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Scientific Study of Novaya Zemlya Archipelago at the end of the 19th – the beginning of the 20th century

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Scientific Study of Novaya Zemlya Archipelago at the end of the 19th – the beginning of the 20th century

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Abstract. The history of scientific research of Novaya Zemlya archipelago at the end of the 19th – the beginning of the 20th century is analysed based on archival and published sources. The study of the history of scientific research on the vast northern territory is closely connected with the history of the role of national science in development of the Arctic territories of Russia. At the end of the 19th century geo-political situation encouraged the Government of Russia to colonize Novaya Zemlya actively. Large-scale scientific research was organized to study thoroughly its physical and geographic characteristics and to explore natural resources. In wide political and socio-economic context the period taken for the study is topical in terms of attaching this territory to Russia. Systematic studies of Novaya Zemlya started in the Soviet period when the young Government of the USSR started to regard the archipelago as an important military outpost of the country and one of the sources of natural productive forces of the country. The leading role of the Academy of Sciences and the All-Union Arctic Research Institute in the research of Novaya Zemlya is shown. Special attention is paid to the initiatives of the scientific society in the research of the archipelago.

1. Introduction

The Russian Empire was present on the territories of the Arctic since ancient times considering them a natural reliable border of the country. Up to the middle of the 19th century the Government tried to use the natural resources of these territories when possible. However, it did not take care about protection of the territories from the neighbouring countries. This problem became relevant for Russia with advances in science and technology and with active redivision of the world by economically strong countries. During this period the Governments of a number of powerful countries began making geopolitical plans concerning the Arctic and the Northern Sea Route. Intrusion into native Russian territories mostly commercial in purpose (industry, trade, timber harvesting) became more frequent. As a result, the geopolitical situation encouraged the Government of Russia to organize protection of its interests in the Arctic and to develop the northern territories.

2. Literature review

Russian archipelago Novaya Zemlya attracted manufacturers and scientists by possible availability of valuable natural resources. The history of its development has lots of interesting and occasionally tragic stories. The studies of this region have always met tremendous difficulties due to its natural and geographical conditions.



Despite this Russian science has wide experience in the research of Novaya Zemlya. The analysis of this experience is of great interest nowadays due to the policy of the country aiming at enhancing attention to the problems of the Russian Arctic. The topicality of the present study is caused by the fact that Russian historiography possesses a relatively low number of investigations devoted to the scientific study of Novaya Zemlya [1, 2].

The research of the archipelago had several steps. It began at the end of the 18th – the beginning of the 19th centuries when the first research expeditions funded by the Academy of Sciences and investors were sent to this territory for exploration of mineral deposits and mapping of the islands. Russian researcher and traveller F. Rozmyslov came to Novaya Zemlya in 1768-1769 and was the first to describe the Matochkin Shar Strait up to the Kara Sea. In 1805 historian V.V. Krestinin prepared a scientific work “Geographic News about Novaya Zemlya” at the request of Academician I.I. Lepekhin [3]. Later the archipelago was visited by research expeditions supervised by V. Ludlov (1806–1807), A.P. Lazarev (1819), F.P. Litke (1821–1824), P.K. Pakhtusov (1832–1833, 1834–1835), K.M. Ber (1837), A.K. Tsivolk (1838–1839). The results of their studies were descriptions of the coasts of the islands and fragmentary data on the geologic composition of the archipelago. After these expeditions Russian researchers did not come to Novaya Zemlya for more than thirty years.

3. Results and discussion

The studies continued only in the 1880's due to a number of factors. In the 1870's researchers from Germany, Austria and the Netherlands started active research of the archipelago. Important expeditions were undertaken by M. Heigly (1870–1871), G. Gyofer (1872), A.E. Nordensheld (1875–1876), A. Vikhman (1878–1883). During these expeditions successful studies of the geography and geology of the islands were carried out. In addition, foreign manufacturers worked actively along the coast of the archipelago. In fact, this territory of the Russian Empire was owned by foreigners.

