

The Ak-Saray palace

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ABSTRACT: This article is to scientifically enlighten the history of construction and to architecturally re-create the original appearance of the Ak-Saray palace, which was built in the late 14th - early 15th centuries in Shakhrisabz by Amir Temur. The Ak-Saray palace is the largest in Central Asia ensemble of national architecture and national heritage of the epoch of Amir Temur. The article is based on the latest archaeological excavations conducted by Kh.T. Sultanov on the territory of the Ak-Saray palace.

KEYWORDS: Architecture of the epoch of Amir Temur and Temurids, the Ak-Saray palace, Temurid style in architecture, Shakhrisabz city, national architecture of Central Asia.

I. INTRODUCTION

In this scientific research of the Ak-Saray palace in Shakhrisabz, the author attempts to recreate the architectural-artistic appearance of the residence of Amir Temur. The study was based on the handwritten works of medieval authors, the scientific works of architects and art historians, as well as the latest large-scale archaeological excavations of the palace conducted by Kh.T. Sultanov [12-13] in 1973-1976 and 1981-1988. In the decoration of the facade of the palace, materials were used for the reconstruction of the facade of the building, made by the painter Aziz Akhmedov, a resident of Shakhrisabz and a holder of Temurid's traditions, who devoted more than 20 years of his life to the theme of Ak-Saray.

Unlike other monuments in the epoch of Amir Temur [8], the appearance of the Ak-Saray palace evokes the curiosity of not only visitors and tourists, but also people, engaged in scientific researches. One wants for at least a minute to imagine all the power and the scale of the greatness of the palace in the past, as a good piece of work in the era Temurid Renaissance.

The reconstructed image of the original appearance of the majestic structure is just a hypothesis that forces our mind to imagine all the luxury and beauty of such a magnificent construction of the XIV-XV centuries of the epoch of Temurids.



Fig 1. Architectural and art reconstruction of image of the palace of "Joint stock company shed" of Gilmanova N.V.

II. SIGNIFICANCE OF THE SYSTEM

The results of scientific searches of the Ak-Saray palace, conducted by Kh. Sultanov, formed the basis of dozens of scientific works, monographs, articles, books and albums. Kh. Sultanov is the author of a wonderful photo book «Historical monuments of the Islamic world in Uzbekistan”).

The first archaeological excavations and architectural studies of Amir Temur’s Ak-Saray palace were conducted by Kh. Sultanov in the 70s. It was him who discovered beautiful tiled floors of the Ak-Saray palace, described by Clavijo,[2] and restored the planning structure of the closed composition of the majestic palace.

According to the records of Clavijo, behind the large gates of the Ak-Saray there was a courtyard, decorated with unusual for those times tiles of various colors. That information was confirmed by the results of archaeological excavations conducted in 1936 S.K. Kabanov,[10] who discovered 1 meter long area of tiles.

In 1976, Kh. Sultanov discovered three more main zones of the interior of the palace, decorated with glazed tiles. These were beautiful tiled floor pavings of the palace rooms that formed a continuous multi-colored carpet. The area of the eastern part was about 120 sq. meters and the western - 140 sq. meters.

When it comes to the uniqueness of the glazed tile, laid out on the square of the Ak-Saray palace, experts note that it is unusual and diverse in shapes and colors, and in some cases also in the ornament depicted on it. Among the tiles not only rectangular and octagonal shaped tiles are found, but also tiles made in the form of more complex geometric figures, decorated with stylized cotton boxes. Colors of tiles vary from white, light blue to blue, and some of them with polychrome décor (a combination of several colors).

Some of the multicolored tiles were decorated with gold. The secret of their production, painting and decoration still hasn’t been fully understood. Scientists around the world still rack their brains over the question on how the tiles can be so well preserved after many centuries.

Based on the findings of the floor area, the total width and length of the yard of the courtyard of the palace can be calculated. Taking into account the width of the galleries on both sides, which was 9-12 meters, the total width of the courtyard was 120-125 meters. Hence, considering the traditional rectangular plan of the palace constructions, the length of the Ak-Saray yard was about 180 meters. According to the records of Clavijo, the width was three hundred steps to the largest room of the palace. Considering the length of a man’s step equal to one gazi (59-61 cm), it can be assumed that the width and length of the courtyard of the palace was about 90-180 meters.

