol. 9, 1955; Vol. 10, 1957.

<sup>5</sup> Dick, N.E. Activities and works of M.V. Lomonosov in geography. On the 250th anniversary of M.V. Lomonosov (1711–1961). Moscow. 1961. 211 p.; Chronicle of the life and work of M.V. Lomonosov. Moscow, Leningrad: Nauka, 1961. 290 p.; Lomonosov in the memories and characteristics of his contemporaries. Leningrad: USSR Academy of Sciences, 1962. 232 p.; Markov, S. Scarlet Book. The importance of M.V. Lomonosov's work "Brief description of the different trips to the northern seas and the possibility of passage through Siberian Ocean to East India". Ogonek, 1961, № 47. pp. 10–11.

<sup>6</sup> Happily working for the good of society. In honor of the 300th anniversary of M.V. Lomonosov. Moscow: Zvonitsa-MG, 2010. 344 p.

<sup>7</sup> Gnucheva, V.F. The Geography Department of the Academy of Sciences of the XVIII century. Ed.: A.I. Andreev. Moscow-Leningrad, 1946. 21 p.; Ptukha, M.V. Lomonosov as an economist and statistician. Collection "Lomonosov", 1946, Vol. 2. 175 p.; Nikitin, N.P. Emergence of economic geography in Russia. Collection of "Problems of Geography", 1950, № 17. 55 p.; Dick, N.E. Activities and works of M.V. Lomonosov in geography. On the 250th anniversary of M.V. Lomonosov (1711–1961). Moscow. 1961. 211 p.; Treshnikov, A.F. M.V. Lomonosov and the study of the Arctic (Report on the III Lomonosov lectures, November 20, 1971). Arkhangelsk, 1971. pp. 110–117.

supported Russian geographers and travelers. In strategic terms, this enormous organizational and research activity considerably strengthened the position of the national geography and created favorable conditions for its development in Russia. To understand this, it is sufficient to see how often he turned to the subject of geographic research, not only in directly in this field, but in studies of other areas of science as well.

We have analyzed the occurrence of geographical terminology in the works of M.V. Lomonosov. The results are presented in Table 1.

Most commonly used geographic terms in M.V. Lomonosov's works are the "Geography Department", "expedition", "Earth", "maps", "geographic atlas", and "ice". Largely, this sequence reflects the hierarchy of scientific interests in geographical studies. But he adhered to a deep geographical determinism, a relatively broad understanding of the subject of science and had a desire to speak out in different directions of geographical research. Hence, his commitment to physical geography was to place emphasis on the need for quantitative environmental parameters and, in economic-geography, to detect population distribution patterns of development of their space and resources by analyzing the statistics. Undoubtedly, M.V. Lomonosov, one of the first national geographers, emphasized the integrity of geography both in theory and in practice. This allowed him to introduce, into the science of geography of the 18th century, understanding of the connection of economic phenomena with the physical and geographical conditions, in practical terms, the need for optimal allocation of productive forces.

The integrity of the perception of the scientist as a geographer, in the past and still now, is hindered by the fact that he ran out of time to finish the geographical study of Russia through the overall survey that he had started in 1758. But, as we

know<sup>8</sup>, he succeeded in organizing a workable organization, developed the basic directions, the questionnaire's sections, questions, and the methodology of synthesis of materials. Influence of the "academic questionnaire" on the development of the national geography can be traced well to the mid 19<sup>th</sup> century. This statement is supported by numerous facts. It is known that the replies to the questionnaires were collected back, to the extent designed by M.V. Lomonosov, only in the early 1770s. They were used, after the death of the scientist, by many researchers (I.I. Lepekhin, N. Ozeretskovsky, P.I. Rychkov, etc.). The description of cities, compiled according to the survey, may be isolated into a special category. They were a generalized "portrait" of the settlements and represented invaluable information for the primary geographic comparisons in space and time. All subsequent attempts to develop programs for geographical description of Russia in the second half of the 18<sup>th</sup> century and in the first half of the 19<sup>th</sup> century were connected directly with the M.V. Lomonosov's questionnaire. Also, in addition to being the originating points of "population geography" and of urban and agriculture research, the "academic questionnaire", undoubtedly, contained the first seeds for future demographics, statistics, sociology, and economics. Not without a reason, this series of work of the scientist included also the compilation of the "economic lexicon" which was successfully completed only in the 1780s by the great Russian scientist, M. D. Chulkov.

