

## **KAZAN GLASS FACTORY OF XVIII-XIX CENTURIES: HISTORY, ARCHAEOLOGY, DISCOVERIES**

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### **ABSTRACT**

The Kazan glass factory's history remains largely unexplored due to the lack of historical data. According to the historical records, on the peninsula located near to the river port of Kazan, there was a district called a "Glass factory" as early as in 1808. The studies allowed determining the approximate time when this factory had been created - not earlier than in 1780. Most of the peninsula, including the factory area, was flooded after the Kuibyshev Reservoir's construction. The glass artifacts discovered in this area are mostly fragments of container glassware in different colours. The discoveries include inscribed samples, which allowed determining their approximate production time: the second half of XVIII-XIX centuries. Changes in the glass formulation fully comply with the Kazan province industrial development at the time.

**Keywords:** *archaeology, glass factory of XVIII-XIX centuries, historical data*

### **INTRODUCTION**

The glass production in Russia has been known since the early Middle Ages, and it had the Byzantine origin and traditions (Shchapova, 1983). The glassmaking in the territory of Russia went into decline after the Horde-era dominion. With the Romanovs, the country saw an enhanced demand for glassware, which cost was extremely high in the absence of domestic production. In this regard, at the beginning of XVII century the government strongly supported foreign manufacturers who undertook the first few attempts to organize glass factories in Russia. In 1634-1939 the Swede Juliy Coyet organized the work of the first glass factory in the village of Dukhanino near Moscow. He specialized in the manufacture of chemist tableware and jars. Initially, the production methods, raw materials and even workers were foreign. But soon quartz sands from the local sand deposits were used for the work (Dulkina, 1978).

The most rapid growth of the Russian glass industry was observed in XVIII-XIX centuries. The activities of many small and large glass factories were aimed at meeting the needs in container glassware, window and art glass. Due to the protectionist policies of Peter I, private entrepreneurs obtained special benefits in the manufacture of glass, so that the amount of glass factories increased. By 1800, they numbered about

50 in Russia. In the first quarter of XVIII century, the government maintained the glass industry development by efforts of the Russian merchants. By the middle of XVIII century, there are 7 glass factories in Moscow alone. In 1880 there were already 207 factories in Russia, in which 14 thousand people worked. By the end of XIX century, the total number of glass factories was 283. The major facilities were concentrated in Vladimir, Novgorod and Tver province, as well as in Saint Petersburg (Shelkovnikov, 1969).

This work is dedicated to the interdisciplinary study of archaeological and historical materials of the former glass factory, which has been built in Kazan in the late XVIII - early XIX centuries for the manufacture of container glassware. The archaeological material collected at the beginning of 2000-ies in spring time during denudation of the Lokomotiv peninsula's land served as a source of scientific research in archeology, history, and archaeometry. At the beginning of XX century, the specified area was called the "Former glass factory"; it was flooded when the Kuibyshev Reservoir was put into operation in 1957.

## RESULTS

### 1. History

Currently, the Lokomotiv peninsula of the city of Kazan is a narrow spit deeply embedded in the bend of the Volga River. The study of archival material on the economy and construction of Kazan in XVII-XIX centuries did not give any information regarding the factory's existence and operation, but the consideration of written and cartographic sources allowed clarifying some circumstances relating to the topics being of interest to us.

The territory of modern Lokomotiv beach in the city of Kazan was known in the past by such names as "Prilutskaya Sloboda" (Prilutskaya Settlement), "Prilutskiy Monastery", "Sloboda Hill", "Glass factory", "Old Believers Monastery" and «Former glass factory". Consideration of the textual, cartographic and archaeological sources reveals the specified area's story from even more interesting sides.

In his materials of the excavations at the Kazan glass factory in 1929, the famous archaeologist N.F. Kalinin noted that it was a place that, called the tsar's (khan) meadow, hosted the tsar's headquarters during the capture of Kazan by the troops of Ivan the Terrible in 1552. In 1595, by order of Tsar Feodor Ivanovich a monastery in the name of Saint Demetrius of Priluki, the Wonderworker of Vologda, was founded on this place (Archive of the Institute of Language, Literature and History, Fund 8).

