First plan of the area near the source of the river Don (1701)

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Abstract. We have found records on the drawing of the map of Ivan-ozero (Ivan lake) and the upper course of the River Don dated 1701 in the archive of Razriadnyi prikaz, RGADA. These records are the earliest evidence of mapping of the region of Don in its upper course at the moment. We outline the circumstances of drawing of a plan. We reconstruct geographic information of the plan according the revealed description. We compare data of the description to data from later cartographic sources. We conclude that sizes and distances reported in the description are reliable data. We surmise about the authorship of the plan.

1. Introduction

Geographers of the ancient world paid attention to the River Don from the very beginning. Cartographers of Western Europe depicted it on the better part of maps of Eastern Europe. Although the ideas of what was the River Don in its upper course differed from one another, many of cartographers, according the tradition that went back to Herodotus, depicted a lake as a source of the Don.

Mapping was common in Russia in the 17th century. But the best parts of geographic drawings were compiled to solve specific problems, most of them to resolve land disputes. The region of Don in its upper course was a sparsely populated area in the 17th century, especially in the first half of the century. The intensity of economic life was low. Location plans of the area of that time were not found.

At the beginning of the 18th century the construction of Ivanovskii kanal, the waterway to connect the River Don to the tributaries of the River Oka, was launched in the region. The canal route passed along the rivers Upa, Shat and Don. In some areas water was passed through artificial channels where locks were built. Ivan-ozero was a small lake located in the area between the rivers Shat and Don. The lake was cleaned from mud and deepened.

Prince Matvei Petrovich Gagarin was appointed for a duty as the head of works and he went to Ivan-ozero from Moscow in July 1701. He traveled along the future canal route and examined it [1]. Prince Gagarin supervised the construction of Ivanovskii kanal from headquarters on Ivan-ozero. Thousands of people worked on the construction of Ivanovskii kanal for 10 years. Technical maintenance of the project was done by Dutch craftsmen and engineers.

We have got brief and inconsistent accounts of the Ivanovskii kanal from the literature of the 18th and the beginning of the 19th century. Ivan Shtukenberg, German by origin, was the first scientist in hydrography and statistics, who published reliable information about the history of it [2]. The most complete study on the subject in historiography of the time before the revolution of 1917 was the article of A.I. Milovodov [3]. Later the history of the project was not the subject of studies, but we can see more precise definitions and additions to the subject in some articles [1, 4–6]. Some of the authors
analyzed maps and plans of the area of Ivanovskii kanal route [4, 5]. They described early experiences of the mapping of the region of the Don in its upper course.

Map of hydrographic system of the region of Ivan-ozero and projected canal route were drawn likely in preparation for construction. Perhaps this kind of work was done also during the process of construction. When and how was this initial mapping of hydrosystem of Don in its upper course done? What were the results? It is important to give an answer because information about the geography of the region was not correct, especially in Europe. S. von Herberstein in Rerum Moscoviticarum Commentarii (Commentaries on the Moscow principality) stated that Ivan-ozero, the source of the rivers Shat and Don, was 1500 *versta* (measure of length) long and 1500 versta wide. Herberstein wrote down information gained during the visit to Moscow at the time of Vassilii the III, Grand Prince of Moscow. Description of Herberstein was one of the main sources of knowledge about Russia for the Europeans for a long time. Commentaries were cited as an authoritative source. The same mistake in measuring of Ivan-ozero (in fact the lake was small) was repeated many times. Even the Dutch cartographer N. Witsen described Ivan-ozero as a big one [7].

Meanwhile Russian maps and records, in which the real size of the lake was described, were already existed at the beginning of the 18th century, and perhaps even earlier. They were done during the construction of Ivanovskii kanal. We will not venture to affirm that persons who assisted in the work (those who were on the site or those who arrived for a short period of time) could make high-quality geographical drawings of the area. Having regard to the lack of maps of the region in Western Europe and even in Russia, find of a drawing is an advance in the research of the geography of the region.

2. Materials and methods

To answer the question, we have done research in the archives. We looked for the maps and descriptions. We focused on documents reporting on the initial stage of construction of Ivanovskii kanal.

Prince Gagarin worked closely with central and local bodies of government. Correspondence was maintained in the executive office on Ivan-ozero (*Ivanoozerskaia kantseliaria*). Executive office had its own archive, with incoming documents, drafts of outgoing documents, as well as, possibly, technical documentation. This archive was not preserved. All information about the construction is extracted from documents remained in the archives of other institutions. Most of them reported on the material maintenance of the construction, equipment, tools, workers and specialists.

