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## THE ORIGIN OF THE SAFAVID DYNASTY'S HELIOTROPE BEADS IN ARDABIL PROVINCE: AN EMPHASIS ON THE VILLAGE OF BALUT KANDI

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### ABSTRACT

*This study explores the origin of the abandoned heliotrope mines in Balut Kandi, a rural area in Razey city (Meshgin Shahr County, Ardabil province). Carved heliotropes were predominantly used as ornaments during the Safavid dynasty, especially by dwellers living in Azerbaijan, Iran, and the Caucasus. Field surveys suggest that the origin of the abandoned heliotrope mines of the Safavid dynasty is Balut Kandi which, according to archeological and crystallography observations, has been the center of heliotrope mines in Northwest Iran during this historical period. Balut Kandi is full of heliotrope minerals, and some carved heliotrope minerals of the Safavid dynasty are still used as ornaments by the locals. These minerals are similar in terms of color, hardness, and chemical formula. Containing chlorite and amphibole minerals, the heliotropes in Balut Kandi occur mostly as jasper. Based on library and field surveys and museum observations, this study employs a descriptive-analytical approach to investigate heliotrope minerals in Balut Kandi as precious and semi-precious stones, both archaeologically and geologically. According to findings, heliotrope minerals in Balut Kandi are among the rare minerals worldwide and hold a great gemological inducement for investment and employment.*

**Keywords:** Ardabil, Balut Kandi, Heliotrope, Safavid dynasty, Mineral.

### INTRODUCTION

The remains of historical and ancient works, particularly carved ornamental minerals, motivate many researchers to explore the origin of these works and minerals. However, geology alone is incapable of recognizing all the mineral deposits precisely as known spots in a geographical area. Nonetheless, merging archeology with geology is a practical way to explore and assess abandoned historical mineral mines. Azerbaijan and the Caucasus are known as the first centers of famous megalithic structures worldwide. For instance, the ancient area “Şəhəryeri” in Meshgin Shahr County is known as one of the widest regions of the Iron Age and the home of human life in Ardabil province. This area has been a host for locals from the end of the 6<sup>th</sup> millennium BC until the Iron Age epoch. Şəhəryeri is located near the heliotrope mines, and carved stone slabs resembling humans are proof for claiming that locals in Şəhəryeri have been acquainted with mining, stone carving, and mineral processing since the 6<sup>th</sup> millennium BC. This study explores the archeological potentials of Balut Kandi and its association with gemstones found in this area.

## MATERIALS AND METHODS

This study employed a descriptive-analytical approach to assess data gathered as documents and photographs from libraries and field observations of museums, virtual sites, antique ornaments (used by the public), and jewelry collectors of Northwest (NW) Iran. The data were extracted after examining the minerals of the heliotropes for their chemical structure, material(s), color, hardness, and transparency, and then matching the form and the carving process of geometric shapes and their design with the ancient jewelry designs. Rafts of heliotrope minerals were first collected from various regions of NW Iran through field surveys and then matched with old carved stone works to map and locate the origin of heliotrope used in the Safavid dynasty using the Google Maps platform. The located areas were identified as maps of the Azerbaijan heliotrope mines located on the eastern sides of the mountain Sablan, Ardabil.

### *Literature Review*

The book "*Which Stone Is It?*" written by Taymor Eslamkish (Nahre Danesh Press, 2014) describes the chemical structure and formation of the concerned stone. Similarly, the 2018 book "*Stone Therapy*" written by Schaufelberger-Landherr (translated into Persian by Farahnaz Sanai Movahhed; Ahoora Press) describes the properties and therapeutic effects of the stone(s) on the body, soul, and spirit. In their article "comparative study of the Trbah of Safavid and Qajar Dynasties in the British Museum" presented in "*the third national conference on the role of Khorasan in the flourishing of Iranian-Islamic art and architecture*", Ali Asghar Kalantar and Mehrdokht Ziapour provide an image of a Safavid heliotrope ring decorated with plant designs. They further speculate that Safavid sultans, dignitaries, and officials have often decorated their rings with precious and semi-precious stones, particularly with carved agate and heliotrope.