According to the archaeological research by Kh. Sultanov, the palace plan consisted of 4 complex structures, interconnected with each other. Those were an entrance, an administrative part, a residential part and a park.

Undoubtedly, the area of the palace was grandiose in terms of scale, assuming that the structure of the Ak-Saray palace included: a mosque, a courtyard for public audiences, a courtyard for private audiences, Amir Temur’s private quarters, a courtyard and a garden of Harem, a sauna, a courtyard with a library and a school, a farmyard with stables, buildings for guards, a kitchen, a darwazakhona and the second gate.

According to the scientists’ assumptions and written sources of that time, the inner courtyard occupied an area of more than 30,000 square meters, having a total width of 120-125 meters and a length of 240-250 meters. The height of the main portal of the central part of the palace was more than 50 meters, and the side towers of the portal were 70 meters each.

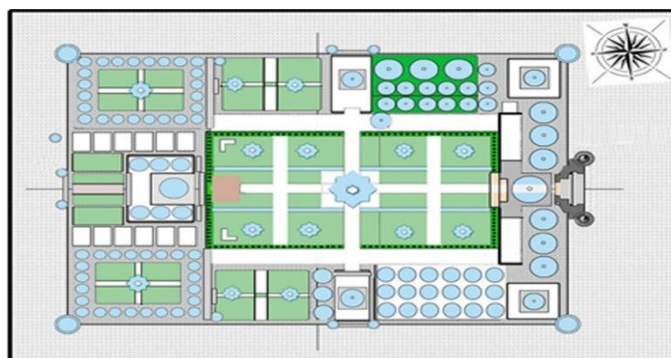


Fig2. Plan of the courtyard of the palace 90 x 180 m



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III. LITERATURE SURVEY

As historical sources indicate, the Ak-Saray palace was built during the period from 1380 to 1396. It is evidenced by a sign in the niche of the portal that indicates the date of completion of the building - 1396 (798 on the "Hijri" - Islamic calendar) and the name of one of the cladding masters, who left his autograph on the mosaic harness of the portal - under the name of «Muhammad Yusuf at-Tabrizi».

According to HafiziAbru, in 1378-1379 during the reign of Amir Temur the ancient city's walls of Kesh hissar were rebuilt, large buildings were constructed, including a high structure that served as a place of habitation for the upper class of the clergy, the Ak-Saray palace, madrasah and other structures. Shakhrisabz became not just a center of trade and crafts, but also a city of science and culture. «In honor of the Excellency of khozrat (Temur), a majestic palace known as the Ak-Saray was built. It is a large building made of stone: the aivan of it is visible at a distance of several farsakhs» .

NizamuddinShami described the palace as follows: «Taki Ravak» (portal and arch) reach up to Auriga (the stars of the capella) and no one in the world saw and comprehended anything like this» .

Sharaf ad-Din Ali Yazdi[1] described the Ak-Saray palace in his own way: «By the order (of Temur) the foundation of the palace was laid and the palace was built (raised). The greatest kungra is completed. The sky lit up with the rays of its stars. The shine of its walls lit a dark night. The brightness of the palace made ozanchi to mistake. The sage was in a deep thought without knowing how to describe the greatness of the palace. The highest building was built according to the new method, as if we spread the sky with our own hands, leveled the earth and painted it with colors. The most experienced engineer, who was in every part of the world, had not seen such a building before. The palace ascended from the earth right up into the sky. The palace was named the Ak-saray» .

In the summer of 1404, a delegation of the Castilian king, heading to Samarkand to Temur, visited ancient Kesh and stayed at the Ak-Saray palace. The Spanish Ambassador Ruy Gonzalez de Clavijowas amazed by the scope and luxury of this architectural building. In his personal diary «Journey to Samarkand to the throne of Temur» he described his stay in the castle of Amir Temur.

Later, the description of the architectural appearance of the Ak-Saray palace was given by the successor of the Temurids dynasty - Zahir-ud-din Muhammad Babur[3]: «Since Temurbek was from Kesh, he made many efforts to make Kesh his main city and capital. He built tall buildings in Kesh. He also built a large gallery to manage diwan. On the right and left sides of the gallery there were two smaller galleries, so that the overseers and beks of the diwan could reside there and administer it. For complainants, he built small galleries on each side of the room. There are few such tall buildings in the world; they say, it is bigger than TaqKasra Palace».