As can be seen from Table 1, the "geographical interests" of M.V. Lomonosov are mainly in the following areas: activities of the Geography Department, polar geography, cartography, and geographical study of Russia. The discussion of the contribution of M.V. Lomonosov to these areas is presented briefly below.

<sup>8</sup> Dick, N.E. Activities and works of M.V. Lomonosov in geography. On the 250th anniversary of M.V. Lomonosov (1711–1961). Moscow. 1961. 211 p.

**Table 1. The frequency of references to geographical terms in the writings of M. V. Lomonosov (1950-1957). The results of analysis of the data in the index to the works of the scientist. Marked terms are mentioned in the writings of the scientist more than 40 times**

	Volumes of works of M.V. Lomonosov, №№ 1–10	Number of references
Adjoint, Geography Department	9, 10	7
Apprentices of the Geography Department	9	39
Atlas of Russia, new	4, 8, 9, 10	65
Atlas of Russia, old	9, 10	10
Atmosphere (research)	5-Jan	45
Barometer, Lomonosov's barometer	1, 3, 4, 5, <b>6</b> , 8, 9	52
Brief description of different voyages to the Northern seas	<b>6</b> , 9, 10	8
Bulletin on geography (publication)	9	42
Cartography	9, 10	3
Cities	4, 9	46
Climate	4– <b>6</b> , 10	18
Drawings geographical (including, of cities)	<b>6</b> , 9	35
Earth's surface	3, 5, <b>6</b>	40
Earth's atmosphere	3, 4, 8	8
Equator	6-Mar	34
Expedition	4, 9, 10	130
Forests	5, <b>6</b> , 9	26
Geodesy	4, 9, 10	7
Geographers	4– <b>6</b> , 9, 10	9
Geographical inquiries, county questionnaires	9	47
Geographical belts (analog of climatic zones and thermal belts)	4, 5	11
Geographical descriptions (including, of Russia)	9	18
Geographical drawing	9, 10	9
Geographical map (including General Map of Russia)	<b>6</b> , 9, 10	91
Geographical observations	9	18
Geography (in general, physical, economics)	4– <b>6</b> , 8–10	51
Geography Department (including activity, works, archive, instructions)	<b>6</b> , 9, 10	149
Hydrography	4, <b>6</b>	6
Ice (as research object: permanent ice, in northern seas, polar, polar mountains)	2, 3, <b>6</b> , 9	78

	Volumes of works of M.V. Lomonosov, №№ 1–10	Number of references
Journeys	4– <b>6</b> , 9	19
Lake (s)	5, <b>6</b> , 9	19
Land (as research subject)	2–5, 8	120
Latitude	4, <b>6</b> , 9	58
Meridian	1, 4, <b>6</b>	37
Metereological observations	1, 3, 4, 7, 9, 10	17
Mountains	5, <b>6</b> , 9, 10	19
Ocean	6-Apr	14
Polar circle	3, 4, <b>6</b>	6
River (s)	5, <b>6</b> , 9	40
Sea (s)	4– <b>6</b> , 9	58
Students of the Geography Department	9	7
Thoughts on the high accuracy of marine routes	<b>6</b> , 9, 10	13
Thoughts on the origin of ice mountains in the northern seas	<b>6</b>	2
Villages	<b>6</b> , 9	15
Wallpaper geographical	9, 10	4
Wind (research)	6-Jan	24

**1. The activities of the Geography Department of the St. Petersburg Academy of Sciences and personnel training for geographical studies.** The Geography Department at the Academy of Sciences was established in 1739<sup>9</sup>. Already in 1745, the atlas of Russia was published. Specifically then, M.V. Lomonosov became interested in the problems of geography. His interest to this science grew over many years and physical, economic, marine, and mathematical geography and geophysics, meteorology, and hydrology became the subject of his research. Even before taking the office of the Director of the Geography

Department, in his writings, he had been repeatedly underlining the leading role of the geographical science in the life of Russian society. In a public speech in 1749 he said, "What is more useful to mankind for mutual exchange of their profusion, what is safer for those sailing in the sea, what is more needed for those traveling to different countries, how to know the location of places, the flow of rivers, distances to cities, size, abundance and proximity of different lands, customs, habits, and governments of different people? These things are clearly shown by geography..." Using these words as the epigraph of this article, we focus on the accuracy of the definition of the subject matter of science, i.e., to "know the location of places".