### *Geographical Location of The Study Area*

Balut Kandi is a village in Arshaq-e Markazi rural district of Arshaq District (Meshgin Shahr County; Ardabil Province; Iran). It is located at 38°39'48" north and 38°39'48" at a height of 1422 meters above sea level (Statistical Center of Iran (Url:1, 2016). This village is on the moving path of Mughan's Shahsevan nomadic pastoralist tribes and is bordered by the Ardabil-Mughan transit road from the east, "Ghare Soo" River from the west, Haft Cheshmeh village from the north, and Hoseyn Khan Kandi village from the south. Balut Kandi is adjacent to the Razey District and is 58 km away from Ardabil and 65 km away from Meshgin Shahr (Figure 1).

Balut Kandi has a mountainous and moderate climate. The lands of this village are covered mostly with herbs and small shrubs of the genus *Astragalus*, with wheat and barley as the most important crops in the agricultural lands. This village is correctly pronounced by the locals as Bolut (or Bollod) which is a Turkish term for "cloud". Interestingly, this local pronunciation does not correspond to the word Balut (that is a Persian word for the oak tree).





**Figure 1.** The geographical location of Balut Kandi village

#### *Formation and Structure of Balut Kandi Heliotropes*

Quartz ( $\text{SiO}_2$ ) is a mineral composed of silicon and carbon oxide atoms, where there are two oxygen atoms for every silicon atom. Heliotrope is among the small quartzes or pure crystalline silica (hidden crystal). The name heliotrope (bloodstone) comes from the red inclusions that may resemble spots of blood. Heliotrope may also be known as blood jade and (in Arabic) as Hajar Al-Dam (Eslamkish, 2018, 141). Heliotrope appears in light to dark green and opaque, and the red spots inside it are due to the presence of iron oxide. The plasma can also be seen due to green chlorite and amphibole minerals (Moazez-Lesco et al., 2001:147). Heliotrope (also known as blood quartz) is a chalcedony with a green background. The name of blood quartz is due to the presence of red spots of hematite inside the stone (Yazdi, 2009:149). Heliotrope is composed of dark chalcedony with a color that spans from dark green and jade-like to red (Schaufelberger-Landherr, 2018:140). The mountain Sablan is located in the northeast of Balut Kandi and is one of the metal-producing mountains of Iran. The iron ore mines of Moeil (a village in Meshgin Shahr County) are the nearest metal mines to Balut Kandi. The iron metal in the heliotrope's veins of this ore is the source of red spots. However, most of the heliotropes in Balut Kandi are dark green and jade-like (Table 1).



**Table 1.** Characteristics and classification of heliotropes (Eslamkish, 2014:64)

Crystalline shape	Mineral name	Crystalline form	Structure and texture	Formation signs	Fracture	Polishing/transparency	Hardness/specific weight	Dust/powder color	Color
	Heliotrope	Trigonal	Highly fine	Bloodstone with	Rough and	Non-transparent opaque	6.5-7 2.5 – 2.6		Green with

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crysta	agate	hars	h
lline	miner	h	red
	als		spo
			ts

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Most natural and inorganic minerals exhibit a steady chemical composition and regular internal structure and are referred to as precious and semi-precious stones (Eslamkish, 2014:1). Sampling and testing of the stones collected from Balut Kandi reveals the color that spans from dark and light green to blood stain green with a hardness of 6.5 to 7 and a specific weight of 2.6 to 5.2. Similarly, the carving of new stone samples revealed an opaque appearance after polishing, suggesting that stones of Balut Kandi can be classified as semi-precious stones in the classification of minerals, thereby being called heliotrope. These stones were found to share a similar color and hardness with old stones of the Safavid dynasty. Probably, most of the ancient stones of the Safavid dynasty are from the heliotrope mines located in Balut Kandi village and its surrounding areas. Adapted from Eslamkish (2014), table 1 provides data on seven aspects required to identify a given mineral or crystal.



**Figure 2.** A heliotrope vein in Balut Kandi (Noorafkan et al., 2023)

Heliotrope stones in Balut Kandi are spread as veins surrounding the village and on the adjacent mountains along the south-north direction. These stones appear in protrusions and veins and/or sometimes in the form of bulk stones. In the reserves of the southern areas, the stone veins appear predominantly in false and bright jade-like colors. Most of the old carved samples appear in false color and are jade-like. There is also scattered evidence of mining and hammering in these regions. In the northern areas (i.e., along the Ghare Soo River), the veins have red-colored grains called blood spots and hold a great gemological value (Figure 3).



