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Re-tracing Copper Metallurgy in the Shahdad Region (3rd Millennium BCE)

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(1-17)

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Abstract

Shahdad is located on the western side of the Lut desert in the central Iranian Plateau. Shahdad has been a major focus of archaeological and archaeometallurgical research in the region due to extensive metallurgical activities documented at the site during the Bronze Age and for having the most abundant remains of copper metallurgy in southeastern Iran. The metallurgical developments at Shahdad have been well documented due to the previous studies by researchers working on the vast peripherial area of Shahdad dating to the period when the settlement was a permanently occupied city during the 3rd millennium BCE. Our latest surveys at the site have identified copper extraction metallurgy across a very large area based on significant amounts of ancient metallurgical remains on the surface including copper ores, moulds, crucibles, furnaces and complete metal tools. Pottery and slag have been observed macroscopically and microscopically in order to find particular traces of the metallurgical processes used during the EBA of Shahdad. Preliminary observations supply a new synopsis by re-tracing the ancient metallurgy at Shahdad. This research has revealed that the metal-workers of Shahdad mainly used copper sulphide (covellite) as their primary Cu-bearing ores. Three different slag types were identified according to their color, external texture and fabrication. Pottery samples were associated with copper metallurgy based on their phase characterizations, which were interpreted as the artefact of a distinct step in the metallurgical production process. This pottery is very porous and rough-textured due to the particular additives, leading to the formation of copper carbonate and copper oxide enrichments in the voids of the ceramic fabric.

Keywords: Shahdad, Archaeometallurgy, Copper Smelting, Early Bronze Age, Craft Specialization.

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Introduction

Copper extraction and copper alloying production have been at the center of archaeological and science-based research approaches for well over a century (Wertime, 1964; Muhly, 1985; Xie, P., Rehren, Th., 2009). Once archaeometallurgical studies turn to the question of the origin of alloying, the Iranian Plateau becomes an important area for examining this and related innovations (Pigott, 1999, 2004). Copper metallurgy developed on the southeastern Iranian Plateau and the neighboring Makran region during the seventh millennium BCE, less than a millennium after the earliest documented use of metal in the form of native copper at Çayönü Tepesi in Anatolia (Muhly, 1989; Maddin et al., 1998; Dardeniz and Yildirim, 2022; Chernykh, E., 1997; 2009).

On the 4th of December 1964, 58 years ago, the journal "Science" published a report about archaeometallurgical activities over an area extending from western and central Anatolia across the Taurus and Zagros mountains to the edge of the central desert of Iran by Theodore A. Wertime (Wertime, 1964). In his manuscript, "Man's first Encounters with Metallurgy", Wertime proposed that the early metalworkers had the distinctive know-how of working with ores bearing copper and other metals in the Iranian and Anatolian culture-areas (Wertime, 1964). Further research has shown that the extraction, refining, and trade of metals developed over the course of several millennia on the Iranian Plateau, in concert with regional-scale developments extending all the way to Mesopotamia (Ottaway, 2001; Pigott, 2004; Weeks, 2016).

The development of pyro-technology and metallurgy on the Iranian Plateau began with the use of native copper in the 7th mill. BCE (Wertime, 1964; Muhly, 1985). The first evidence for smelting copper ores is found at many locations dating from the late 6th mill. BCE onwards, with the first reduction of copper oxides (cuprite) and carbonates (malachite), attested during the Neolithic period (8th/7th mill. BCE). Copper from sulphitic copper ores was already being produced as early as the 6th to 4th mill. BCE (Emami and Shahsavari, 2020). The next step in technological development occurred during the Chalcolithic period, which consisted of the use of elements such Pb (lead), As (arsenic), Sn (tin), Sb (antimony), and Zn (zinc), for creating various alloys. The ore type processed during this stage is related to the size, number and type of the objects produced. This period is characterized by the use of arsenical copper and the rise of early bronze. Antimony-rich copper ores from the Chah-Messi and Toroud areas in the northern part of the central Iranian desert, employed for creating bronze objects, lead to the accidental production of Cu-Sb alloys in some parts of the Iranian plateau (Emami 2014). The metal objects and ingots from Haft Tappeh provide an important insight into the tin-bronze technology present in southwestern Iran Plateau during the Bronze Age (Rafiei-Alavi et al., 2022).

