
HISTORY OF SCIENCE

The First Russian Fisheries Research Expedition: Centenary of the Expedition for Fisheries Research along the Coast of Murman

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Abstract—This paper revives one of the brilliant pages in the history of Russian science—fisheries research and the exploitation of the biological resources of the Far North's seas. The expedition to the Barents Sea with the first Russian fisheries research vessel “Andrey Pervozvanny” under the leadership of N.M. Knipovich in 1898–1899 is described and the scientific results of the expedition are discussed.

Key words: first fisheries research expedition, Murman, N.M. Knipovich

Time flies by at terrific speed: the centuries fly by as minutes, and when you read the “Report of the Expedition for Fisheries Research along the Murman Coast” by N.M. Knipovich and colleagues [19] early in the past century, you begin to understand that they also can be applied now early on in the new century and new millennium: Success in the field of marine biology and physical geography have fully corresponded to the powerful growth of other branches of science and, comparing the sum of knowledge about the sea with which mankind went into the nineteenth century with the knowledge which was available at the end of this century, we cannot but experience a sense of satisfaction however insufficient our knowledge about sea still is...” Now, the concept of fisheries research has become firmly established as an independent line of marine science that is usually called fisheries oceanology [1, 2]. In 1902, Knipovich wrote in the above-mentioned report about investigating the nature of the sea as arising very late in the twentieth century: “...the basic idea of fisheries research is very simple and may be formulated as follows: only thorough knowledge of the nature of fishing waters can provide the basis for the expedient use of their natural resources”. Thus, one can argue that fisheries research in Russia began just 100 years ago and one of the first national fisheries research expeditions was the above-named expedition for which the first Russian fisheries research vessel “Andrey Pervozvanny” was constructed.

The waters of the Arctic Ocean and the White Sea, which wash the Russian coasts, have played for a great role in the life of the northern Russians for a long time; the waters along the northern coast of the Kola Peninsula (known as the Murman coast) are particularly

striking in this regard. The severe climate of these places has prevented agriculture from developing and, therefore, coastal dwellers paid more attention to the sea and sea fishing. Moreover, the Russian coast-dwellers did not limit themselves to their home waters: in the middle of the 16th century, Russian sea fishing and fish trade extended far to the west where, according to Norwegian data, their intensity considerably exceeded that of the “subjects of Their Majesty, Dutch King”. In the nineteenth century, however, with the development of towns in northern Norway and with coastal barter, Russian sea fishing in these waters was reduced to practically nothing. Most Russian sea fishing was limited to the home waters and, in addition to the coast-dwellers (“pomory”), who made their livings from sea fishing, colonists, industrialists, and fish traders from Vologda, Saint Petersburg and other provinces left for the Murman coast. The most severe climatic conditions, lack of knowledge of the waters in the fishing areas, and a low level of fishing organization (lack of normal fishing vessels and their rigging) have all made the Murman fisheries insufferably difficult and risky businesses [32, 33].

During stormy days in the autumn of 1894, twenty-nine Russian fishing vessels were lost in the White Sea when they returned from cod fishing in the Barents Sea. Aid was given to the orphaned families of fishermen by the “Committee for Aid to Dwellers of the Russian North Coast,” which is part of the Saint Petersburg branch of the Imperial Society for aid to Russian merchant seamen and to which the Grand Duke Aleksandr Mikhailovich was elected honorary chairman. Apart from philanthropic purposes, the committee set such important aims as regulation of domestic sea fishing in the north. To work out questions concerning fisheries

research in the Russian North, the Special North Commission of the committee was established in late 1896. The experiences of other European states were used as examples, especially the Scandinavian countries (for example, Norway) where extensive economical reforms were carried out at that time. Norway's fishing fields where modern vessels and fishing gear provided not only Norway with fish, but also neighboring countries, including the Russian North. The committee appealed to a group of researchers in Saint Petersburg who had knowledge in the field of biology of marketable fish and experience of the northern seas research, including N.M. Knipovich (Fig. 1), a zoologist, ichthyologist, and oceanographer who spoke Swedish and Norwegian and later helped acquaint Russia with the experience of Scandinavian colleagues [34]. N.M. Knipovich was famous for his studies at the Solovetskaya biological station of the Saint Petersburg Society of Naturalists in the White Sea. Here, he was among the first in Russia to begin oceanographic observations in parallel with zoological ones and to search for the relationship between marine fauna distribution at different depths and water temperature variations [14]. In addition, N.M. Knipovich participated in the investigation of fishing and hunting grounds of the North, which he presented in reports to the Ministry of Agriculture and in which he emphasized that knowledge of fishing grounds is a necessary condition for the development and exploitation of fisheries [15, 16, 24].

