

Conservation and Restoration of Floral and Leafy Decorations on a Porcelain Vase in Sahebgharaniyeh Palace

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ABSTRACT

Porcelain is the main constituent of abundant vases found in museums, palaces, etc. From standpoint of art and crafting, vases are priceless and valuable. It is noteworthy to point that the majority of studies conducted are focused on industrial ceramics rather than cultural and historical values of fragile artworks made up of porcelain and ceramics. This paper focuses on the conservation and restoration of an artistic porcelain western vase belonging to Sahebgharaniyeh Palace located in the Niavaran Cultural and Historical Complex, Tehran, which was built over Qajar Dynasty. The floral and leafy decoration on the vase was not only restored but also crafted in accordance with remaining patterns. It is concluded that certain procedures of conservation and restoration applied to the ceramic vase to preserve and maintain its artistic and historical values and features.

KEYWORDS: Porcelain Conservation and Restoration, Sahebgharaniyeh Palace, Niavaran Palace Complex, Western Vase, Qajar Dynasty.

INTRODUCTION

Niavaran Palace Complex is a historically significant building situated in north of Tehran with a garden area of approximately 9000 square meters [1]. There are a number of museums and palaces inside the complex depicting Iranian history since 1794 when Qajar family came to power. Although the family of the following dynasty, Pahlavi kings, lived in this palace for several years, its foundation belongs to the Qajar architectural design [2].

The Qajar dynasty (1794-1935), also called Ghajar, Kadjar, was a Persianized native Iranian royal family of Turkic origin [3,4]. Qajar dynasty ruled in Iran about one and half of century. The Qajar era is distinguished from other historical eras in terms of numerous changes and transformations Iran underwent. During their reign, Qajar dynasty witnessed seven kings ruling the country. Nasser Al-Din Shah, the fourth king (1831-1896), induced many changes to Iranian culture, arts, and architecture. He was the first Iranian king travelled to Europe three times and became familiar with European culture, art and architecture and introduced the importance of modernization over Iranian art and culture [5]. Iranian people were then introduced to the western world. In addition, Photograph studios and printing industry were established in his era [6]. As trading prospered between Iran and Europe, many new items, such as paintings, fabrics, and decorative objects were imported to Iran.

Since Naser Al-din Shah Qajar (1831–1896) resented his precedent monarch's summer palaces, he appointed a group to search for localizing a great summer palace around Tehran. The group ultimately reported that the best place is Niavaran region in the northeastern part of the old Tehran city. Niavaran complex was founded upon his order and was subject to his direct supervision. This reveals the reason behind the fact that the architecture of buildings within this palace is unique and of artistic value [7].

Sahebgharaniyeh Palace was first constructed by Fath-Ali Shah Qajar (1772–1834) [8]. Naser Al-Din Shah named the palace Sahebgharaniyeh, implying that this place is worth belonging to a great ruler, whose reign lasted over one century. Since Naser Al-Din Shah had the most long-lasting reign among Qajar kings, he was known as Soltan-e Sahebgharan which means king of many centuries, as a metaphor [9].

Sahebgharaniyeh Palace is one of the unique and special historical monuments in Tehran. Artistic and architectural values of this building make it a prominent distinction among palaces designed and constructed during Qajar era. A combination of western and Iranian traditional art and architecture has

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given a great sense to the visitor[10]. He tried to reflect architecture of Qajar era in Sahebgharaniyeh Palace. There are, for instance, numerous valuable mirror works throughout the palace, with some plaster works designed in the interior parts. The palace is replete with antique inanimate objects that were either crafted by Iranian artists or bestowed to the kings by foreign envoys or kings. There are many paintings and ceramic vases, seen in interior parts of the palace.

Five monuments have been incorporated into the Niavaran Palace Complex, including Sahebgharaniyeh Palace, Niavaran Palace, Ahmad Shahi Pavilion, Jahan-Nama and a private library as well as other cultural, historical and natural attractions including Blue Hall, a private cinema, and Niavaran Garden. The design of the palaces is inspired by traditional both Iranian and western architecture. Its decorations are also inspired by pre- and post-Islamic arts, as shown in Figure 1 and Figure 2, respectively [11].

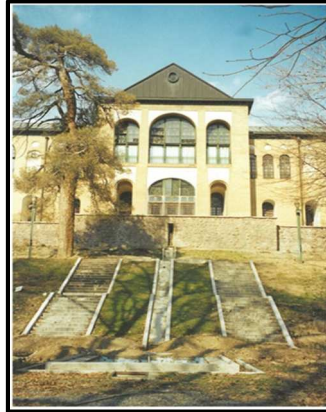


Figure 1: Exterior design of Sahebgharaniyeh Palace (© Leila Farahbod)



**Figure 2: Interior design of Sahebgharaniyeh Palace.
The restored vase located on the second floor
(© Leila Farahbod)**

Not only are the exterior and interior architectures of Niavaran Palace Complex glorious and impressive but also the entire area of the walls around the complex are decorated with brick and tile works. There are several tile works in the middle of each brick-work wall. Floral decorations as well as birds may generally be found as the main theme of these tile works. The dominant colors within these tiles are azure, white, blue and some red and yellow, as shown in Figure 3 to Figure 6. These are representative of Iranian traditional tiling colors.