Back in 1757, the outstanding organizer of science, M.V. Lomonosov was charged with

<sup>9</sup> Gnucheva, V.F. Lomonosov and the Geography Department of the Academy of Sciences. In: Lomonosov. Moscow: USSR Academy of Sciences. 1940. 259 p.; Gnucheva, V.F. The Geography Department of the Academy of Sciences of the XVIII century. Ed.: A.I. Andreev. Moscow-Leningrad, 1946. 21 p.; Goldenberg, L.A. The Geography Department of the Academy of Sciences and the creation of the first academic Atlas (1739–1799). Essays on the history of geography in the USSR. Moscow, 1976. pp.49–60.

leadership at the Geography Department (he took the office in 1758). He saw the main objective of its activities in this field to be the subordination of the work of this organization to the public interest and, above all, the creation of a new Russian atlas, based on precise geographical data<sup>10</sup>.

M.V. Lomonosov sought to strengthen the Geography Department as the lead agency that performed essentially the function of government, of natural resource accounting, and of preparation of scientific data for the compilation of the atlas of Russia. According to the records of the scientist and his daily routine, he took deep interest in education of Russian cartographers and surveyors. He was drafting the projects for astronomical expeditions and was sending informational questionnaires to the provinces of Russia to obtain various kinds of geographical data from the field. While preparing the material for the geographical description of the country, the scientist, besides sending out questionnaires, dealt with the problems of economic geography of the country. And for collection of information on agriculture, industry, economic production, mining activities, availability of regional building materials, and resources he created a project "economic lexicon".

The management of the Geography Department was clearly influenced by the intrinsic constant desire of M.V. Lomonosov to expand the application of science, directing it to achieve the practical need. He had a great interest in the issues of development of agriculture in Russia. Thus, at the Academy of Sciences, he organized a "farming class" and, under the influence of M.V. Lomonosov's ideas, in 1765 in St. Petersburg, "The Free Economic Society" was organized, which played a significant role in

<sup>10</sup> Gnucheva, V.F. Lomonosov and the Geography Department of the Academy of Sciences. In: Lomonosov. Moscow: USSR Academy of Sciences. 1940. 259 p.; Gnucheva, V.F. The Geography Department of the Academy of Sciences of the XVIII century. Ed.: A.I. Andreev. Moscow-Leningrad, 1946. 21 p.

the development of agriculture and industry in Russia.

Frequent mention, by the scientist in his works of "students of the Geography Department" and "apprentices of the Geography Department" (see Table 1) suggests that M. Lomonosov paid much attention to the training of geographers. It is characteristic, for example, that M.V. Lomonosov was the first to start, at the St. Petersburg Academy of Sciences, the mass production of globes for the "benefit of the geography of Russia" and especially for the benefit of the spread of geographical knowledge among Russian youth. It is clear that this was facilitated by his position as Head of the University and the Gymnasium at the St. Petersburg Academy of Sciences, and by the fact that, in 1755, he founded the University of Moscow.

**2. Polar geography, the study of the northern seas and ice.** Love and heightened interest in the Arctic exposed M.V. Lomonosov's "roots of a coast-dweller". No wonder the main ridge, which crosses the Arctic Ocean, bears now his name. All the years of active work in the Academy, M.V. Lomonosov showed great interest in the study of Polar regions and the Northern Sea Route.

He approached the problem of the Northern Sea Route from the perspective of the development of maritime activities in Russia and the development of the Far North, emphasizing its importance politically and economically. His best-known works in this area are "Brief Description of Various Trips to The Northern Seas and the Indication of Possible Passage Through the Siberian Ocean to Eastern India" (1763) and "Thoughts on the Origin of Ice Mountains in the Northern Seas" (1761). The latter work was published in Russian only in 1949 in the book of V.A. Perevalov<sup>11</sup>. In this work, he gave the first classification of the ice, which is

<sup>11</sup> Perevalov, V.A. Lomonosov and the Arctic. Moscow-Leningrad. Glavsevmorput, 1949. 504 p.



largely similar to the modern classification; introduced the concept of fossil ice; indicated that ice mountains “appear due to the steep shores of the sea”; proved the existence of a large ice drift which was discovered only in the 2nd half of the 19th century. It may be stated that in “Thoughts on the origin of Ice Mountains in the Northern Seas”, M.V. Lomonosov introduced the world’s first theoretical study on glaciology, subdivision of glaciers into mountain and mantle characteristic of the Arctic<sup>12</sup>. In essence, this work was the *beginning of the glaciological research in the world*. Not without reason, for this research specifically, he was elected a member of the Swedish Academy of Sciences.