We used records of Razriadnyi prikaz fond (collection) of Russian State Archive of Ancient Acts (RGADA). Razriadnyi prikaz expedited orders from Prince Gagarin in most cases. Razriadnyi prikaz decided the contractor and sent the appropriate order. Archival files that contain correspondence of Razriadnyi prikaz and Prince Gagarin of three primal years of construction are of special interest. They reveal data on cartographic works and persons who could make a job. To reconstruct the lost documents we used their descriptions. Data from descriptions was compared to data on water objects (Ivan-ozero lake and the adjacent area of Don watercourse) from records of the 2nd part of the 18th century and the early 19th century.

3. Results and Discussion

We have not found drawings of the design works or plans in the records of Razriadnyi prikaz. It seems that the said institution was involved in the issues of construction only from the start of works. Prince Gagarin did not report on the implementation of works till the autumn of 1701. We guess he considered himself accountable only to Tsar as he received the assignment personally from the Tsar. Razriadnyi prikaz provided Prince Gagarin with funds and material resources, and was worried about the productiveness of resources, but did not take liberties to require the report from commissioner of Tsar.

On September 30th, two months from the departure of Prince Gagarin from Moscow, *boiarin* (noble of high rank) Streshnev, head of Razriadnyi prikaz, ordered to send *podiachii* (minor official) Polikostritskii to Ivan-ozero. Polikostritskii was instructed to ask Prince Gagarin for report to Tsar on Horomnoe (palace, residential building). Prince Gagarin had to depict Horomnoe and to make a drawing of it with instructions keyed to accompanying drawings, to report with a letter to Tsar on estimation of
the end of works. The same should have been reported on Perekopnoe delo (digging and construction of the canal). The drawing, the letter and the description had to be given to Polikostritskii, who would immediately go to Moscow [8].

The drawing (the plan) mentioned in this message to Polikostritskii is probably the earliest graphic document, the first mapping of the upper course of the Don. It is the subject of our report.

Polikostritskii was sent by Razriadnyi prikaz, but we have not found the said plan in the Archive of it. Perhaps the plan and the related papers were delivered directly to Tsar and were not send to Razriadnyi prikaz.

We have not found letters from Prince Gagarin from earlier date with data on works he supervised as an appointed executive. We think these letters do not exist. Gagarin reported to Streshnev in detail only in October. He mentioned the drawing (the plan) he sent to Razriadnyi prikaz in the report. He underlined he had no person to draw it better because “the place was a desert” [8]. As we can see, the history of this plan was not limited to the fact the plan was ordered to draw, the plan undoubtedly existed.

We do not know who drew it. Probably, officials of Ivanoozerskaia kantseliariia worked on it. It is also possible that Polikostritskii had a hand in it, officials of Razriadnyi prikaz did this kind of work. Gagarin probably participated as well as the head of work, consultant and supervisor. We have not found evidence of the presence of foreign experts on the lake in October 1701 in the records. So we doubt they took part in the drawing.

Although the geographical drawing of the area around Ivan-ozero of 1701 is not available for research now, it is possible to get an idea of its content. We can do it with the help of an excerpt which was preserved in the records of Razriadnyi prikaz Archive in two editions. In one of them, it is reported that Gagarin sent a Chertezh perekopnoi rabote i zhilomu stroeniu (Plan of the canal construction with a drawing of a building). The excerpt gives the detailed description of the plan. It shows the proportions of Ivan-lake, it reports which rivers connected with the lake were cleared, it gives data on the constructed canals, it describes the adjacent land routes, describes the palace built for Tsar, measurements of the chambers and their specifications.

Officers of Razriadnyi prikaz took a close look at the report and put Polikostritskii a question. How far was the Tsar palace from the lake Ivan-ozero and the canal? Was there a bridge in the place where the road intersects the canal? What was the place where the river Urvanka flows into the lake? Policostritskii could not answer the question on water route of Urvanka before the beginning of earth-moving works [8].

No matter how imperfect was the plan of 1701 (the survey was done without the instrumental work), we regret for its loss. First of all, the document fixed data on the Don River’s headwaters and the terrain. In other circumstances it would enrich the geographical knowledge of that time. In the second place, it contained information about the initial stage of construction of Ivanovskii kanal, a waterway project which could initiate developmental growth of the region.

A small insert map that shows headwaters of Don, Voronezh and Oka rivers is close in time to the plan of 1701. We can find this map as map-inset in an atlas Novaia chertezhnaiia kniga, sodervashchaia velikiu reku Don ili Tanais… (1703-1704) (New drawing book depicting great river Don or Tanais… (1703-1704)). Drawer of the atlas had no idea what was the source of the Don River at a time. There was no Ivan-ozero on the map [4]. It was strange, as it went against the antique tradition of Don description, and also considering the fact that the mapper probably had sharp interest to this region at the moment of construction of man-made waterway. The plan of 1701 could have been used by the compiler of the atlas, yet it was not used.