Information on the territory in XVII century is very fragmentary. In his monograph, R.I. Sultanov, the researcher of the Kazan historical geography, points out that in XVII century the territory being of interest to us named as the Prilutskaya Sloboda was adjacent to Yamskaya Sloboda (Sultanov, 2004). Describing another historic Sloboda of Kazan – Mokraya (Wet), he also notes that the Sloboda has been located at the exit from Kazan to the Moscow road, on the southern outskirts of the city (near the present railway station) on the low-lying, swampy ground. It appeared at the site of small settlements - Rogozhkina located near Lake Rogozhskoe and Prilutskaya situated in the area of the modern streets Korochenko, Said-Galiev, R.Yakhin and the station square (Sultanov, 2004). Wet Sloboda bordered with a stockade wall in the north and Yamskaya Sloboda, and lakes Rogozhskoe and Prilutskoe in the south. In the settlement's area, there were 17 households of tradespeople (Proceedings ..., 1932). According to Kazan Old Believers, the monastery existed until the middle of XVII century, and it was closed because of the monks' commitment to the old rituals and traditions. In XVIII century, Prilutskaya Sloboda is part of the city (Sultanov, 2004).

On one of the earliest Kazan plans dating back to 1739, this area is referred to as the "Prilutskiy Monastery". Its drawing is schematic in the plan (Russian State Military Historical Archive (RSMHA),

Fund 349). In the city's plan of 1760-1770-ies, the settlement presented under No. 32 is outlined in more detail and described as a "Suburb where the Prilutskiy monastery was before, and now people of different ranks live". The Prilutskoe Lake is specified under No. 50 (RSMHA, Fund 846). In the next plan of 1767, the settlement is marked as "Slobodka Gorka" (Town Outskirts Hill); one stone and three wooden buildings are designated therein (RSMHA, Fund 192). In the Kazan plans of the end of XVIII century, the settlement reappears as "Prilutskaya Sloboda". The provincial plan of Kazan of 1798 shows "Prilutskaya Sloboda" as a small settlement with a street, houses and vegetable gardens (RSMHA, Fund 846).

Obviously, being a territory of the Orthodox Monastery from ancient times, the place continued to be sacral after its dissolution. A semi-legal community of Old Believers of the Pomorye, also called the Fedoseyan Concord and Priestless Concord, became such a group of religious people who shown their interest in the former monastery at the beginning of XIX century. The community's leader, Kazan merchant Vasilii Andreyevich Savinov acquired one of the wooden houses in the area that was owned by the privy councilor and cavalier Fyodor Fyodorovich Zheltukhin in 1808 (Vorobyev, 1996). The deed text is interesting: "I granted a deed of purchase to the Kazan merchant of 3rd guild Vasilii Andreev, Savinov's son, that I, Zheltukhin, sold to him, Savinov, my wooden fortress house with all buildings and a garden belonging to it, which is located in Kazan, Ilyinskiy parish, 2nd part, 1st quarter of Podgorodnaya Sloboda (Suburban Settlement) called Stekolnaya Sloboda (Glass Settlement)..." (National Archive of the Republic of Tatarstan, Fond 1). In other words, as early as at the beginning of XIX century this area was called the Glass factory, and the cartographic sources point out the name "Former glass factory" only in the middle of XIX century. The V.A. Savinov and F.F Zheltukhin deal was also interesting from the point of view that F.F. Zheltukhin, being a high-ranking official in the Russian Empire, was the owner of not registered glass factory in Tsarevokokshaisk district of Kazan province. The statements of the Ministry of Finance until 1822 did not include his factory, although it has been working since 1795.

Merchant V.A. Savinov bought the Glass factory properties annually and very consistently. In November 1815, V.A. Savinov sought that the city authorities organized the Old Believers cemetery on his land. In 1818, he built a stone chapel here naming it "prayer temple at the poorhouse" for the state authorities. By 1820-ies, a multifunctional center of the Pomorye appears here; it is composed of a chapel, poorhouse, residential stone and wooden buildings (Timofeev, 2005). This center was so important for the Old Believers that they called it a "monastery" (Zenkovskiy, 2009).