At meetings of the North Commission, organization of the long-term year-round fisheries research expedition was conclusively settled. The organization of the expedition and its leadership were entrusted to N.M. Knipovich. The idea of the fisheries research was based on the development of fisheries by increasing the intensity of fishing on existing fishing grounds and procuring new fishing grounds, as well as protecting fishing resources against destruction or increase. This required full and comprehensive knowledge about the fishing grounds and the biology of marketable fish. N.M. Knipovich and co-authors stated: "We see that the complex of creatures inhabiting these waters is a whole that should be studied in its entirety if we want to understand the life of animals that interest us from the fisheries viewpoint" ([19], p. 3).

The idea of fisheries research along the Murman coast was accepted by the Minister of State property and Agriculture, A.S. Ermolov, and the Minister of Finance, S.Yu. Vitte. In spring 1897, necessary resources were allotted for the expedition. The decision to construct a specialized vessel in the following two years was approved. In summer, N.M. Knipovich was sent on a mission to Sweden, Norway, Denmark, Scotland, and Germany, where he investigated the organization of fisheries research and acquired equipment for future expeditions when possible. N.M. Knipovich was firmly convinced that the arrangement of the fisheries research would be successful "only by way of comparison of data concerning different seas (especially,



Fig. 1. Nikolai Mikhailovich Knipovich (1862–1939).

neighboring ones)" and saw the need for the "comparability of results, integration of research methods and their development in different countries..." During his trip, N.M. Knipovich met with the director of the Dutch biological station (K. Petersen), head of the Norwegian fishery research (J. Hjort), advisor on fishing industry problems in Norway (J. Dal), a German planktologist (V. Hensen), a well-known ichthyologist in Kiel (K. Aptstein), director of the Helgoland biological station (F. Heinke), and with J. Murrey and other members of the Fishing Bureau of Scotland in Edinburgh. N.M. Knipovich met and corresponded with many of these scientists for an appreciable length of time afterwards. N.M. Knipovich paid particular attention to the Norwegian studies [35], having been delighted with the works of G.O. Sars, which revealed that cod and most other marketable fish have pelagic eggs. N.M. Knipovich studied the history of fishery in Norway and Norwegian fisheries reports in Norwegian waters; became acquainted with much fishing equipment, specifically with the newly invented and tested Petersen trawl; examined vessels used for fishing on the high sea [16,



Fig. 2. Schooner “Pomor”—first expedition vessel. This and subsequent illustrations to the paper (except Fig. 60) are given from the expedition’s reports.

20, 21]; and even acquired one such vessel of 56 t displacement which was solely for the use of expeditions until the main expedition steamer was constructed (Fig. 2).

Returning from his trip abroad, N.M. Knipovich presented plans for future expeditions in which complex long-term studies of the sea were planned and that could be called the formation of fisheries research. This program was the first national program on biological oceanography, which developed intensively in Europe at that time [31]. The subject of this new discipline, study of the sea itself and processes going on in it rather than an individual group of organisms inhabiting it, had no name at that time. K.P. Yagodovsky, one of N.M. Knipovich’s assistants, later remembered a visit to the Norwegian biological station in Drebac: “In the conversation with the assistants of Prof. Jort, we displayed an interest in their specialty; in Russia, we knew naturalists—zoologists, botanists, chemists etc.—here we saw in laboratories the botanical and zoological preparations and devices for chemical studies. We specialized in everything concerning water. We study the sea population, both animals and plants, we conduct also the chemical analyses of water, fishing products etc. It was a novelty for us” ([40], pp. 37–38).

In 1897–1898, preparation for the expedition began. The first period (May 1898– May 1899) has been called the “Exploratory Expedition.” Although there was no

specially constructed vessel for its aims, the main task of this period was preparation for the main expedition.