The Russian Government initiated colonization of Novaya Zemlya to confirm its belonging to Russia and to protect the geopolitical interests of the country in the northern seas. Malye Karmakuly, the first settlement on the territory of the archipelago gradually inhabited by the Nenets and Pomor people, was founded in the second part of the 1870's. Foma Vylka who moved to the archipelago together with his family in 1869 became its first permanent inhabitant. He worked at the life-saving station in Malye Karmakuly from 1877 to the end of his life. Foma Vylka and other Nenets people permanently living on Novaya Zemlya played the major role in attaching the territory of the archipelago to Russia at the end of the 19th century. Regular steam navigation between the archipelago and Arkhangelsk organized in the 1880's allowed to intensify scientific studies of the archipelago.

Organization and realization of the First International Polar Year became an important stage in the research of Novaya Zemlya. In 1875 the head of the austro-hungarian expedition (which had discovered the Frantz Josef Land Archipelago) Carl Weyprecht in his report “Major Principles of Investigating the Arctic” at the 48th Assembly of Physicists and Naturalists suggested conducting complex research of the Arctic territories through international cooperation. In fact, this idea became a program of a new step in the research of the Arctic [4]. C. Weyprecht suggested creating a ring of stations surrounding the North Pole and allowing observation according to common methodology.

In 1879 the International Meteorological Congress approved of the project of the First International Polar Year that was planned to be held in August 1882 – august 1883. More than 700 people from 12 countries including Russia took part in it. There were twelve stations organized in the Northern hemisphere and two stations in the Southern hemisphere (Russia and the USA owned two polar stations each, Finland belonging to the Russian Empire at that time, Germany, Austria-Hungary, Great Britain, Sweden, Denmark, Norway, and Holland owned one station each) and two stations in the Antarctica (owned by Germany and France) [5]. Their work was devoted to the study of climate fluctuations in the Arctic.

The first polar station was opened by Russia on Novaya Zemlya in Malye Karmakuly. Its location on this territory confirmed the belonging of the archipelago to Russia. Russian expedition of the Academy of Sciences supervised by hydrographer K.P. Andreev came to the archipelago at the

beginning of August 1882. Midshipman D.A. Volodkovskij, head of the Kronshtadt astronomical observatory V.E. Fuss, doctor L.F. Grinevetskij, and a student of St. Petersburg University N.V. Krivosheya took part in the expedition. The station started continuous observation of meteorology and terrestrial magnetism. Despite climatic difficulties the archipelago was crossed for the first time from its western coast to the Kara Sea by L.F. Grinevetskij that winter.

K.D. Nosilov, a member of the Russian Geographical society, conducted research of Novaya Zemlya in 1887 – 1891. He spent three winters on the archipelago, organized continuous meteorological observation, and visited several islands to study their geologic composition and nature.

In December 1894 the governor of Arkhangelsk A.P. Engelgardt addressed the Ministry of Agriculture and State-owned Property with a request to send an expedition to Novaya Zemlya and Vaygach Island aiming at study of their geology and discovery of mineral deposits needed for the development of steam navigation in the North. Worried by the activity of foreign manufacturers seeking the opportunity to settle on the islands he supported the development of the uninhabited territories. His request was supported by the director of the Geological committee A.P. Karpinskij. The governor proposed F.N. Chernyshev to become the supervisor of the expedition [Russian Historical State Archive. Fund. 37. Inv. 57. File. 493. P. 2 o6.].

F.N. Chernyshev was sure in the necessity to study Novaya Zemlya after his return from the expedition to the Timan (1889 – 1890). In his letter to the Ministry of Agriculture and State-owned Property F.N. Chernyshev supports such expedition: “[...] Such expedition having successfully ended up will highlight the work of Russian people in our Arctic Ocean. [...] It is highly undesirable to postpone such event, as foreign researchers are willing to come to our polar seas more and more having expeditions. It would be sad to see that in this respect Russia may let them have this territory, that the description of our northern islands started by the Russian people in very difficult circumstances will be finished by strangers in much better conditions!” [Russian Historical State Archive. Fund. 58. Inv. 2. File. 275. P. 1–5.]