Owing to the descriptions of medieval scientists, the records of Clavijo and Babur, it becomes possible to imagine how glorious the appearance of the Ak-Saray palace, which became the pride of the Temurids' architecture, was. Even in the remained parts of the building, one can see its unique architectural style, distinguished by its scale, richness and variety of artistic decor, symbolizing the power, prosperity and wealth of the state of Amir Temur. In the XVII century on the facade of the building one could read the inscription: "If you doubt our might - look at our buildings!". But time and the human factor spare nothing and no one.

During the period from 1373 to 1438, as noted by Professor R. Khilenbrand, Shakhrisabz became the center of construction, where, in addition to huge ensembles, grandees, Temur and Temurid dignitaries built palaces, mosques, madrassas, baths, caravanserais, bridges, irrigation facilities.

The first scientific research of the monuments of Shakhrisabz had exploratory character. More detailed information about the structure of Shakhrisabz was given by A.L.Kun in 1870.

Large scientific studies of the monuments of Shakhrisabz and the Ak-Saray palace were made by V.V. Bartold[4], A.Yu. Yakubovsky, M.A. Terentyev, I.I. Umnyakov, B.N. Zasytkin, S.N. Kabanov, Y.G. Gulyamov, M.E. Masson [5] and G.A. Pugachenkova[7], L.Yu. Mankovskaya, E.V. Rtveladze.

Later, archaeological scientific researches were continued by a group of scientists-archeologists: S.N. Kabanov, Kh.T. Sultanov, E. Asamov[15] and others.

A special place in studying the architectural monuments of Shakhrisabz belongs to the joint publication of M.E. Masson and G.A. Pugachenkova (1942) «Shakhrisabz during the reign of Temur and Ulugbek». Based on the archaeological data and facts from medieval written sources, the authors of the publication assumed the time when the city emerged, described the historical structure of architectural monuments, built during the reign of Amir Temur and Ulugbek.

The history of the formation of Shakhrisabz from ancient times and its medieval architectural monuments were the subject of research by E.V. Rtveladze, A. Sagdullaev. In their joint work «Monuments of the past centuries» a broad historical overview of the region, based on their own observations, is given.

According to foreign scientists A.U. Pope[17], A.E. Hergfeld, F. Sarre, H.L. Goethein, D. Schelumberger, in the Islamic architecture of different countries common methods of planning of palace constructions were used. For example, in Western countries churches, monasteries and palaces had similar principles of planning. The Ak-Saray palace was compared with similar Ghaznian palace constructions of XI century on the territory of Afghanistan, India: Agra, Lahore, Delhi, as well as in Udayhira near Baghdad, Alhambra in Cordoba.

IV. METHODOLOGY

Kh. Sultanov's archaeological research didn't confirm Clavijo's information about the existence of a "big reservoir" in the middle of the courtyard, since the location of the large basin was not found, due to the construction of modern engineering communications at that site. At the same time, the descriptions of Clavijo about the existence of a large howz in the middle of the yard also can not be proven false.

When excavating the courtyard of the palace, no whole fragment of the ceramic cladding or a whole brick in the place of presumed basin were found: everything was covered with construction debris at 1.5-2 meters. Another version can be assumed - local residents plundered palace buildings part by part for many centuries, might be the quality of building material was of poor quality. Probably, the elements of the decoration and brickwork of the palace will someday be found in neighboring to the place private courtyards.

The garden of Ak-Saray also had a traditional layout of Amir Temur's countryside palaces and matched the canons of an ideal «chorbog». The compositional solution was subject to the "golden ratio" law.

The remains of ceramic pipes with a diameter of 0.10-0.15 m., found during the archaeological excavations of the palace, validate Clavijo's records about the existence of a number of fountains and water channels within the territory of the palace. The water apparently came from a water reservoir and then was distributed through ceramic pipes throughout the palace to the fountains.