Exploratory Expedition. The first part of the expedition for the fisheries research along the Murman coast, begun in spring 1898, had two basic aims: material and technical equipment (rigging) for the whole expedition and collection of as much scientific data as possible for the maximum expedient organization of the main expedition and correct interpretation of its results thereafter.

This trip was of great importance for N.M. Knipovich for adequate material and technical equipment. First of all, the purchase of the schooner “Soblomsten” was significant: the sailing qualities of this boat were so high that instead of the two assumed weeks, it took only seven days for the passage from the Norwegian port of Olesund to another Norwegian port, Warde, and, already under the Russian flag and name “Pomor,” the boat dropped anchor in Ekaterin Harbor in Murman, the base of the expedition. The 10th of May, 1898 is considered to be the day when the exploratory expedition formally began. For a year, “Pomor” was the sole vessel to faithfully serve the expedition, although it was inadequately adapted for the operations required. Valuable assistance was given by the administrative steamer “Murman,” the use of which was sometimes permitted by the Arkhangel’sk Governor A.P. Engelgardt.

N.M. Knipovich considered fisheries research to be all studies using “strong fishing gears” for the collec-

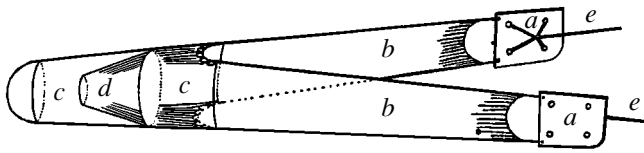


Fig. 3. Scheme of the Petersen trawl (by K. Petersen). *a*—otter boards, *b*—wings; *c*—bag; *d*—conic internal trawl cod end; *e*—cables forming a trawl bridle.

tion of even such groups of animals that play no part in the fishery, i.e. quantitative studies determining the relative abundance of organisms in different parts of the sea as fisheries research ones ([19], p. 6). Thus, fishing equipment should be used as scientific equipment. One piece of equipment was the special trawl designed by the Danish zoologist K. Petersen, the director of the Danish biological station. The Petersen trawl combined the otter trawl and so-called Danish seine for eel fishing. Having tested this trawl in the Christian-fjord with the inventor himself (K. Petersen), N.M. Knipovich brought it to Russia, where the trawl was first applied during the Murman expedition for zoological and ichthyologic collections (Fig. 3) from aboard the “Pomor” and showed excellent catchability. One of the discoveries made with the Petersen trawl was a huge accumulations of the deep-water prawn *Pandalus borealis* in the fiords of the Murman region (Fig. 4). During the expedition, the Russian and Norwegian longlines, nets, fishing rods, etc., were also used. For hydrological studies, thermometers, bathometers, areometers, and Secchi discs were acquired in Saint Petersburg, London, Kiel, and Stockholm; a specific silicon bronze was ordered from Christiania (Oslo).

The expedition’s list was formed over a period of several months. In addition to N.M. Knipovich, about ten other people participated, including the ship’s doctor A.K. Gausman; the assistant A.M. Filippov; and the students N.S. Zhikharev, N.M. Mikhailovsky, N.A. Smirnov, and K.P. Yagodovsky. In summer, a zoologist from Berlin University, Dr. Leonid Lvovich Breitfuss, a senior assistant, joined the scientific group of the expedition. L.L. Breitfuss was from the family of the Petersburg’s Germans. For revolutionary activity, he was deported from Russia and obtained a doctoral degree in Zoology from Berlin University, where studied sponges under the guidance of the well-known zoologist F. Schultze [11]. Because N.M. Knipovich was being busy at Saint Petersburg University and the Zoological Museum of the Academy of Sciences and was able to work in Murman only in summer, L.L. Breitfuss stepped in for him during the fall and winter. Vsevolod Drzhnevsky was head of the expedition during his winter stay in Germany for the purpose of acceptance of the steamer “Andrey Pervozvanny”.