A.A. Kondratiev, an astronomer of the Pulkovo observatory, I.A. Morozevich, a member of the Mineralogical unit of the University of Warsaw, Vasily Iglin, a companion of F.N. Chernyshev in the Timan, Nikolaj Petrov, who lived on the river Mezen, Philip Arkhipov, a Laplander from the Kola Peninsula, took part in the expedition in 1895. The expedition lasted for about two months. In spite of being short it turned out to be extremely difficult.

Initially F.N. Chernyshev intended to visit the Matochkin Shar Strait, Krestovaya Guba, Malye Karmakuly and then move to Yuzhnyj Island. But the vessel “Djigit” was damaged in a storm and did not let the members of the expedition move to Krestovaya Guba. The participants of the expedition examined the western part of the Matochkin Shar Strait. In August 1895 F.N. Chernyshev crossed Novaya Zemlya along the valleys of the river Malaya Karmakulka and the Ershov river to the coast of Novaya Zemlya on the Kara Sea and explored the coast of Abrosimov Bay. Having returned to the Western coast of the archipelago he explored Pukhovj Bay, Bezmyannaya Guba and the northern coast of Gusinaya Zemlya [6].

As a result of the expedition F.N. Chernyshev for the first time gave the general idea of the geology of Novaya Zemlya, made the first geologic map of the archipelago, gave the idea of its orography, and showed its relation with the continental mountain ranges the Pay-Khoy ridge and the Urals. He noted that the southern part of the archipelago is related to the Pay-Khoy, while the part of the archipelago situated to the North of Bezmyannaya Guba belongs to a different tectonic area [7]. This expedition became one of the most effective for the investigation of the archipelago in the 19th century forming further interest to its detailed study.

At the turn of the 20th century the archipelago was frequently visited by a number of smaller expeditions. In 1900 the fauna of Novaya Zemlya was studied by a geographer B.M. Zhitkov and a zoologist S.A. Buturlin on a request of the Society of Devotees of Natural Science, Anthropology, and Ethnography. In 1900 – 1901 A.A. Borisov explored the eastern coast of the archipelago and made a survey of Medvezhiy Bay, Chekin Bay and Neznaemyj Bay. The research trends started by the expedition of F.N. Chernyshev were continued by the studies of a well-known traveller and geologist

V.A. Rusanov. In 1907 – 1911 he had five expeditions to Novaya Zemlya, crossed Severnyj Island on foot several times, and went round Novaya Zemlya from the South in a boat. As a result, he gathered broad material on the geologic structure of the islands of the archipelago, rich paleontological and geological collections, determined and characterized the Upper Carboniferous deposits (Krestovaya Guba, Mashigin Bay). The results of the studies were summarized in a number of articles [8]. Two geologic expeditions, one supervised by A.V. Ivanov on Krestovaya Guba, the other one – by A.A. Svitsyn on Propashchaya Guba, carried out research on the archipelago in 1911 studying copper deposits. In 1912-1913 a polar expedition supervised by G.Y. Sedov studied the nature of Novaya Zemlya and was forced to stay on the archipelago the whole winter. The researchers determined the geological structure of the archipelago more exactly and were the first to cross the glacier situated between the latitudes of 75 and 76 degrees.