It is considered, that the science of glaciology, as the study of glaciers, originated with the research by the Swiss natural scientist H. de Saussure, i.e., with his essay “Trip to the Alps” (1779–96). Only in the 19th century, the subject of this science was defined; however, systematic materials on glaciers were lacking and methods of research and knowledge on ice physics were insufficient. Therefore, the first stage of glaciology was mainly descriptive and was characterized by the accumulation of information mainly on the forms of temperate glaciers<sup>13</sup>. Regretfully, at that time, there was no call for the work of M.V. Lomonosov. It just had the knowledge and ideas that would allow much earlier development of the polar glaciology and understanding of the nature of glaciation in high latitudes<sup>14</sup>.

As is known, M. V. Lomonosov studied the aurora and he compiled a circumpolar map of the Arctic Ocean, as well as the

scheme of its currents. In his treatise “A brief description of the different trips to the northern seas...” (1763), which justified the development of the Russian Arctic navigation, he called for the development of the Northern Sea Route. Already in 1764, he complemented this work with “On the Northern Navigation East, through the Siberian Ocean”. During 1759–1761, he developed and submitted to the authorities several academic projects of academic expeditions which were, in his view, necessary for scientific geographical research and for immediate practical purposes of the state. For example, under his initiative, expeditions of V.Ya. Chichagov, P.K. Krenitsyn, and M.D. Levashov were set on foot and plans for many other arctic studies were developed<sup>15</sup>.

**3. Cartography, compilation of “land-maps”, “geographical drawings”, “geographical plans”, and “Atlas of Russia”.** Defining M.V. Lomonosov as an outstanding national geographer, we understand that the main achievement of the scientist in this area is precisely the development of cartography, compilation of “land-maps”, “geographical drawings”, “geographical plans of the cities”, a circumpolar map, and the “Atlas of Russia” where he led the work<sup>16</sup>. Taking the lead in the Geography Department of the Academy of Sciences in 1758, M.V. Lomonosov wrote in a note on the origins and activities of the Geography Department of the Academy of Sciences, “...I was commissioned, among other things, to lead the Geography Department, and, having accepted the position, I immediately put extreme effort into the compilation of a new, properly Russian atlas and the best possible detailed and true Russian geography...” M.V. Lomonosov points to this directly in the “Introduction to the Geographical Expeditions” (1760): “...have no doubt that in three years we

<sup>12</sup> Koryakin, V.S. The value of ideas of M.V. Lomonosov for polar research and the history of Russia. In: Happily working for the good of society. In honor of the 300th anniversary of M.V. Lomonosov. Moscow: Zvonnitsa-MG, 2010. pp. 164–180.

<sup>13</sup> Kotlyakov, V.M. Glaciological dictionary. Leningrad: Gidrometeoizdat, 1984. 527 p.

<sup>14</sup> Perevalov, V.A. Lomonosov and the Arctic. Moscow-Leningrad. Glavsevmorput, 1949. 504 p.; Koryakin, V.S. The value of ideas of M.V. Lomonosov for polar research and the history of Russia. In: Happily working for the good of society. In honor of the 300th anniversary of M.V. Lomonosov. Moscow: Zvonnitsa-MG, 2010. pp. 164–180.

<sup>15</sup> Materials for the history of expeditions to the Academy of Sciences in the XVIII and XIX centuries. Comp. V.F. Gnucheva. Ed.: V.L. Komarov. Transacts of the Archive of the Leningrad Branch of the Academy of Sciences. Vol. 4. Moscow-Leningrad, 1940. 312 p.