In the course of the exploratory expedition, 244 stations were set up, at which the littoral collections, 472 trawlings, and nearly as many hydrological series from

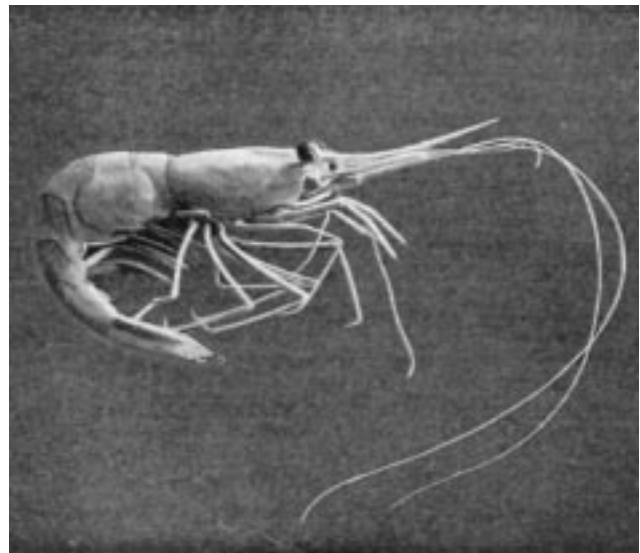


Fig. 4. Deep-water prawn *Pandalus borealis*.

the surface to depths of 425 m were made. In addition to basic marine operations along the coast of Ekaterin harbor and other sites, plants, insects, birds and even the remains of the Quaternary fauna were collected.

The scientific results of the exploratory expedition were:

1. Year-round measurements of water temperature in all the accessible points of the water body and at different depths (from 0 to 250 m) were made for the first time. It was established that temperatures lower than 0°C are only found at the surface or at depths in the freshened fiords during winter seasons while temperatures above 0°C are generally typical of the Murman region.
2. The Murman sea climate was specified. According to the data V.Yu. Vize [38], the name “Barents Sea” first appeared on a map in 1853.
3. The navigation and fishing conditions at the Murman were explored for the first time.
4. Forty-three species of fish were caught and, in essence, the comprehensive idea of the ichthyofauna of the Barents Sea fish was first formed.
5. The commercial accumulations of herring and deep-water prawn at the Murman were discovered.
6. The first data concerning the biology and nutrition of fish were obtained.
7. A quite comprehensive idea of the fauna of marine invertebrates of the Murman region was formed.
8. The expedition concluded that “These findings hardly allows for complaints of the poverty of fish in the Murman region, even in this relatively unsuccessful year.”

Beginning of the Main Expedition. On May 10, 1899, on the anniversary of the beginning of the explor-



Fig. 5. “Andrey Pervozvanny”—first Russian fisheries research vessel.

atory expedition, the main expedition for fisheries research along the Murman coast started.

The start of the expedition was preceded by a period of construction of a special vessel designed exclusively for the expedition. This vessel was named “Andrey Pervozvanny” to honor the first of the twelve apostles of Christ. In the report about the expedition of the first fisheries research vessel of Russia, we read: “Steamer “Andrey Pervozvanny” was built in the shipyard “Bremen Vulkan” in Vegesack of the ship steel “Siemens-Marten” and it belonged to class +100 A K/4(E) of the German Lloyd. Its overall length is 151 feet, the load waterline length is 131 feet, the extreme beam is 26 feet, the hold depth is 13 feet 9 inches, the draught is 10 feet, the tonnage is 336 reg. t, and full speed is about 10 knots...” (Fig. 5). By that time, the vessel was constructed with consideration for the smallest details required for its specific functions as a fisheries research vessel and for conveniences of the crew’s work and life. The most basic things required for normal operation were two masts with booms, two steam winches for trawling, a boat davit with a hand winch for the lowering of pelagic nets and other small devices, three boats, a steam launch, two laboratories equipped with all things necessary for operation, electric lighting, and steam heating. Here, it is pertinent to note that the forethoughts in the plan for “Andrey Pervozvanny” (constructed in the late 19th century) are causes for admiration, because its compactness does not inconvenience the crew working on it. From our experience working on similar vessels constructed more recently, in the mid- twentieth century, one they rank far below “Andrey Pervozvanny” in this regard.