Figure 1: Part of the palace yard, tile work in the middle of each bricked wall (© Leila Farahbod)



Figure 2: Details of tile work on the walls, some parts of which damaged (© Leila Farahbod)



Figure 3: Part of the palace yard, tile work in the middle of each bricked wall (© Leila Farahbod)



Figure 4: Details of tile work on the walls (© Leila Farahbod)

On the second floor of Sahebgharanieh palace, there are two luxury vases which are reputed to be bestowed to Naser Ald-in Shah in one of his journeys to Europe. The vases are made by the German factory "Meissen", which is one of the first porcelain manufacturer in Europe located in Dresden, Germany. Figure 7 to Figure 9 show pictures of these vases from different aspects.



Figure 5: Full front view of the vase (© Leila Farahbod)



Figure 6: Closer detailed – front view of body of the vase (© Leila Farahbod)



Figure 7: Detailed back view of body of the vase (© Leila Farahbod)

Discussion: Restoration of Meissen Vase

In this research, one of the vases which was further damaged was selected to be restored. There are six steps in a conservation and restoration project, including: **1.** Historical data collection, **2.** Conduction of

comparative studies **3.**Collection of artistic data, **4.**Methodology, **5.**Pathology, and **6.**Conservation and restoration operation.

1.Information required for the project is obtained during the process of historical data collection. Evidence found from documents of Sahebgharanieh shows that the vase is originally from Dresden, Germany. The studies reveal that in Naser Al-Din Shah's second journey to France in 1878, a pair of vases was gifted to him by Queen Victoria of the United Kingdom (1819-1901 AD), according to museum official documents.

2.The second step is conduction of comparative studies, whereby further information about the project is extracted from comparison of a variety of documents. A precise study of the vases recognized the Meissen-trademark as being used on the vase. Meissen is the oldest European hard-paste manufacturer company that was established in 1708. The production of porcelain at Meissen, near Dresden, Germany, started in 1710 and attracted artists and artisans to establish one of the most famous porcelain manufacturers. Meissen porcelains are rare and expensive, so only the upper class of society could afford to buy its products [12]. Because of the religious atmosphere of Iran at that time, Naser Al-Din Shah avoided declaring officially the name of Queen of United Kingdom in his diary [13].

3.For collection of artistic data, the vase has a height of 104 Cm and maximum diameter of 45 Cm. There are ten half-naked or nude angel sculptures either sitting or standing on different parts of the vase, whose faces are identical. The vase contains a variety of flowers and leaves from many species, with a large number of different colors and forms. Although the flowers on the vase are not identical, there is still a unity nature in their arrangement.

4.In the methodology step, technical and statistical data are obtained through different experiments and methods. The process includes: **4.1.**XRF¹experiment **4.2.**Vase rating among porcelain productions, **4.3.**Forming process, **4.4.**Attaching adjunct parts, **4.5.**drying process, **4.6.**XRD² experiment and kiln temperature, and **4.7.**Ornament and glazing procedure.

4.1. Most of the methods already presented for non-destructive inspections help to acquire knowledge on the context of the historical record of this object. An applicable object analysis method must be fast, precise, and comprehensive [14]. By characterization of the vase, it is possible to repair the vase much more easily. For this purpose, XRF and XRD methods can be used as two common techniques to help scholars do analysis on artworks [15]. The XRF experiment is a reliable technique for obtaining quantitative information on a historical object [16]. XRF experiment has proved a powerful and reliable technique to provide immediate data related to cultural heritage objects [17]. Type of the material used in the porcelain of the vase was identified using XRF method. Monochromatic X-rays are generated by an X-ray tube and then applied to bombard a very small piece of the specimen. The results showed that the porcelain vase contains 65% silica (SiO₂) and 27% aluminum (Al₂O₃).

4.2. According to the above results from the XRD test, it is possible to determine the position of vase among ceramic products. The ceramic industry is classified into four main groups. The fourth group in this classification is called "fine ceramics" or "white wares", which divides into four groups; the first one is household dishes. This is sub-grouped into dense and porous subgroups, each dividing to colored and white groups [18]. Based on the above data, the vase under study is categorized as dense white group which is, in fact, type of hard porcelain.

