

RUSSIAN CARTOGRAPHY OF THE BALTIC SEA (18th-19th centuries)

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Paper presented at the 14th Conference on the History of Cartography, Stockholm, Sweden, June 1991.

The voyages of Russian navigators in the Baltic Sea are known to date back to ancient times. As early as the 9th century, Novgorod merchants are known to have navigated in the Baltic and around Europe as well as to the Mediterranean. From that time onwards, they became permanent visitors to Swedish and Dutch sea ports and had established some firms in those countries. In later years, Russian voyages in the Baltic decreased little by little, and finally ceased completely for a time.

Revival of Russian navigation in the Baltic occurred during the time of Peter I. But no Russian hydrographic surveys or Russian charts of this area existed at that time. Therefore, providing sailors with charts in order to ensure safety of navigation became the immediate priority.

Owing to the absence of other alternatives, the first Russian charts of the Baltic consisted of three foreign charts which had been translated into Russian and engraved by Peter PICART at the very beginning of the 18th century. Two of the charts have a similar title, namely "Размерная карта части Балтийского моря" (Graticuled chart of part of the Baltic Sea). One of them covered the sea area from St. Petersburg to Moonvik, and the second - from Moonvik to Røgersvik, later known as Baltischport. The third chart is "Новая размерная карта" (New graticuled chart) - from St. Petersburg to Eland with the Gulf of Riga and the Oland islands.

In 1705, the chart "Часть сначала Восточного моря и проч" (Part from the beginning of the East Sea and others), covering the Baltic from the meridian of Borgo to the Gulf of Bothnia and part of the Gulf of Riga, appeared. It was engraved by a Dutchman, Adrian SCHOONEBEECK, who had been invited to Russia by Peter I in order to organize map publishing. In 1698-1705 he headed the first Russian engraver's workshop to be created in Moscow. SCHOONEBEECK engraved most of the Russian maps of that period and trained several apprentices.

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The cartographical department of the Academy of Sciences in St. Petersburg preserved two undated charts. One of them - "Розмерная карта части Балтийского моря начинающаяся от Броклома до Стрельны с Финским берегом и побережьем от Пернова до Шлоттбурга" (Graticuled chart of the part of the Baltic Sea beginning from Brocklome to Strelina with the Finnish shore and the sea coast from Pernov to Schlottburg) - was engraved by Peter PICART. The second chart has no title, but a title on an attached piece of paper bears the inscription: "Градусная карта от Банврангеля и Малорога Кронштадта" (Graticuled chart from Banwringel and Malorog to Kronstadt).

The charts described above are reprintings of foreign, mainly Swedish, charts with the translation of all geographical names and other inscriptions in Russian. They cover the Gulf of Finland, part of the Gulf of Riga and a small part of the Gulf of Bothnia. Rather rough pictures of the shore and a few soundings formed the contents, so these charts could not satisfy the needs of navigation, and Peter I decided to begin hydrographic surveys in the Baltic.

Before that time a marine study was known to exist in Russia. In 1696 according to the order of Peter I, depth soundings and surveys of the shore had been carried out in the north-eastern part of the Sea of Azov. As a result, the chart of the northern part of the Sea of Azov from the mouth of the Elanchik to the mouth of the Don was compiled by Engineer Christian RUGALL. Besides the picture of the coastline, the chart contains a few soundings in fathoms, given along the tracks of the ships which took part in this survey. In 1699, the first Russian large-scale survey had been carried out on the Don from the town of Voronezh to the Sea of Azov. This survey and the subsequent mapping based on the surveys was headed by Admiral Cornelius CRUYS (1657-1727), who was on the survey from the Dutch Navy and in 1698 passed to the Russian survey, being invited by Peter the Great. In 1700-1706 several Russian charts of various parts of the Black Sea, mainly of the Sea of Azov had been compiled based on the survey and the marine study created by Russian marine officers. But later the survey in this area was appreciably cut down, because the interests of Peter I had moved to the Baltic, and in 1710 Russian hydrographic surveys began in the eastern part of this region.