Tests of “Andrey Pervozvanny” were carried out by Lloyd on March 24, 1899. The vessel was to be operated with the help of the veteran “Pomor” as well as by the deck schooner “Rybak” from Norway and two insubmersible boats for long-line fishing. On April 6, 1899, “Andrey Pervozvanny” hove up the anchor, made compass adjustments and went to sea. On April 8, she dropped anchor in Kiel where the well-known German professors, including the planktologist V. Hensen and zoologist K. Brandt, visited her. On April 9, the ship was bound for Libava, where the expedition’s members, headed by N.M. Knipovich, were taken aboard. Here, the vessel was also sanctified. On April 16, “Andrey Pervozvanny” reached the port of Copenhagen, where the expedition’s participants met with the Russian Consul-General Gor; envoy count Benkendorf; Dr. K. Petersen; the expert on Danish fishing and future President of the International Council for sea research, K.F. Drexel; and zoologists of the Zoological Museum of Copenhagen, including Jorgensen, Jensen, and Mortensen. The next destination was Christiania (Oslo), where N.M. Knipovich was wellknown, and the Russian fisheries research expedition was welcomed by the authorities and by university professors, including the famous Fritjof Nansen. Leaving Christiania for Russia, “Andrey Pervozvanny” visited many Norwegian towns: Drebac, Bergen, Trondheim, Bode, Tromso, Hammerfest and Warde. In each, the expedition’s participants met with colleagues, visited museums, aquariums, and biological stations. In Trondheim, one more small schooner, later called “Rybak,” was purchased. On May 5, “Andrey Pervozvanny” dropped anchor in Ekaterin harbor, her new moorage. It is inter-

esting that the vessel's crew was registered in the Nevsky yacht club, which allowed the payment of taxes and duties that the fishing ship should pay to be avoided

So, on May 10, 1899, the main expedition of "Andrey Pervozvanny" began. The scientific and fishing results of this long-term expedition are found in the seven volumes of the reports prepared N.M. Knipovich and his assistants [18,19] and L.L. Breitfuss [4–6]. The fishing operations of the expedition are described in a special issue of the reports [7].

The results of the exploratory expedition proved to be very important and determined the success of the main expedition. The trips of N.M. Knipovich to Norway, Sweden, Germany, and other countries helped to work out the accurate and most important lines of the expedition's operations. Having posed the problem of investigation of the sea as the whole, N.M. Knipovich attracted specific attention to oceanographic studies. In these years, a powerful international community appeared in the field of oceanography, the International Council for the Exploration of the Sea (ICES). Its members were Belgium, Great Britain (including Scotland), Germany, Holland, Denmark, Norway, Russia, Finland, and Sweden [39]. The first Stockholm conference of the Council was held in 1899. N.M. Knipovich actively joined in International Council, maintained correspondence with and met with many member scientists [27]. He rightly believed that the expedition's operations would gain the specific importance if it would be carried out according to the unified international program worked out and applied by all countries and participants of this International Council. With the active support of the Swedish oceanographer Otto Petersson, "Andrey Pervozvanny" in 1900 began to work with this program: a voyage was organized along the Kol'sky meridian. Organization of oceanographic studies proved to be quite difficult for N.M. Knipovich, as he was a zoologist by education. Particular attention should be placed on the accuracy of data obtained for which purpose the newest methods were used. N.M. Knipovich and L.L. Breitfuss made business trips to Stockholm to consult with O. Petersson. Ultimately, O. Petersson recommended to them his assistant Augusta Palmquist, who spent the summer of 1901 in Murman and analyzed the hydrological samples collected, and in particular determined the salinity and trained a Russian assistant, V.K. Soldatov, to perform these special techniques.

Prior to fisheries research expedition along the Murman coast, knowledge of the Barents Sea currents was quite vague. True, other expeditions had been conducted earlier: there had been a Norwegian one on the expedition vessel "Voringen" (1876); a Dutch one on "Willem Barents" (1878–1884); and during a cruise of Admiral Makarov on "Ermak", F. Nansen on "Fram" and Norwegians on "Michael Sars" collected quite comprehensive hydrological materials, but they were concerned predominantly with the western part of the

sea. Expedition on "Andrey Pervozvanny" allowed further elucidation in more detail of the nature of the Barents Sea, and data was collected from more than 600 stations to construct the detailed tables of average monthly and annual temperatures. The map of currents was presented in the paper by N.M. Knipovich, "Principles of the European Arctic Ocean Hydrology," [17] which has not lost its significance to the present day. However, shortly after N.M. Knipovich arranged the methodical part of the studies and received the first interesting results, leaders of the Committee for Aid to Dwellers of the Russian North Coast began to express discontent with the types of studies he selected, reasoning that an evident turn towards pure science had been made. The relationship between oceanography and fishing, a strategy of the "comprehensive and full study of the sea," lost the support the public, upon which the Committee has rested [10].