<sup>16</sup> Bagrov Leo. The history of Russian cartography. – Moscow: Centrpoligraf, 2005. 528 p.

will ...have much improved atlas, over the old Russian, of sixty or seventy special maps..." Here, he writes about his plans for the geography of Russia, with an atlas to be one of its parts and another part represented by a geographical description of the country. In his article "M. V. Lomonosov as an Economist and Statistician", M.V. Ptukha mentions these plans, "...atlas, especially in its original form, until 1763, was only a pretext to fight, so to speak, the banner of the geographical ideas of Lomonosov, and not the only task for him; it was just one of the main parts of the overall plan. The great scientist envisioned his worthy cause that only he was equal to undertake, i.e., creation of a complete geography of Russia whose main part should be the compilation of a detail statistical-economic description of the country".

The long title of the first atlas (or "old atlas", as it was called in the works of M.V. Lomonosov) is as follows: "The Atlas of Russia, Consisting of Nineteen Special Maps of the Russian Empire with the Bordering Lands, Compiled Using the Rules of Geography and the Latest Observations, with the Attached General Map of the this Grand Empire, Compiled by the Efforts and Labors of the Imperial Academy of Sciences". This cartographic publication of the early period of the national cartography was issued in 1745 by the St. Petersburg Academy of Sciences and was recognized as the first official atlas of our state. This product was being worked on for 20 years under the decree of the Peter I. In 1730s, several atlases by I.K. Kirillov were issued, which were not considered official because they contained maps that did not cover the entire territory of the country. Several maps of this atlas were included in the 1745 atlas.

Despite the fact that the "Atlas of Russia..." (1745) was the apex of Russian cartography of the first half of the 18th century, it had many inaccuracies that were the point of attention by M.V. Lomonosov who spoke

about the need to create a new atlas. Nevertheless, the atlas was in great demand: only in 1749–1762, several additional issues of 25, 50, and 100 copies, were printed repeatedly. However, from the moment of the publication of the "Atlas of Russia...", the old atlas has not been ever published again<sup>17</sup>.

As science and technology progressed, there appeared newer and more sophisticated atlases. Specifically, they were: "Russian atlas..." (1792) which consisted of 44 maps of governorships and the general map of the country<sup>18</sup>. The atlas was compiled by A.M. Vildbreht (1756–1823) who was a geographer of the Geography Department of the Cabinet of Her Imperial Majesty, a corresponding member of the Academy of Sciences, a mathematician, teacher, and supervisor of the Mining School. He had been working on this atlas since 1785. In 1786, he produced his first map of the governorship. A. Vildbreht authored 40 maps out of 45. The new atlas was first published in 1792, however; a number of its maps were dated to 1786. The general map of the Russian Empire had all the necessary data known about Russia, except for roads, as an element of strategic importance. In addition, it included the Russian territories in North America, i.e., Alaska. The map reflected all the achievements of geography in the study of the Russian Empire at the end of the 18th century. It included much of the geographic information collected during the preparation of the atlas by M.V. Lomonosov that has not been entirely published.

There is yet another cartographic story worth mentioning in connection with the name of M.V. Lomonosov. It is known that the 18th century was, to Russia, the

<sup>17</sup> Svenske, K. Materials for the history of the creation of the Atlas of the Russian Empire, published by the Imperial Academy of Sciences in 1745. Compiled by Charles Svenske. Proceedings of the Imp. Academy of Sciences, Vol. IX. St. Petersburg. 1866. 204 p.

<sup>18</sup> Kusov, V.S. Unfinished works by M.V. Lomonosov to map of Russia. Moscow University Bulletin, Geography, 1989. № 1. pp. 37–44.; Kusov, V.S. Monuments of national cartography. Moscow, 2003. 146 p.