4.3. The method used in forming process is hollow slip casting. In this method, first a plaster mold is obtained from the main form of vase body without any attachment. Then the raw materials are prepared and gradually cast in the plaster mold. After a while, these materials are absorbed into the mold wall forming a thin layer. As time elapses, the thin layer becomes gradually thicker. Those materials not absorbed into the vase body are removed from the vase and again, new materials are poured into the mold. Again, the materials are stuck to the thicker layer, losing their water and thus shrinking. Due to the occurrence of shrinkage, it separates from its initial plaster mold, thus forming the vase body. Base of the vase is separately formed using the same technique. These two parts are internally attached to each other using a cylindrical metal rod passed through the base and body. Finally, the rod is internally fixed to the vase by using a glue, creating an integrated object from two separated parts.

4.4. Attachment of adjunct parts such as flowers, leaves and angels had been done before the body was dried. A bunch of 17 flowers over the handles, 19 flowers over the front part and 16 on the back part of the body, 62 flowers over the base, 7 flowers over the lid, 60 leaves over the base, 19 leaves on back of

¹ X-Ray Fluorescence

² X-Ray Diffraction

the body, 41 leaves over the front part of the body, 69 leaves over the handles, and 21 leaves over the lid had been attached to the vase during the process of attachment of adjunct parts.

- 4.5. The vase had been probably dried in a place without any airstream and a wet cloth had been used to improve the gradual drying process. It is better to avoid allowing any airstreams to flow through the workshop by setting the air conditioner on a constant temperature.
 - 4.6. Conducting the XRD experiment, the kiln temperature in which the original vase had been dried out was estimated. XRD method is used to specify qualitative and semi-quantitative characteristics of minerals as well as type the composition [19]. The XRD experiment is able to exhibit the composition of the material for a brief analysis [20]. The results revealed that kaolin was transformed, under temperature, into Mullite and Quartz compounds [21]. Mullite is formed in temperatures above 1200 - 1400°C [18]. Quartz is crystallized in temperatures above 870°C [21]. Considering the results of XRD, Mullite and Quartz are formed at 1050- 1400°C. On the other hand, XRF results show hard porcelain, as a kind of ceramic, anneals below 1350- 1450°C. The common temperature of the above mentioned interactions was 1400°C. The specimens collected were tested in the laboratory of Iran University of Science & Technology following the sampling stage.
 - 4.7. The ornament and glazing processes had simultaneously been carried out using manual art and then the vase was probably annealed in the kiln. In the first step, all of the glazed colors except for gold were painted on the vase using a brush and then annealed in the kiln. In the second step, the golden parts had been painted and annealed again in the kiln because it requires higher temperature [19]. Glazing art is generally an artistic process requiring a lot of patience and delicacy.
5. Pathology takes different damages into account. Generally, damages to china are categorized into four different groups, namely: 5.1. Physical and mechanical damages, 5.2. Damage to adjunct parts, 5.3. Inappropriate restoration in the past, and 5.4. Superficial contamination, as discussed in the following.
- 5.1. China has a high resistance to tough weather conditions and temperature tolerance, as compared to materials, such as wood, fabrics, etc. Typically, it is vulnerable to physical and mechanical damages which may occur in form of breaks and cracks. If the weight of the vase is particularly high and its adjunct parts are fragile, it is more likely to break [19].
 - 5.2. Physical and mechanical damages were the most obvious damages to the vase. By evaluating conditions, it can be concluded that damages were likely due to inappropriate handling. The vase had many broken and missing flowers and leaves, including 42 broken flowers and 15 broken leaves while the broken pieces were unavailable.
 - 5.3. The vase consists of two parts: the larger part forming the body and the smaller part that is the base. These two parts were attached internally. Taking a view from the outside, it can be observed that there is a thin line between the two parts caused by the parts overlapping each other. A piece of fabric has been used in order to fill the thin line between the two parts, which has become outworn over the years. This kind of damage is referred to as the damage of adjunct parts and its restoration calls for further investigation in future researches.
 - 5.4. The entire surface of the vase was coated with a thin layer of dust caused by superficial contamination that had penetrated the most inner parts of the angels, flowers, and leaves. The probability of occurrence of such contaminations increases when the museum is located in a district with heavy traffic and high rates of air pollution.
6. Restoration operation. This stage includes three sub-stages: 6.1. Cleansing superficial contamination, 6.2. Removal of inappropriate restorations made in the past, and 6.3. Conservation and restoration of physical damages.
- 6.1. Cleansing superficial contamination was accomplished using water and a small percentage of liquid soap in a way that no damage or scrap was made to flowers and leaves of the vase. Thus, a soft and smooth piece of fabric was used as the cleaner.
 - 6.2. There seemed to be a narrow trace of the improper old restorations made on the interstice of some restored flowers and leaves in the past. Acetone was injected in multiple stages into these parts using a syringe in order to remove inappropriate restorations previously made. It removes the glues applied to the vase, facilitating the detachment of broken parts. After cleaning, the broken parts were attached again using a Paraloid glue. Noteworthy to say that Paraloid B72 is some kind of strengthening material that is used as a glue for ceramic and glass, as well as to stabilize colors on ceramic. Naturally as a solid material, it can be solved in Acetone, Toluene and Thinner [19].
 - 6.3. Conservation and restoration of physical damages. In this stage, conservation and restoration of the 42 damaged flowers and 15 impaired leaves were carried out, respectively, as presented in details in