Fig3. Ceramic pipes for giving and discharge of water

One of such decorative pools was discovered on the territory of the palace during archaeological excavations at the western pylon of the southern edge of the palace. It was of 35-40 cm depth and probably served as an aquarium for the habitation of sacred fish - schizothorax (silver fish that was considered sacred).

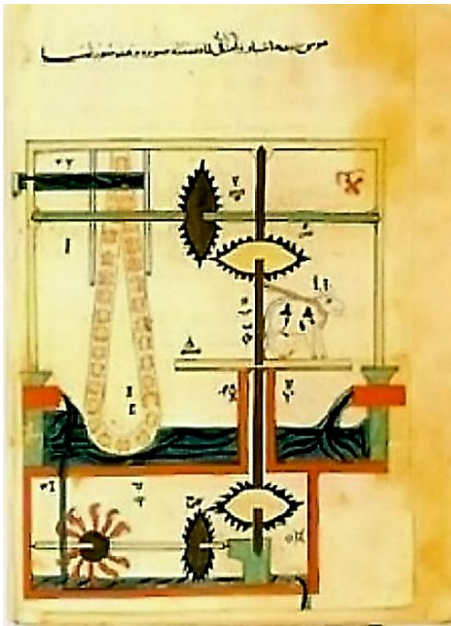
The walls of the pool were sloping and covered with majolica plates, painted with gold. The bottom of the pool was laid out with tiles, measuring 25x25x3 cm, with glazed brick-like mosaic. The side walls of the pool were covered with bricks of blue, white and red colors. Ceramic tiles with a picture of a goldfish were also discovered during excavations. In miniature paintings of medieval masters, in «Baburnama», «Hamsa» one can find images of such pools of various shapes: square, rectangular, octagonal, round, combined, depicting splashing fish and ducks in them.

There was also a legend about a wonderful howz on the roof of the Ak-Saray palace portal. The water flowed into the howz through a lead gutter or leather pipes from the mountains of Takhta-Karachi, and then fell down as an artificial waterfall.

Definitely, that legend has no scientific proof, but given that the scope and scale of the construction of Amir Temur's palace was huge, it can be assumed that such pools with fountains could have existed on the second and the third floors, since the luxurious residence of the ruler - the palace of his huge empire was the embodiment of all innovative achievements and technologies that were ever created during that period.

In addition, as the ruler of a huge and rich empire, Amir Temur could afford such an attractive luxury as fountains and pools in his chambers, in such hot climatic conditions, considering that the method of supplying water to the top was already known for a long time before the era of Amir Temur. This is evidenced by the works of many medieval scholars who gathered in the libraries of the ruler and were widely used by his masters and architects in the XIV-XV centuries.

Fig4. The system of water supply on miniatures



In the XII - XIII centuries the scientists of the East had similar knowledge and with the use of mechanical machines could supply water not only to any height, but also by the means of systems and water pumps distributed the water between basins and fountains. The water was supplied to the tank, as if in modern water towers, and from there the water went down and distributed to fountains at a lower level.

In the XII century, Al-Jazari (inventor, mathematician and astronomer of the Islamic revival) invented many mechanical devices that are prototypes of modern mechanisms and are used in technologies to this day. In addition, Al-Jazari designed valve pumps, water-lifting machines, water clocks and fountains.

The Book of ingenious devices on automata (automatic machines) and mechanical devices was popular during those times, as it had been released in many copies and described the mechanisms that Al-Jazari invented himself. Some of mechanisms were based on the earlier works the Banu Musa brothers, well known in the construction of fountains.

Certainly, considering the size of the Ak-Saray portal, the water could not ascend to such a great height straight from the mountains, since the pressure, when feeding water from the Takhta-Karachi mountain pass, with a pipe diameter of 10-15 cm and a height of 1 m, would be 1 atm. that

would simply rupture the pipes at high altitude. However, it can be assumed that the water from the mountains was collected in special reservoirs and then, with the help of water-lifting machines, driven by bulls, was taken upwards.

Consequently, the rooms and chambers of the ruler and the female belonged half of the palace had water and there were green plantations, since at a height of 20-25 m the water could descend under pressure from the upper reservoir.

Another important finding about water supply in the gardens can be archaeological excavations by U. Alimov^[14] around Samarkand. He was the one who found T-shaped hollow wall, built opposite to the entrance of the palace, and in his opinion, the wall created a water pressure for fountains.