The city maps of 1830-1840-ies are unequivocal while naming the studied area as the "Old Believers monastery". In the Kazan plan of 1842, the settlement's western part is indicated as a green area covered by vegetation – probably, this was the cemetery. The eastern part of the "monastery" continued to be a one-street settlement with two stone and seven wooden buildings (National Archive of the Republic of Tatarstan, Fund 324). The city plan of 1839-1848 completely copies the previous plan, except for the appearance of a settlement of eleven small wooden buildings on the west, "green part"; they were likely to be the Old Believers' chambers (RSMHA, Fund 1356).

With the Nicholas I's enthronement, the situation changed for the Kazan Old Believers. In 1836, rigid rules turning over control of the poorhouse to the city authorities were extended to the community, and in 1845 it was finally closed (Timofeev, 2005).

On the Kazan plans of the second half of XIX century, the "Old Believers monastery" becomes the "Former glass factory". The city plan of 1875 is interesting by a new name of the lake neighboring to the settlement, which assumes the name "Stekolnoe" (Glass Settlement) here (National Archive of the Republic of Tatarstan, Fund 324). On the city plan of 1887 edited by Ilyin, the settlement is referred to as the "Former glass factory" (Plan of the city of Kazan...).

The outstanding Russian writer Maxim Gorkiy who at the end of XIX century frequently visited the abandoned poorhouse's building gave very important characteristics of this territory in his work "Konovalov": "We especially liked to be in the "glass factory". A building, which stood close to the city in a field, was called like this for some reason. It was a three-storey stone house with a failed roof, broken window frames, cellars full of smelly liquid mud during the whole summer. Being green and gray, dilapidated, a kind of degraded, the building looked from the field to the city with its dark hollows of the mutilated windows and seemed to be a disabled person insulted by fate, thrown out of the city limits, miserable and dying. During a flood, this house was undermined every year, but covered from the roof to the ground with a green mouldy crust, it stood indestructibly, fenced with puddles from frequent police visits – it stood and, though it did not have a roof, gave a shelter to different obscure and homeless people" (Gorkiy 1950, 27).

The prayer temple at the "Former glass factory" was opened only in 1905, after the Emperor Nicholas II's decree "On Strengthening the Foundations of Religious Tolerance". It was renovated at the expense of Kazan manufacturer M. Okonishnikov. Regular services were resumed here in 1910. In the middle of 1920-ies, Prilutskiy prayer temple was home to 10 people. At the end of 1937, the last church service took place in the temple (Annotated list...).

## 2. Archaeology and Archaeometry

In the area we are interested in, the archeological studies in the form of a reconnaissance were first held in 1929 by a representative of the Academy of Material Culture M.G. Khudyakov and Kazan archaeologist N.F. Kalinin. During the reconnaissance, arrangement of the factory's glass melting furnaces was established, remains of glass melting pots and production samples were found. Researchers managed to determine that there were 16 pots in all (Archaeological reconnaissance ..., 1929). In 1937 N.F. Kalinin examined the area again. In his article, following the results of his examination, he noted that in 1932 a garden and livestock sovkhov (state farm) No. 1 of the Kazan Railway was set up in the former glass factory. It was found that the glass factory's former pits had been covered and converted into greenhouses (Kalinin, 1937). In 1955-1957, a part of the territory of the Former glass factory was flooded at the start of the Kuibyshev Reservoir.

A collection of glass selected in the area of the Former glass factory consists of 50 pieces of container glassware of various thicknesses, size and color. Some artifacts have single letters or words. By its quality, the glass is visually divided into three groups. The first group makes a larger part of the collection and features low-grade glass with bubbles and foreign inclusions. Fragments of the second group are manufactured from higher quality glass with good gloss and no visible inclusions, including a fragment of a faceted blue glass vessel of very high quality with the letters "OVSK". Two clear glass samples have no noticeable inclusions either, but in contrast to the second group artifacts, their surface is not glossy due to the microcavities.

Among the first group of samples, there was a small bottle fragment with an inscription "F. GRACHE". According to historical records, in the middle of XIX century F.H. Grache of German descent opened a pharmacy and then a factory, which produced artificial imitations of mineral water, in Kazan (Dvoenosova, 2001).