In 1902, L.L. Breitfuss, who was forced to consider the Committee leaders' opinion and to perform many practical measures, became head of the expedition. However, research activity continued to progress. So, L.L. Breitfuss began to regularly send to the "Bulletin of the ICES" the hydrological data obtained during cruises (made four times a year) along a specially defined triangle. According to L.L. Breitfuss' data, the map of currents was much more complex than N.M. Knipovich believed. He also rebutted N.M. Knipovich's view about the exclusive role of insolation in the seasonal rise in the Gulf Stream's temperature in the Barents Sea [7]. Nevertheless, complex biological studies were the foundation of the expedition's operations. It can be said with confidence that from materials from this expedition, we gained an impression of the basic species composition of the Barents Sea fauna and flora. All subsequent collections have supplemented this information with only single species.

The first goal of this expedition was the study of ichthyofauna and foundations for ideas of the ichthyofauna composition in the Barents Sea were laid here. A list of fish included 69 names, one-third of which were noted for the first time in this region. Based on the materials from the expedition, the book by N.M. Knipovich [22] was devoted to the systematics of fish of the genus *Lycodes* with descriptions of new species and subspecies of this genus, which includes *Lycodes jugoricus* Kn., 1906 and *L. marisalbi* Kn., 1906 In significance, this work by N.M. Knipovich is comparable with the classic work of A. Jensen [13], which is devoted to eelpouts of the waters of northern Europe and Greenland. The collections of fish obtained in the expedition have formed the basis of other important publications of N.M. Knipovich. In one of them [23], a comprehensive description of the individual changeability of one of species of eelpout family, *Gymnelus viridis*, was given, which is accompanied by high-quality illustrations. Thereafter, based on this knowledge, new species have been described: *G. retrodorsalis* Le Danois, 1913; *G. anredsoni* Chernova, 1998 and



Fig. 6. Hydroid *Monocaulus groenlandica* Allman, 1876 (specimen from collection of Zoological Institute of Russian Academy of Sciences).

G. knipowitschi Chernova, 1999 [8, 9]. The ichthyologic materials of the expedition, exceeding 1200 units of storage and delivered to the Zoological Museum of the Imperial Academy of Sciences (now, Zoological Institute of the Russian Academy of Sciences), form the basis of the collection of marine fish of the Barents Sea and are studied today by taxonomists and serve as the base materials for new summaries and revisions. The expedition was the first to collect data on the biology and distribution of fish in the Barents Sea. Hydrological stations were established at the same time as the biological stations, and the possibility of relating the distribution of fish to the water temperature and salinity and earlier unknown migrations of many marketable fish, in particular cod, were discovered for the first time. It was shown that the bulk of cod in the Barents Sea was of Norwegian origin and at the same time there were the runs of cod spawning along the Murman coast.

It is very interesting that related to the industrial problems of fishing, the results of examining the quality and methods of fish salting were included in the report. This chapter of the report is called "Improved salting of cod and haddock using the Dutch method" and was later issued as a separate publication [3]. The traditional method of fish salting used by Murman industrialists using English salt was criticized and called insane, resulting in a "sink of infection." The recommended method has assumed the use of "setyubalskaya" salt applied by the Dutch.

The results of zoological works of this expedition are not less significant for science. First of all, for the

whole period of operations in the Barents Sea (between the "thirty-first meridian on the west and Novaya Zemlya on the east" and almost to 76°N), more than 2000 stations were established. The operations were carried out on the littoral, in shallow waters, and to depths of more than 400 m. The approximate calculations suggest that among the benthos and plankton collections obtained by "Andrey Pervozvanny," more than 2000 species were found that belong to different groups of invertebrates. In the collection of the Zoological Institute obtained during the expedition, there are 74 species of Spongia, 99 species of Chidarians, 56 species of Bivalves, 53 species of Gastropods, 56 species of Echinodermates [35]. Among the species found, there are rare representatives of the psychrophilic fauna. Among these is, for example, a very interesting hydroid of bipolar genus *Monocaulus*—*M. groenlandica* (Fig. 6) caught at a depth of about 300 m. A total of two species of this genus are known in the arctic, while other two species of *Momocaulus* were found in the Antarctic [37].