Figure 10 to Figure 13 and Table 1 and Table 2. The vase was restored on the basis of “Anastilosie” method by which certain restoration is carried out to an exact degree of the original work[22].

To prepare the surface for the restoration process, the edges of the broken parts were cleaned using water and a low percentage of liquid soap solution. Gum paste, a flexible and shatterproof material was used to form the missing parts of the flowers and leaves. It is made by mixing a cup of polyvinyl acetate, half cup of starch corn flour, and ten drops of glycerin and kneading it by hand. Then, the obtained material is heated in a pan which is lubricated by Vaseline in low temperature. There is no need to turn over the paste, so after a few minutes it is put out of the pan and kneaded again. The paste should be kept in a cold place to lose its heat slowly [19]. Using the prepared paste, the missing parts of flowers and leaves were formed similar to the adjacent ones. This job needs a lot of attention and precision. Each of the flowers with their unique forms was restored naturally and lively so that the soul of the object remained unchanged. If needed, special floral decoration tools may be fabricated and used, considering the situation and form of the flowers and leaves. Performing such a type of restoration requires the artist to have the knowledge of sculpturing as well as flower-making. Gum paste can be shaped into the forms of flower, petals, and leaves in the missing parts. There is no need to use glue since gum paste has its inherent adhesive property, as shown in Figure 10 and Figure 11. The before, during, after processes of flower and leaves restoration at different stages are presented in details in Table 1 and Table 2.



Figure 10: The author repairing the damaged flowers (© Leila Farahbod)



Figure 11: The author repairing the damaged leaves (© Leila Farahbod)

Table 1: Different steps of conservation and restoration of flowers (©



















Description	Before restoration	During Restoration	After Restoration
Dahlia			
Rose			
Cluster Dianthus			

Table 2: Different steps of conservation and restoration of flowers and leaves (© Leila Farahbod)

Name of the flower	Before restoration	During restoration	After Restoration
Composite Flower			
Restoration of Leaves			
Decoration of Tendril Leaves			

For further details of the last stage in the painting process, after a couple of hours, when the paste was dried, the painting process started using watercolor and gouache. In some cases, painting is required in two steps:

Painted surface is first given time to be dried and next it is repainted to appropriately demonstrate its quality.

It should be noted that the vase has flowers and leaves similar to living and natural ones. Thus, painting must be carefully done to maintain the natural and living state of flowers and leaves.

Finally, Paraloid 15% was used to fix colors. In addition, it acts as a glaze leading to a luminous surface similar to other parts of the vase, as shown in Figure 12 and Figure 13. Due to the fact that restoration must be reversible, the whole process may be reversed by other restoration practitioners in the future.



Figure 8: Painting the flowers (© Leila Farahbod)



Figure 9: Painting the leaves (© Leila Farahbod)

Conclusion

Qajar decorative elements and compounds such as tiling, mirror work, and plastering were used as a means of aesthetic purposes for Sahebgharaniyeh palace during the Qajar era. A combination of European

and Iranian traditional architecture has been used in Sahebgharaniyeh palace, one of Niavaran complex palaces. There are a lot of paintings and other antique objects used in the interior decoration of the palace, including two luxurious vases found on the second floor of this palace and conferred to Naser Al-Din Shah Qajar (1831–1896), one of Qajar kings who traveled to Europe more than any other Iranian kings. The vases are products of Meissen, the pioneer porcelain manufacturer in Europe headquartered in the city of Dresden, Germany. The floral and leafy decorations on both of these vases had been damaged due mainly to physical damages as well as inappropriate handling over the years. The objective of the present research was to restore and conserve the fragile flowers and leaves on one of the two vases in six steps including historical data collection, conducting comparative studies, collection of artistic data, methodology, pathology, and conservation and restoration operation. Each of the noted steps were described in details and then the restoration and conservation processes were illustrated step by step. Steps taken in this research over a few months led to the restoration and conservation of a total number of 42 flowers and 15 leaves of the vase that had earlier been damaged.

This study provides significant results, which preserve the worth and splendor of the vase that had already been damaged. The vase also includes 4 angles standing on the upper head. One of the angles is almost destroyed and requires restoration and conservation. For future study, this can be renewed through the art of molding sculpturing method.

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