In the Baltic, the first works were carried out near Kronstadt under the leadership of Cornelius CRUYS. In 1715, Lieutenant TRAVIN and Lieutenant MYASNOY sounded the Gulf of Riga. In 1716 Captain LEIN and Navigator KOZHIN completed hydrographic surveys in the Gulf of Finland, Navigator FOSTING sounded in the Finland Archipelago and GOSTER described the southern shore of the Gulf of Riga. Data from Russian hydrographic surveys had been used for three charts, including the new nautical atlas, which had been published in 1714 and is known under the title "Книга розмерная градусных карт Ост зее или Вяржанскаго моря ..." (Graticuled book of degreed charts of the Ost Zee or the Varangian Sea ...). Besides three charts compiled on the basis of Russian surveys, the atlas contains 13 reprints of the Swedish charts translated into Russian. This atlas was republished in 1718, 1720 and 1723.

A contribution to Russian investigations and marine cartography on the Baltic was made by Ivan (Johann-Ludwig) von LUBERAS. He was probably of Livonian descent and started in Russia as a military engineer. In 1719, according to

the order of Peter I, Colonel-Engineer LUBERAS was entrusted with the maintenance of beacons and lighthouses in the Gulf of Finland and together with marine officers AGAZEN, EKGOF, HANS, MISHUKOV and LEIN began a general inventory in this area. In one year several specific charts of separate parts of the Gulf of Finland were finished, and in 1726 the set consisting of one general and 12 larger scale charts was presented by LUBERAS to the Admiralty Board. The general chart was the first one of the Gulf of Finland created completely on the basis of the Russian surveys. At present it is held in manuscript in the Library of the Academy of Sciences in St. Petersburg. It shows coastlines and shallows, mouths of rivers, shore ledges and precipices, relief, woods, swamps and settlements. Compass roses and a compass network are shown on the marine portion of the chart.

Meanwhile the editing of foreign materials translated into Russian was continued. Swedish and Dutch charts, especially of the central part of the Baltic, had been translated into Russian under the supervision of Fedor SOIMONOV (1692-1780), a Russian hydrographer who had graduated from the Marine Navigation School in Moscow. He had taken part in the Great Nordic War and then, in 1719-1720 and in 1724-1727 carried out hydrographic surveys on the Caspian Sea. The translations of these foreign charts were published in 1738.

During 1739-1741, Baron Ivan LUBERAS surveyed the northern coast of the Gulf of Finland. In this task he was assisted by Alexey NAGAEV, whose works constituted one of the splendid pages in the history of Russian marine cartography.

Alexey NAGAEV (1704-1780) graduated from the Naval Academy in St. Petersburg in 1718. He participated in the survey by the Russian Navy in the Baltic (1718-1731), in the Caspian Sea (1731-1734) and then in the Baltic again. As a hydrographer and surveyor, he worked on the White Sea (1730) and in the Baltic in 1739-1740 as an assistant to LUBERAS. In 1746-1752, NAGAEV headed the Naval Academy and at the same time, he headed the inventory in the Baltic. When these investigations had been finished a set of charts were delivered for engraving and, in 1756, a new "Atlas" of the Baltic was published.

NAGAEV's "Атлас всего Балтийского моря с Финским и Ботническим заливами, с Шкагер-Раком, Категатом, Зундом и Бедтами" (Atlas of the whole Baltic Sea, with the Gulf of Finland and Bothnia, the Danish sounds and Kattegatt-Skagerack area) consists of 28 charts. Charts of the Gulf of Finland and the Gulf of Riga are based on Russian surveys from their beginning up to NAGAEV's survey of 1746-1752. The rest of them had been compiled on the basis of the latest Swedish and Dutch charts, with additions and corrections made according to the modern (for that time, of course) observations. Charts of NAGAEV's atlas surpassed all existing Russian charts of the Baltic in completeness of contents, accuracy of the surveys which had been carried out as a basis for the charts, and high quality of presentation. The atlas was republished in 1757, 1788, 1789, and 1795. Each edition was accompanied by pilot directions in three volumes which were published as manuscripts.

All Russian charts of the Baltic, including the charts of NAGAEV's atlas, were compiled on the basis of materials acquired during the marine inventory. That is why the accuracy of soundings coordinates and location of coastline had significant errors. At the same time, introduction of sextant and chronometer to the Russian

fleet increased the accuracy of navigation. Under these conditions existing charts based on the marine inventory were considered insufficiently accurate for the safety of the navigators. So, the necessity of a new inventory and corrected sea charts of the Baltic became apparent.