During the times of Amir Temur, a radical change occurred not only in the engineering and construction technologies, but also in the growth of their durability, due to the homogeneity and plasticity of building materials.

One of the unique features of Amir Temur's epoch was the introduction of square fired bricks in construction works. Fired bricks were burned in a kiln which made them durable. The use of square bricks by Temurids in the construction

of their hyper-impressive architectural structures with great portals and domes has ensured the preservation of their structures for many centuries, in contrast to the rectangular bricks used in the Kara-Khanid's era.

The square shape of the brick had exceptionally high technical and functional qualities, which contributed to a more even distribution of the load during earthquakes.



Fig5. Square shape of a brick of the palace

As a binding agent in the construction, ganch (a local variety of gypsum, containing natural impurities) was a widely used. Local ganch after hardening possessed not only high durability, but also elasticity, which was extremely important for providing earthquake resistance in zones of permanent large and small earthquakes. The use of ganch in construction was a revolution in architectural designs and construction technology in the East. Ganch also served as the main solution for the molded parts of the vaulted systems for fixing the decorative tile facings. It was used in plasterworks and as a primer under the wall painting with the addition of ash for strength and giving a greyish shade of the base.

V. EXPERIMENTAL RESULTS

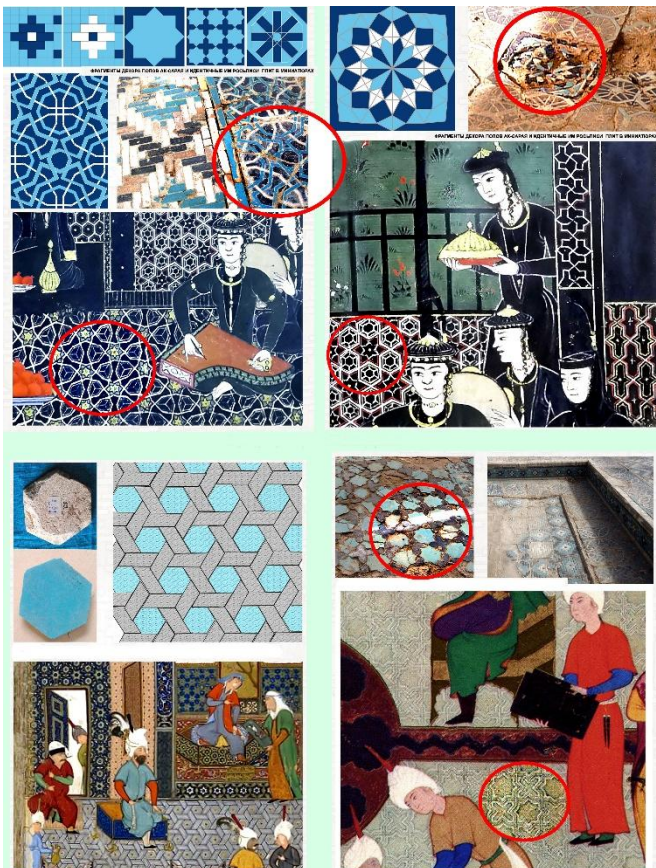


Fig6. Decorative tiles of the palace in miniatures

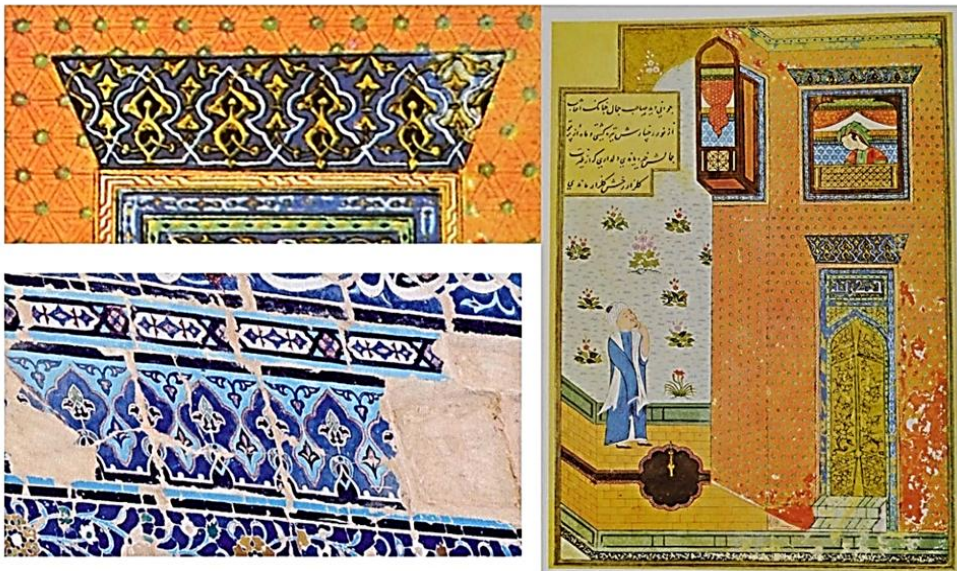
As if in a fairy tale, the palace was all lined with brick mosaics, majolica plates, carved terracotta and paintings. They depicted geometric patterns and ornaments consisting of seven colors of the rainbow: violet-blue, emerald green, golden, blue with a blue hue, white, red-brown, etc.

The decoration of the walls and the portal of the Ak-Saray palace combined many different styles and colors. Masters from different parts of Asia brought various cultures with them. The ethnic mixture of Tabrizian, Iranian and Indian elements in design of the palace blended harmoniously with the Timurids style. The mix of different elements created a unique picturesque image of the Ak-Saray palace.

All these fragments of the palace paintings can be found in works of medieval miniature painting of the 14th-17th centuries, which to this day have brought the similarity of the elements of the Ak-Saray palace with miniature sources.

Miniature painters tried to reflect elements of the artistic decor of palaces, mosques, portals and iwans by transferring all the beauty and luxury of the structures built by Amir Temur, in their works. Since they were direct participants in their construction, art painting and decorative wall decoration. The walls of the interior decoration of the Ak-Saray palace were also decorated with monumental paintings, which