time of “securing its borders”. One of the moments that made significant impact on the subsequent history of Russia was the development and “consolidation” of the Orenburg region. The Orenburg expedition was established precisely with a view of the annexation of this region into the Russian Empire. Under Primarily with the efforts of the founder and first head of the Orenburg expedition I.K. Kirilov, of his successors in office, V.N. Tishchev, of V.A. Urusov, and of the first governor of Orenburg I.I. Nepluev previously the “wild and unruly” land was brought “under the scepter of the Russian government”. But the list of “the organizers and champions of the Orenburg region” would not be complete without mention of P.I. Rychkov (1712–1777.). In 1741, P.I. Rychkov led the Geography Department, established under the Orenburg commission. In 1752, at his initiative, a group of surveyors headed by the lieutenant I. Krasilnikov began drafting a new general map of the Orenburg province and of ten individual maps. The compilation of the first atlas of the province was completed in 1755<sup>19</sup>. And already on January 21, 1759, M.V. Lomonosov presents the request to the Office of the President of the Academy, K.G. Razumovsky, in which he insists on the need to establish “a class of academic correspondents, using the example of some other Academies” and “to initiate such things by accepting Peter Ivanovich Rychkov as one of such correspondents”. The efforts of M.V. Lomonosov were not in vain; on January 29, the Academic Assembly awarded P.I. Rychkov the honorary title of a corresponding member. The diploma was issued to P.I. Rychkov on August 18 of that year. Interestingly, this request became known only after more than 100 years through the publication of P. Pekarsky<sup>20</sup>. Previously, it was attributed to G.F. Miller, but as it turned out, the draft had been written by Lomonosov.

<sup>19</sup> Chibelev, A.A. In the depths of the steppes: Essays on the naturalists of the Orenburg region. Ekaterinburg. Nauka. UIF. 1993. 118 p.

<sup>20</sup> Pekarsky, P. The life and. literary correspondence of P.I. Rychkov. St. Petersburg. 1867. pp. 42–43.

**4. The geographical study of Russia, the organization of expeditions, “geographical questionnaires”, development of physical-geographical and economic-geographical research.** Projects of expeditions designed by M.V. Lomonosov were largely implemented during the famous academic expeditions of the 1770s–1780s. Undoubtedly, the organization of geographical research, the development of their techniques, support of talented Russian geographers, organizational and research activities of M.V. Lomonosov has considerably strengthened the position of geography in the country and created favorable conditions for its development in Russia. N.E. Dick<sup>21</sup> notes that for M.V. Lomonosov, the desire to tie the developed of theoretical problems of geography with the practical needs of the country was extremely important. He considered the rapid growth of industry (especially steel sector) and trade, impossible without extensive use of natural and labor resources, to be the most important tasks. The development of productive forces in the vast expanses of Russia demanded knowledge of economics and geography of the state and its individual areas, their natural resources, and geographical conditions of economic development.

M.V. Lomonosov clearly understood the importance of synthesis of knowledge about the nature and the knowledge of the economy. As a result, due to the formulation of research of geographical features of the economy of Russia, the ideas about the new science, which he, at the beginning of 1760 called “economic geography”, have been formulated<sup>22</sup>. M.V. Lomonosov considered that specifically from this new science it was possible to improve economic-geographical information available, at that time, at the Academy of Sciences and to attempt to

<sup>21</sup> Dick, N.E. Activities and works of M.V. Lomonosov in geography. On the 250th anniversary of M.V. Lomonosov (1711–1961). Moscow. 1961. 211 p.; Dick, N.E. Lomonosov’s period in the development of Russian geography. Moscow: Mysl, 1976. 127 p.

<sup>22</sup> Nikitin, N.P. Emergence of economic geography in Russia. Collection of “Problems of Geography”, 1950, № 17. 55 p.

provide *general geographic description of Russia* that would contain predominantly data on economics.

For this work, he began to collect geographic information, sent questionnaire to land districts, which provided material for both the geographical content of the atlas maps, as well as for compilation of a detailed economic and geographical description of Russia. Prior to M.V. Lomonosov, this was attempted by V.N. Tatishchev who conducted, in the 1720s, “...surveying of the entire state and compilation of detailed geography land-maps”.

“Geographical questionnaires” were sent to different regions of Russia to get physical- and economic-geographical and economic information in 1759. The questionnaire consisted of thirty questions: the type and size of cities, occupations and trades of the population, commerce, industry, agriculture, features and sizes of rivers, lakes, conditions for navigation, and conditions of mountains. The contents of the questionnaire allowed receiving data on integrated properties of the territories and their administrative borders. In the questionnaire, natural resources were considered an important source of economic development. In general, these “geographic questionnaires” showed how widely M.V. Lomonosov understood the problem of geographical research and the need for geographical description of the country. The data coming to the St. Petersburg Academy of Sciences, according to the questionnaire sent out, were the important source for many of the national economic and geographical works of the second half of the 18<sup>th</sup> and 19<sup>th</sup> centuries. M.V. Lomonosov was interested in a river or a lake in a town and how it is placed on their shores, are there any factories of plants, on which rivers and at what distance from the cities they are located, is there servage fishing and what fish is there, are there any salt reserves etc. The questionnaire also was intended to collect