Beginning in 1902, A.K. Linko began to work as the expedition's planktologist. Aleksandr Kelsievich Linko collected all the plankton on his own, identified all the zooplankton, was an excellent specialist on coelenterates (bottom and pelagic), and provided a very convincing analysis of the relationship between plankton development and the fishing course along the Murman coast. A.K. Linko [29] compiled a list of the phyto- and zooplankton species (about 800 collected during the expedition) and analyzed their composition and seasonal dynamics. He came to the basic conclusion that a commercial quantity of cod should be expected when plankton becomes oceanic and warm-water, although it can also contain a minor component of arctic forms. During his work at the Zoological Institute, A.K. Linko identified all collected hydroids in the Institute's collection, including hydroids caught during the expedition on "Andrey Pervozvanny." From the results of this processing, he published the two-volumes monograph "Hydroids" in the series "Fauna of Russia" [28, 29]. The early death of A.K. Linko prevented this splendid, even today world-known work from completion. The last volume was written by N.V. Kudelin [25].

The combination of works on hydrology and marine chemistry from studying plankton and bacteria is of great importance for biological and oceanographic studies. In particular, studies of the famous Kiel school in Germany (K. Brandt and others) [31] were conducted. In the last years of the expeditions near Murman, B.L. Isachenko began to carry out bacteriological investigations, which revised the interpretation of the Arctic Ocean as a basin supposedly lacking in denitrifying bacteria that, according to K. Brandt's hypothesis, determined the abundance of phytoplankton at high latitudes. B.L. Isachenko found these bacteria and knowledge of them has contributed to the further development of marine microbiology [12]. Unfortunately, these interesting studies ceased in connection with the liquidation of the Murman expedition in 1909, and such



Pomor shnyaka



Norway ela



Femburn ela



Dal' boat

Fig. 7. Boats of different types used in the expedition and the most perfect of them—boat of Dal's type—dalevka.

investigations in Russia have not been formed since then.

In addition, the expedition was also an improvement of fishing vessels types in the Murman region. Up to that time, coastal dwellers used several types of cumbersome boats that they constructed, largely small flat-bottomed fishing boats, karbasses (large rowboats) and other boats accommodating not more than 3–4 peoples, often without decks. During the expedition, so called “dalevki” (Dal's boats) with standard decks and air boxes on the bow and stern that provide stability and safety for the boat (Fig. 7), were ordered from Norway.

One cannot but note that in Ekaterin Harbor, where the expedition was outfitted, the so-called hostel for children from the “pomor” camps who, in view of the remoteness of a number of settlements, could not attend the city college in Aleksandrovsk, was established. In the hostel, children were provided with clothes, a cot, and three frugal meals a day, while one of the expedition participants checked the lessons prepared by the children every day. During their free time, children helped the expedition members. Such assistance to the coastal dwellers on the expedition was worthwhile, because it included not only material support to the poor families of the coastal dwellers, but also awoke the children's interest in the fisheries research activity.

In 1906, Russia participated in the International Exhibition of oceanography and sea fishing in Marseilles. The following materials of the “Andrey Pervozvanny” expedition were presented at this exhibition: 1) a set of the expedition's papers; 2) hydrological maps of the Barents Sea; 3) bathymetric maps of the Barents Sea; 4) a map of the expedition's stations for 1898–1906; 5) fishing grounds maps; 6) collections of the expedition's photos and 7) an oil painting of the “Andrey Pervozvanny.” The Russian representative was Master P.Yu. Shmidt. The Committee for Aid to the Coastal Dwellers of the Russian North was awarded the “Diploma de Grand Prix” for this exposition.

In spite of the apparent significance of the expedition for fisheries research along the Murman coast and the meaning for science and fisheries studies, expeditions were terminated in 1909 because the State Duma rejected the request for continued financing. The attempts of a number of scientists to find other expedition leaders to continue studies of the northern seas proved to be unsuccessful [27]. Although the main Administration for Land Management and Agriculture took over studies in the Russian North and, as one of the first steps, decided to further process the Murman expedition materials and publish its “Works,” regular

study of the Barents Sea have continued in other programs.

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