**Figure 3.** Heliotrope stones from the Safavid dynasty in dark and light colors and spots of blood used by locals in NW Iran, Ardabil (Nourafkan et al., 2023)

Heliotrope is classified as a semi-precious stone that has been used from ancient times in the form of ornaments, and for religious beliefs, magic, and therapeutic purposes. Heliotropes found in Balut Kandi appear in dark green, light green, and blood-stained green. Due to its widespread colors, heliotropes of Balut Kandi can be regarded as the biggest reserve of these stones in NW Iran.

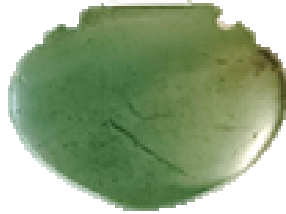
However, numerous bulk heliotrope mines exist in NW Iran, especially in Mianeh (East Azerbaijan province). Heliotropes of these regions are fully different from those in Balut Kandi, as well as from old turbahs (Mohrs) of the Safavid dynasty. However, the reserves in these areas are less deep compared to those in Balut Kandi. By comparison, heliotropes of Balut Kandi differ from other heliotropes in NW Iran in terms of veining, and their reserves are much deeper, thereby being more economically valuable.

Inspired by the works of artists of the Timurid dynasty, most of the carved heliotropes of the Safavid dynasty are in the form of leaves, vases, and hearts. These stones are mostly decorated with plant motifs that represent the paradise garden promised by the Holy Qur'an. For a plurality of art and architecture works of the Safavid dynasty in the regions of Azerbaijan (particularly in the tomb of Sheikh Safi al-Din-e Ardabili), glazed tiles are decorated with flower and vase paintings. In addition, enthused by the belief in life after death and heaven, most of the tombstones around the tomb of Sheikh Safi al-Din-e Ardabili are carved with flowers and flower vases. In a research entitled "Study of Symbols and Motifs of Safavid and Qajar Dynasties Ornaments", Cooper (2001) ponders leaves as a symbol of fertility, growth, and revival, as well as green leaves as a symbol of hope, revival, and restoration (Cooper, 2001:55). People in the Far East ponder the leaf as a symbol of prosperity and happiness (Chevalier and Gheerbrant, 2000:77). However, most of these designs are vases rather than hearts. Thus, heliotrope stones with blood stains are mostly in the form of hearts (Figures 4 and 5).





**Figure 4.** A filigree pendant made up of a precious stone from the end of the 12th century)  
(Gheybi, 2012:294)



**Figure 5.** A heliotrope of the Safavid dynasty from the collection of Hossein Behzad WakilAbad  
in NW Iran) (Noorafkan et al., 2023)

During the Safavid dynasty, most of the works were ornamented with motifs of plants, geometrical designs, and inscriptions. These works were often decorated with silver and gold metals inlaid with precious and semi-precious stones (Amiri et al., 2019:27). In a 2020 study entitled “Symbological study of motifs and ornaments of the Safavid and Qajar dynasties”, Bagheri reports that craved heliotrope stones are similar to silver pendants of the 11<sup>th</sup> and 12<sup>th</sup> centuries of Hijri in terms of symbology and design of form and shape. This report indicates that heliotropes used by the natives belong to the 11<sup>th</sup> and 12<sup>th</sup> centuries of the Safavid dynasty (Bagheri, 2020:22).

The great mystery of illuminated manuscripts in Islamic art is the regeneration of plants, especially leaves and stems. On the other hand, Byzantine iconoclasm has created abstract Islamic forms, while Islamic art has been created to prevent idolatry (Chevalier and Gheerbrant, 2000:183). Most of the heliotrope samples used by locals in NW Iran are either with or without metal borders. A sample in Figure 6 is a metal-free design with a longitudinal perforation through which the necklace’s chain paths. During the Safavid dynasty, heliotropes were mostly used in the form of engraved necklaces, rings, and turbahs.



**Figure 6.** A pendant made up of agate stone belonging to the Safavid dynasty, provided by Mustafa Mousavi collection in NW Iran) (Noorafkan et al., 2023).