economic, statistical, political, physical and geographical information. The most interesting fact is that the questionnaire required the economic data in the context of specific natural conditions of the areas. However, it lacked subjects division. During that time, it was conventional to have separate categories for different subject. As a result, certain categories of information were given in isolation from each other. M.V. Lomonosov was interested in these data and their mutual relationships and dependencies, which was a significant step forward in methodological respect.

Responses to the questionnaire were coming to the Academy for nearly 10 years. This situation impeded correction and edition of the atlas maps, slowed down their publication, and did not allow M.V. Lomonosov to start compiling a full geographical description of Russia. However, the materials collected were of great value and contributed much to the dissemination of geographical information about our nation.

The responses to the M.V. Lomonosov’s questionnaire were different in their content from the data collected by V.N. Tatyshev: they provided a relatively comprehensive picture about settlements. By 1773, in the words of M.V. Lomonosov, there were “four volumes of collected responses and already half of the state has a detailed topography”.

Based on historical data, V.F. Gnucheva<sup>23</sup> notes that “... the materials received in response to the questionnaires were reviewed by the participants of the expedition of 1768–1774 and used for work on the description of Russia”. In 1771–1774, the collected and processed in the Geography Department responses were partly published and became known to a wider range of scientists.

Another major work of M.V. Lomonosov in economic-geographical study of Russia

<sup>23</sup> Gnucheva, V.F. The Geography Department of the Academy of Sciences of the XVIII century. Ed.: A.I. Andreev. Moscow–Leningrad, 1946. 21 p.

was to establish an "Economic Lexicon..." ("Short List of Used Economic Lexicon of Russian Products...", 1763) where, in alphabetical order, products manufactured in Russia were listed. He suggested that each product should be accompanied by "...the place where every product is born or produced with the quantity and goodness, whether is consumed in the same location or sold to other cities and by what means delivered and its sale price; such locations should be shown on the maps with assigned degrees and minutes of latitude and longitude supplied for convenience of search"<sup>24</sup>.

He planned to prepare two detailed maps ("economic land-maps") for the European part of Russia and Siberia. The entire description, according to M. Lomonosov, was to fit in one small book. Unfortunately, "The Economic Lexicon of Russian Products..." was not completed, but the collection of data and their processing was continued by the Academy of Sciences for a long time after the death of M. V. Lomonosov.

In addition to the geographic questionnaires and collecting information for "Economic Lexicon...", other works of M.V. Lomonosov also aimed at economic-geographical study of Russia. First, it was associated with geographical expeditions that he was organizing. They included not

only the determination of astronomical objects and the geographical description of the area, but the collection of economic-geographic information. For these purposes, he attempted to use the data of the so-called "second revision" (1742), made a list of items for individuals who were to conduct the "third revision" in order to incorporate the population census of Russia in its geographical study.

M.V. Lomonosov gave the utmost importance to the population issues, considering that the power of the state depends on the availability of a large number of working-age population. He put population growth in dependence on the conditions of life and its cultural development and he proposed a number of measures to "preserve and augment Russian people".

Thus, only four areas and four activities of M.V. Lomonosov in the "field of geography", but how diverse and profound the results are and how significant the contribution to the formation of the national geography is! I would like to conclude the article with the words of M.V. Lomonosov that he said to Jacob Shtelin, his secretary and assistant, before his death, "...I regret only that I could not accomplish all that is taken for the good of the Fatherland, for the growth of science, and for the glory of the Academy"<sup>25</sup>.

**Arkady. A .Tishkov**

<sup>24</sup> Dick, N.E. Activities and works of M.V. Lomonosov in geography. On the 250th anniversary of M.V. Lomonosov (1711–1961). Moscow. 1961. 211 p.

<sup>25</sup> Sapozhnikov, Yu.N. Lomonosov's anniversary. In: Happily working for the good of society. In the honor of the 300th anniversary of M.V. Lomonosov. Moscow: Zvonitsa-MG, 2010. pp. 7–29.

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