By the beginning of the 20th century it had become obvious that the seas and the bowels of the North of Russia are especially promising for industry. Both the scientists and the country's leaders understood this. At the beginning of the 20th century further scientific research has become an important part of the Government policy in the North. On December 1, 1914 the Standing Polar Committee was created in the Academy of Sciences. It aimed at investigation of the polar countries in general and especially the North of Russia. The Polar Committee supervised expeditions of other academic institutions. The Polar Committee joined a number of prominent researchers and experts in the sphere of the North of the USSR. It was a very flexible organization constantly establishing temporary subcommittees [...]. [Russian State Archive of Economics. Fund. 3429. Inv. 7. File. 889. P. 1–12]. The subcommittees working on the archipelago at different times included the subcommittee for an expedition to the Novaya Zemlya supervised by A.E. Fersman, the subcommittee for 5-year studies on Novaya Zemlya supervised by K.M. Deryugin and others. In 1917 the Committee widened the activity of the Polar Geophysical Observatory in the Matichkin Shar Strait that was inspected and instructed by A.I. Tolmachev and B.L. Isachenko several times.

A new stage in the study of Novaya Zemlya started in the 1920's when the Government of the Republic of Soviets started active studies of the bowels of the North, and the research of the Arctic became systematic and significant for the country. The Government planned the European North of Russia to become the main source of natural production forces for the country. The authorities aimed at using the resources of the North to steer the country out of economic crisis related to World War I and the Civil War. The necessity of wide scientific and technical studies of the territory was evident. Every expedition worked in accordance with annual and five-year development plans of the country's economy. The investigation of Novaya Zemlya was determined both by scientific and economic issues and by political aspects to create a reliable military outpost of the country in the Arctic.

On March 4, 1920 Northern Scientific and Commercial Expedition was organized by an order of the Presidium of the Supreme Soviet of the National Economy. Its aims included mineral exploration on Arctic territories, with oil, coal, ores, etc. among them. Creation of this organization was supported by the Academy of Sciences, with the President of the Academy of Sciences A.P. Karpinskij being its scientific supervisor and R.L. Samoylovich being its head. The studies of Novaya Zemlya started from the first years of the Northern Scientific and Commercial Expedition work.

The first Soviet expedition to the archipelago started in the summer of 1921. The Novozemelsk group worked under the supervision of R.L. Samoylovich. It had to conduct meteorological observation, geologic studies, gather zoological and botanical collections. Professor P.V. Vittenburg and M.A. Lavrova were included in the group of researchers from the Academy of Sciences to carry out geological research on the western coast of Severnyj Island and Yuzhnyj Island and to study coal deposits. The route of the Novozemelskaya expedition overlapped with the route of Academician F.N. Chernyshev [9]. During the investigation of the geology the material enlarging the data collection of the Academy of Sciences was gathered, but it was still necessary to cross Novaya Zemlya from the Barents Sea to the Kara Sea for the full understanding of its geology [10]. In 1923 the Novozemelsk group of the Northern Scientific and Commercial Expedition was charged with the investigation of the coast from Bezmyannaya Guba to the Matochkin Shar. On the Pankovaya Zemlya the expedition

found the signs of coal, in 1924 specified the map of the Kostin Shar Strait and chose Krasino as the next site for studies organized in 1925.

In 1922 – 1924 the Novozemelskaya subcommittee was organized to work out under the supervision of the Polar committee a five-year plan of Novaya Zemlya complex studies. In July 1924 the Polar Committee charged P.V. Vittenburg with organization of geologic investigation of Novaya Zemlya the next year. The expedition aimed at making geologic cross-section along the route from the western coast (the Barents Sea) to the eastern coast (the Kara Sea) crossing Severnyj Island, along the crossline from Krestovaya Guba to Razmyslov (Naznaemyj) Bay, along the Southern Krestovaya Valley explored by geologist V.A. Rusanov in 1909. The expedition was supervised by M.A. Lavrova and included scientists G.F. Zemlyakov, G.E. Ratmanov, Y.D. Chirikhinai, A.K. Shenkman [11].

During the expedition to Novaya Zemlya that lasted from August to November 1925 the geological material was collected in all places where the steamer stopped. For the beginning of work Y.D. Chirikhin carried out topographic survey of the route about 27 km long. He also conducted geologic studies and collected data for geologic cross-section. G.E. Ratmanov observed the soil and collected botanical and zoological material. Photos and drawings of the landscape along the route were made [St. Petersburg branch of the Archive of the Russian Academy of Sciences. F. 75. Inv. 1. File. 11. P. 1–2].