Based on the elemental composition data, one can say that the archaeological fragments from the former glass factory are manufactured from three basic types of glass: lime-potassium, lime-potash and lime-sodium-potassium. The first group amounts to 18%, the second group - 6% and the third - 68% of the total number of discoveries. The composition of two fragments has a mixed formulation.

Most likely, each glass type corresponds to a certain period. According to the preserved data on one of the Russia's largest glass factories of XIX century (State Archive...), various materials were used as a raw material in different periods of the factory's operation. Most often the formulation included the glass scrap, which was specially purchased. At the beginning of XIX century, glass was brewed with the addition of "straw ash" - ash of grains substantially free of sodium. Then the factory switched over to potash made from ash of wood plants. This fully corresponds to the archaeological discoveries from the peninsula. The second group glass with very "clean" glass belongs to the early formulation of the beginning of XIX century.

The third - the largest group of glass - was brewed according to a later formulation of the end of XIX century and contained wood potash. It is characterized by a mixture of potassium and sodium component, where the first one prevails. The formulation might be due to a new component, which was added during melting of glass scrap - soda. Study of historical documents found an interesting fact about organization of the first soda production from common salt in Russia. In 1869 technologist, a Kazan University professor M.Ya.Kitary and chemical engineer I.Ya.Tisa implemented a method for the ammonia production of soda invented by the Belgian chemical engineer Ernest-Gaston Solvay (Solvay E.G.) (Rubtsov, 1901) in a factory, which was constructed in the town of Laishevo of Kazan province. In connection with unprofitable production, the factory was closed in 1874 (Lukyanov, 1948). Thus, in the period from 1864 to 1874, the Kazan factory could use sodium raw materials, which were produced 55 km from Kazan.

Percentage of the artifacts can serve as an evidence of the assumption that the formulation has been changed in a staged way. The smallest group is composed of glass fragments with an "old" calcium-potassium formulation of the beginning of XIX century, and the most representative group is brewed on wood potash of the end of XIX century. The mixed formulation "transitional" glass also supports this hypothesis. According to analytical data, the wide variations in the microelement concentrations show diversified raw material - sand, lime and ash.

## CONCLUSION

The considered textual, cartographic and archaeological sources prove intensive development of the studied area since the end of XVI century. The above data give grounds for stating that the area was a spiritual center of the Kazan Old Believers, a place of residence of the urban population for many years, and the glass factory was here at the end of XVIII - first half of XIX centuries. The resulting archaeometric data are fully consistent with the historical information concerning the glass industry development in Russia and organization of soda production in Kazan province in XIX century.

The glass factory constructed at the turn of XVIII-XIX centuries manufactured a variety of products, for the Kazan pharmaceutical house of Ferdinand Grakhe as well, including the artificial mineral water bottles. Studying the chemical composition of archaeological material revealed that the glass of different periods was made according to certain formulations. The most glass fragments were brewed using ash glass. This is quite natural because Russia has been one of the largest producers of these raw materials in the world since XVI century.

The main thing that determined the mass production of potash was its high demand across Russia and abroad. As it is known, potash has been widely used for the preparation of alkali since ancient times. Then it was used for glass production, dyeing, bleaching, wool washing, various salts, at snuff factories, etc. A significant part of the production was delivered to St. Petersburg and then abroad. Russia was the largest potash exporter in the world market: in 1864 – 11,000 t (for comparison: USA – 1,900 t) (Lukyanov, 1948).

In XVIII-XIX centuries, Kazan province was one of the potash production leaders in Russia. For example, in 1807, 66 enterprises manufactured this product, and it was used both in the domestic and foreign markets (Koreeva, 2014).

The interdisciplinary studies are a powerful argument that a glass factory dating back to the end of XVIII-XIX centuries was functioning in this area. Distribution of artifacts by their appearance coincided with the division according to their chemical composition. The glass formulation composition of different periods corresponded to characteristics of the local industry. At the beginning of manufacture, the glass was brewed on the "straw ash", sand and lime. Most likely, when brewing glass one of the mixture components was soda prepared in Laishevo in Kazan province at the Russia's first plant manufacturing this product using the ammonia method in the middle of XIX century. In the third quarter of XIX century, glass included wood potash.

## ACKNOWLEDGEMENT

The work was performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

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