The correction of NAGAEV's atlas was assigned to a naval officer Gavriil SARYCHEV (1763-1831), later Admiral and Honorary Member of St. Petersburg Academy of Sciences. In 1802-1806 SARYCHEV, assisted by Navigator Ivan PECHONKIN, and Hydrographer, later Major-General, Alexey KOLODKIN created a network of 28 control points on the sea coast with coordinates determined by astronomical methods. In addition, the goniometrical network of remarkable features was developed among astronomical control points. In 1808, the situation shown on the old NAGAEV's charts was transferred to the newly created network, and, in 1812, a new atlas of the Baltic Sea was engraved and published ("Морской атлас всего Балтийскаго моря с Финским заливом и Категагом ...").

SARYCHEV's atlas consisting of one general and 12 large scale charts, was the turning point in Russian cartography in the Baltic. For the first time the Russian charts were based on astronomical control points. Locations and outlines of shores, islands, shallows, dangers and other features have been shown with considerably greater precision on the charts of this atlas. Contents and graphic appearances of the charts had been much improved.

After the publication OF SARYCHEV's atlas, hydrographic surveys on the Baltic were continued. Small expeditions were exploring some parts of this sea. As a result several medium scale charts had been compiled. In 1814 the new atlas of the Gulf of Finland was published by Major-General Leonti SPAFARIEV, the Director of Lighthouses ("Атлас Финского залива, означающий северный и южный берега, с прилегающими островами, от мыса Мозерорта и Оландских островов до Кронштадта ..." - Atlas of the Gulf of Finland showing the northern and southern coasts with islands, from Point of Mozerort and the Oland Islands to Kronstadt ...). This atlas was republished in 1823.

Hydrographic surveys created on the basis of triangulation were the next steps in the history of Russian cartography in the Baltic. These surveys began in 1828, under the leadership of the famous Russian military geodesist, the Director of the Hydrographic Depôt Lieutenant-General Fedor SCHUBERT. Direct triangulation was carried out under his guidance by Lieutenant, later Major-General, Vassili WRANGEL. From 1833 soundings and surveys of the coasts were headed by Captain Lieutenant Michael REYNIKE, known for his hydrographic surveys of the White Sea.

SCHUBERT's expedition lasted for 25 years, from 1828 till 1853. During this period it succeeded in surveying and sounding the entire Gulf of Finland and the Gulf of Riga, as well as some other parts of the Baltic. All these works had been made on the basis of well developed triangulation. Sounding was carried out along tracks. In some places the distances between tracks were not more than 50 metres. In consequence 350 sheets of soundings, as well as the coastwise belt of land had been produced from the basis of SCHUBERT's expedition. But it must be underlined that the surveyed belt of land was very narrow, and the development of relief was

unsuccessful. Nevertheless in 1834-1854 26 charts and 3 plans of the Gulf of Finland and the Gulf of Riga had been compiled, namely:

- general chart of the Gulf of Finland from Kronstadt to Dageror;
- 4 sailing charts from St. Petersburg to Reval;
- 12 medium scale charts of the northern coast and 7 medium scale charts of the southern coast of the Gulf of Finland;
- 2 medium scale charts of the Gulf of Riga.

These charts, partially supplemented by soundings and corrected had been used by Russian and foreign sailors for more than 80 years.

Since 1853, hydrographic surveys in the Baltic were headed by Vassili WRANGEL. Up to 1860, he finished the inventory of the Baltic to the limits of Russian possessions. Since 1859 WRANGEL and later other Russian naval officers (BORISSOV, PUSHCHIN and others) carried out hydrographic surveys in the Finnish Archipelago. The main purpose of these surveys was to locate and investigate numerous dangerous shoals and fairways research.

In general, since the surveys under the leadership of Fedor SCHUBERT and up to 1908, 82 charts and 34 plans had been compiled and published on the basis of hydrographic surveys and surveys produced by Russian hydrographers, geodesists and sailors. Among them there are 39 charts based on the surveys carried out since 1870.