The Northern Scientific and Commercial Expedition continued intensive studies of Novaya Zemlya. In 1925 it was reorganized into the Institute for Northern Studies. In 1925 and 1927 two reconnaissance expeditions supervised by R.L. Camylovich were sent to Novaya Zemlya. Geologic studies were conducted on Severnyj Island situated by the Gorbovy Islands, on Barents Island, and in the Russian Harbour where coal deposits were found.

In 1928 the Council of People's Commissars of the USSR approved the Order “On intensification of scientific research work in the Arctic possessions of the USSR” [Corpus of legislative acts of the USSR. 1928. № 52. P. 464]. As a result in 1930 the structure of the Institute for Northern Studies was reorganized into the All-Union Arctic Research Institute. In 1931 the institute organized two expeditions to Novaya Zemlya to study its geology. The expedition under the supervision of V.K. Esipov studied the tectonics, stratigraphy, and morphology of the glaciers in the area of Krestovaya Guba and Sulmenevaya Guba. The other one under the supervision of M.M. Ermolaev carried out investigation and exploration on the Southern coast of the Matochkin Shar.

Further studies of Novaya Zemlya date back to the Second International Polar Year 1932 – 1933 with participation of 44 countries. The USSR started to prepare for the research beforehand. In 1931 scientific expeditions of the All-Union Arctic Research Institute founded two polar stations in Tikhaya Bay, on Domashnij Island and the Cape of Zhelanie. In 1932-1933 the USSR sent 26 sea expeditions to the Arctic aiming at hydrologic and hydrographic research of the Arctic Basin and the adjacent territories of the World Ocean. In this way, the expedition of the All-Union Arctic Research Institute on the icebreaker “Rusanov” in 1932 aimed at construction of radio station on Cape Chelyuskin and replacing the member of polar expedition on Domashnij Island, as well as investigation of the Northern land straits and construction of high-mountainous glaciological station on Novaya Zemlya. The expedition was supervised by R.L. Samoylovich.

The Glaciological station (polar geophysical observatory “Russian Bay”) was constructed in the strait Russian Bay and was supervised by M.M. Ermolaev. The aims of the observatory included seismoacoustic sounding of the atmosphere, metrological studies, determination of the thickness of glaciers, geological and glaciological studies. The people working on the station explored Severnyj Island on foot and determined the glacier thickness as 400-500 m [12].

The journey of the icebreaker “A. Sibiryakov” along the Northern Sea Route from Arkhangelsk to Vladivostok at one time became one of the most important events. The director of the All-Union Arctic Research Institute O.Y. Shmidt was appointed the supervisor of the expedition. For the first time in history the Northern Sea Route was overcome in one time, this being the beginning of its use as an effective transport route. Chief Directorate of the Northern Sea Route was established on December 17, 1932 and regular commercial traffic started by the end of the 1930's.

In 1933 the All-Union Arctic Research Institute organized four geological expeditions for investigation of Novaya Zemlya archipelago in the context of the Second International Polar Year. В рамках Второго Международного полярного года в 1933 г. The Western Novozemelskaya expedition (under the supervision of I.F. Pustovalov) conducted geological and topographic studies in the area from the Gulf of Inostrantsev to Russian Bay; the Eastern Novozemelskaya expedition (under the supervision of B.V. Miloradovich) studied the area between the Cape of Zhelanie and Sporyj Navolok Cape; the Northern Novozemelskaya expedition (under the supervision of G.V. Gorbatskij) carried out observation of geomorphology and soil in the area of the Cape of Zhelanie and the Gulf Krasnyj; the expedition under the supervision of B.A. Alferov carried out geologic survey of the Kostin Shar.