The lake was present on the drawing created under supervision of Prince Gagarin. The description reveals the measurements of Ivan-ozero, it has 96 sazhen (measure of length) in its length, 64 sazhen in its width, 3 sazhen in its depth [8] (for sazhen of the 17th century it has 207.4, 138.2 and 6.5 meters respectively). Apparently these were first accurate measurements of the lake, which was the source of the River Don. They are valuable for the reason that since the time of Herodotus the lake, the source of Tanais, was considered very large.
Were the measurements of the plan of 1701 fixed accurately?

a) Are they a reliable source?

b) Whether they depict Ivan-ozero before the start of construction of Ivanovskii kanal or not?

We can compare the description of the plan of 1701 with the maps of the reign of Catherine the Great. In the period between the reigns of Catherine the Great and Peter the Great work on water project on the lake was suspended. So maps of the second half of the 18th century most likely fixed the layout as it was at the end of the reign of Peter the Great. Of course we should keep in mind possible changes in the location of rivers and in landscape happened for natural reasons, above all seasonal changes in natural watercourse.

We can see the lake of irregular form surrounded by filling dams on a chart Plan kanalov, kotorye idut ot Ivan-ozero po reke Donu i Shatu (Plan of canals that go from Ivan-ozero to the rivers Don and Shat). The drawing was made in between 1740 and 1775 (perhaps in 1763). A length of the lake is 100 sazhen and a width is 70 sazhen (216 and 151 meters respectively). On the other chart from Atlas Tulskogo namestnichestva (Atlas of Tula region) of 1787 the area in between the embankments with the lake inside it measures 100 by 60 sazhen (we see the same measurements in the explanatory text of the atlas) [5]. So, the data received from these charts and the description of the plan of 1701 is close enough. These maps were drawn 50 years apart so the exchange of information between the drawers was highly improbable event. Preservation of proportions of the lake for almost ninety years gives us an opportunity to say that data cited by Prince Gagarin is a reliable source. It applies to lateral dimensions of the lake. A depth of the lake was not indicated in Plan kanalov, kotorye idut ot Ivan-ozero po reke Donu i Shatu. In the explanatory text of Atlas Tulskogo namestnichestva a depth of the lake is 6.5 arshin (measure of length) (i.e. 4.7 meters). If these figures were exact we could say that the lake was grown shallow. We cannot state this definitely as we do not know the time of measuring.

To answer the question whether the plan of 1701 depicts Ivan-ozero before the start of the construction of Ivanovskii kanal or not, we refer to the records of Razriadnyi prikaz. Records contain information about vehicles (boats) and tools (wooden pails) for working on water. Tools are mentioned only in connection with the construction of the canal [8]. Records of the years 1701 and 1702 contain no information about works on the lake, modification of its shape or depth. It means that during these years such work was not carried out on Ivan-ozero. However, we cannot be sure of it.

With the description of the plan we can form clear picture of Ivan-ozero and earth-moving works at the moment of drawing of the plan. In the middle of October of the year 1701 two artificial channels (canals) were existed in the area of the lake, the construction of another one started. The canals were 3.5 and 0.5 km long, water depth was from 2.2 to 3.6 meters. At a distance of 650 meters from the natural channel of the Don River the construction of another one artificial canal was started. The width of it was four times as much as the width of the previous canal. The artificial canal was 17.3 meters wide against the 4.3 meters wide of an old one. The text of the document is not clear enough, so we cannot say where the earth-moving works were done. In addition to the construction of new artificial channels old river-bodies were improved. The natural channels of the Shat River and the Urvanka River were cleared for the space of 30 meters and for the space of more than 20 meters for the Don River [8]. Report on the works on the Urvanka River is unique, we have not found information about the works on the Urvanka River in other historical sources.

4. Conclusion

Russian geographical plans (drawings) are a valuable historical source. They contain information on the history of geographical knowledge, but also on politics, economics and technology [9; 10].

Prince Matvei Petrovich Gagarin, officer of mapping of Ivan-ozero in 1701 (Ivan-ozero lake was the source of the River Don at the time), fixed accurately the natural dimensions of the basin. Most likely the fixation matched well actual dimensions of the lake before the start of water project works. Drawing of the plan initiated further studies of the terrain along the body of the River Don, one of the largest rivers of Eastern Europe.
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