As shown in Figure 6, a gray agate with white stripes belonging to the Safavid dynasty and collected from NW Iran is carved in the form of a vase and has a silver frame. Azerbaijan is a region through which Iran's semi-precious stone belt passes. This region is a center for the largest reserves of opals in Iran. The term “agate” emanates its name from the river Achates in Sicily, Italy (Haj Alilou, 2001:427-428). These agates exhibit a crystallographic hexagonal structure and are well characterized by fine layering and various colors. Their chemical formula is  $\text{SiO}_2$  and they have a density of 2.61, a hardness of 6 to 7.50, and a refractive index of 1.54 to 1.55. Notably, the agates of Qezel Yataq village (Mianeh County) have a glass appearance after polishing (Tavakkoli, 2001:67-65). Agate is usually composed of consecutive bands of chalcedony and quartz (Bauer, 1977:208).



**Figure 7.** A gold pendant of the 10th and 11th centuries of Hijri belonging to the Safavid dynasty made up of gold leaf, ruby, and turquoise) (Bagheri: 2020).

The sample in Figure 7 follows two general designs, implying the interest of the artist in the Safavid dynasty in vases and flowers. The vase design in the center of the pendant is inlaid with five gems, one of which has been lost (Afroogh and Mohammad, 2015:61). In the larger vase, there are seventeen red rubies with turquoise gems. Such as nested vase design was popular during the Safavid dynasty, mostly due to religious issues and the creation of life. Furthermore,

the designs containing flowers and vases (similar to those in carpet weaving) have been ordinary and used from the Safavid dynasty and are known as Shah Abbasi flowers.



Figure 8. Sang Khon, northwest of Iran, discovery site, middle of Zarshlo village, (personal collection of Behzad Noorafkon) photo (Noorafkon, 2024).

Heliotrope stone (blood stone) is one of the semi-precious stones, but because of its green and red color, its rarity has many customers in the world. During the Safavid period, the precious ring of the Safavid kings was made of bloodstone, and at the time of their death, they broke the ring according to customs. It was done by field and field investigation and sampling from the corner of the northwest of Iran from three places, Zarshlo in the middle, Irlu in Ardabil and Balut Kandi in Ardabil, and by cutting the collected samples it was determined to match the Safavid samples. that the type of jade-like blood stone used in the ornaments of the people of northwest Iran is from the stones of Balut Kandi village, located in the east of Sablan mountain, Ardabil. The healing properties of blood stones include: purification of body organs, especially kidney, liver, spleen and blood. Blood stone is very effective for diseases, bladder, and blood circulation and gives its users strength and life force, and strengthens the sense of smell, liver, lungs, and muscles. This stone is very effective for varicose veins and injuries caused by it (Schaufelberger-Landherr, 2018:140). Ancient Roman soldiers believed that blood stone has the ability to slow down bleeding and used it. Indians believe that people can prevent bleeding by placing blood stone on wounds and injuries, immersing it in cold water, this scientific theory is due to the fact that the iron oxide in the stone is astringent and effective.(url:2,2021).



**Figure 9.** Seal of the Safavid era, leaf, British Museum, (Ziapur, Kalanter, 2023).

During the Safavid era, every king who reached the position of king was carved a bloodstone ring, which was used as a royal seal only for the king, which was used in orders, and at the end, after the death of the king, the ring was broken so that it would not be used. Do not use.

## CONCLUSION

Studying precious and semi-precious stones in museums and collections allows us to find the age and origin of these stones from their symbolic design, forms, and shapes. Carved heliotropes are grouped as semi-precious stones used with designs of leaves and vases (in the form of ornaments) during the Safavid dynasty in the 10<sup>th</sup> and 11<sup>th</sup> centuries of Hijri. This art was only found during the Safavid dynasty and in the Azerbaijan region while having no foreign counterparts. Field surveys in the stone mines of Balut Kandi neighboring areas confirm that the original heliotrope mine in Balut Kandi has been exploited for making ornamental and therapeutic objects (especially for the Shahsevan women) during the Safavid dynasty in Azerbaijan. Accordingly, investigating old carved minerals allows us to identify the abandoned mines of these precious stones in historical periods. Balut Kandi is a good example to show these historically valuable and old abandoned mines with great potential due to its big reserves of heliotropes for investment and employment through gem carving. In addition, merging archeology with geology can link industry with mining. Nevertheless, precious and semi-precious stones were given great importance in the northwest of Iran during the Safavid era, and the exploration, extraction and processing of gem stones was one of the important priorities of the Safavid rulers.

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**ETHICS STATEMENT:** I promise that the scientific findings in this article are based on my own field research. And other materials are given as reference sources.



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