After the Polar Year the Soviet scientists continued to study the islands of the archipelago. In 1934 numerous expeditions under the supervision of N.N. Mutafi, M.M. Ermolaev, A.A. Petrenko, B.A. Alferov and others conducted research on the whole territory of Novaya Zemlya archipelago. The schemes of the stratigraphy and palaeography of the islands were composed, deposits of lead, zinc, copper, and fluorite were discovered, making a contribution into the development of the complete scheme of geologic structure and palaeography of the Arctic. In 1936 M.M. Ermolaev published a monograph “The Geology of Novaya Zemlya” that summarized the research of the archipelago in the 1920’s – 1930’s. In this monograph M.M. Ermolaev drew a conclusion about the absence of promising mineral deposits in the bowels of the archipelago, thus determining its future [13].

Further research on the territory of Novaya Zemlya were related to preparation for the 17th International Geologic Congress in 1937. 2362 geologists from 50 countries took part in it. The head of the geological service I.M. Gubkin became the President of its organizing committee, with geologist and mineralogist A.E. Fersman becoming its secretary general. The main subjects of the congress were devoted to the world oil reserves, coal deposits, the tectonics of Asia, and the geology of the Arctic. A number of expeditions in the form of excursions were organized as a part of the congress for its participants, including the Northern expedition (to Karelia and the Kola Peninsula), the Siberian expedition (from Sverdlovsk to Novosibirsk), the Ural expedition, and the Novozemelskaya expedition. The geological maps of the Soviet Arctic were presented at the congress and were recognized as the best. A guidebook of the archipelago for the participants of the congress was composed during preparation for the expeditions. To prepare the guidebook the All-Union Arctic Research Institute sent two expeditions to Novaya Zemlya to carry out geological, glaciological, and geomorphological observations (under the supervision of A.A. Petrenko and B.V. Miloradovich).

In the summer 1937 for the geologists interested in the Arctic and especially in the structure of Novaya Zemlya the Novozemelskaya expedition was organized from Moscow to Novaya Zemlya through Arkhangelsk on the steamer “Voronezh”. The expedition lasted 23 days. 28 specialists including 18 foreign specialists took part in it. The participants of the congress visited Chernaya Guba, Belushya Guba, Malye Karmakuly, the Matochkin Shar, the Bay of Blagopoluchiye and the Cape of Zhelaniye. The organization of such outstanding event demonstrated the leading role of the Soviet scientists in the studies of the Arctic. [14].

4. Conclusions

The scientific research on Novaya Zemlya were minimized due to World War II and the Great Patriotic War. Military operations affected the archipelago making it a naval station of the USSR in the Arctic. Intensive scientific research of Novaya Zemlya did not continue after the end of the military conflicts. The Soviet Government had to react adequately to the challenges of the “Cold War” that started at that time. There were two viewpoints on the Arctic territories in the state policy after the war: military strategic and economic. The choice between the economic development of the region and development of military zones defined the future of the archipelago which became a nuclear test site of the USSR in 1955. Severnyj Island was evacuated and the scientific stations were closed. The archipelago became a secret zone.

The national strategic interests of modern Russia in the Arctic coincide with the scientific materials collected during the Soviet period. Many ideas and projects on the strategic and socio-economic development of the Arctic territories are reflected in the modern state concept of Russia “Fundamentals of the Russian Federation state policy in the Arctic for the period up to 2020 and for the future” (2008).

The first complex scientific expedition to Novaya Zemlya in the modern history of Russia was organized in 2018, becoming an important event and a new stage in the studies of the archipelago. It was organized under the aegis of the Northern fleet and the Russian Geographical Society to study the geological characteristics of the archipelago and the history of its development reconstructing the routes taken by the first researchers of Novaya Zemlya. In this connection understanding of the history of the scientific study of the archipelago is important to solve modern problems of interaction between science and the Government, to find ways of mutually beneficial cooperation in the Arctic region to ensure national and resource security.

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