reflected the life of the ruler and his entourage, as well as his military campaigns.



While working with artifacts, located in the State Museum of History of the Timurids, the remains of the fragments of decorative ceramic tiles, which served as a facing material for decorating the gardens and palaces of Amir Temur, were studied in the museum's funds. Based on these fragments, the original view of patterns and ornaments of structures were re-created. Exactly the same fragments of tiles with patterns of plants were found during

the archaeological excavation on the territory of the Ak-Saray palace. The same fragments of artistic decor, we can find in works of medieval miniatures[16,18, 19, 20] .

Fig7. Fragments of a decor of the palace and analogs of a miniature of 1427 Herat. Florence

VI.CONCLUSION AND FUTURE WORK



Fig8. The remained palace poles

At present, the greatness of the Ak-Saray palace is resembled by remained two pylons of the huge portal of the palace. The height of the northern pylon is now 38 meters. The arch was the largest among similar ones in all Central Asia and had a span of 22.5 meters. The arch collapsed approximately 200 years ago. But even the pylons of the palace, proudly rising against the background of the setting sun, have not disappeared without a trace and evidence how great the architectural structures and the works of the medieval architects of the era of Amir Temur were.

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My name is Nafisa Gilmanova. I am from Tashkent- the capital of Uzbekistan. I am an artist and I work at institute as teacher. I teach the drawing and painting at the Architectural and Construction Institute in Tashkent.

Now I am an assistant professor and third year doctoral student of the Architecture and Construction Institute at the Department of History and Theory of Architecture.

Subject of my thesis is "Features of the development of fine arts in the architecture of the Timurids and Baburids ".

My research supervisor is professor Abdumazhid Madraimov.

In my scientific work, for the first time I consider the era of the Timurids and the Baburids together.

I make a comparative analysis of two epochs, I reveal their similarity and difference.

In architecture of two epochs I consider the most outstanding architectural constructions, like madrassas, mosques, mausoleums, palaces and gardens of two epochs.

In the fine arts: ancient oriental manuscripts, treatises, works of miniature painting of two epochs.

Baburids in India are successors - of cultural heritage of an era Temurids in Central Asia.

Both eras made - the huge contribution - to development of the fine arts and architecture not only the countries of the East, but also to art and the culture of the World Civilization.