Shahdad is one of the most important cities located on the southeastern Iranian plateau, and is definitely one of the key localities based on the metallurgical activities there. Despite the cutting edge status of copper production at Shahdad, and research into the site's metallurgical industries, it is still a matter of debate from where and how the copper ores used at the site were extracted. These include the role of metal-producing communities within a larger economic setting (Meier and Vidale, 2013). Consequently, the development of metallurgy

was essentially the most crucial step in the evolution of material culture during the EBA, since it represented the processing of a new class of high temperature materials, namely metals. During the Neolithic, it seems that the use of metals was largely based on selective collecting of colourful and altered ores found in the search for decorative materials. Decorative objects made of metals were first formed by cold-working native metals (e.g., copper), followed by forming them through warm-working, followed by development of true pyrotechnology. Pyrotechnological processes (e.g., metallurgy, pottery, and glass-making) required more exact information about raw materials, their behaviour at high temperatures, and their sustainability under extreme temperature conditions. It is worth mentioning that four crucial metallurgical sites in periphery of the Iranian Plateau with evidence for the smelting of copper at this early stage include the Chalcolithic site of Tal-e Iblis (Caldwell, 1967; Frame, 2004), Tappeh Qabrestan (Majidzadeh, 1979), Shahdad (Hakemi, 1992) and Tappeh Hissar (Thornton, 2009). During the Chalcolithic, the melting of copper was often performed using a variety of different types of crucibles. Such crucibles were used for the melting of copper and the smelting of copper oxides and carbonates (Rostoker et al., 1989; Hauptmann et al., 2003). In ancient copper smelting furnaces, the temperature roughly reached 1200° C and even higher (Hauptmann et al., 2003; Rehren et al., 2012). More recently, the recycling of metals and metallurgical remains has received much attention and has been the focus of scholarly debates. In addition to the metallurgical processes themselves, scholars have focused on metallurgical-related materials and objects such as specialized ceramics, crucibles, and tuyères, which were already used as relatively heat-resistant materials, each of which has a huge impact on our understanding of the evolution of pyrotechnology (Hein et al., 2013).

Metallurgical advancement on the southeastern Iranian Plateau has been considered by means of the pioneering production and use of arsenic-copper (arsenic Bronze), which has been advanced in Mesopotamia once the new alloy of Tin Bronze was commercialized in the socio-economic situation of the region (Lamberg-Karlovsky, 1967; Thornton, 2014; Weeks, 2013). Since then, archaeometallurgical studies focusing on the use of metals and alloys in southern and southeastern Iran became the focus of many studies (Maddin et al., 1977; Thornton, 2010; Wayman and Duke, 1999). Due to the wide scatter of cultural materials over a broad region, Shahdad might be considered a true centre of metal production and metallurgical ceramics. Accordingly, the area might prove to have been a commercial centre for the trade and exchange of metallurgical raw materials and goods to neighbouring areas. Our recent survey presents several new ideas based on previous (sometimes conflicting) archaeological reports on this topic and attempts to introduce insights which can settle a major debate on the nature of copper production at Shahdad.

Archaeological Highlights of the Region

The western edge of the Dasht-e Lut desert—where Shahdad is located—is situated between the eastern flanks of the heavily folded Kerman Mountain Range and the Lut desert (Fig 1). This is one of the key regions of the Iranian Plateau for studying the pathways and trajectories of early urbanization (Eskandari 2019, Eskandari et al. 2021). Previous excavations at the Bronze Age site of Shahdad in

the Dasht-e Lut, with its burials containing rich and sophisticated artifacts, fully justified its definition as an advanced early urban center (Hakemi 1997, Salvatori and Tosi 1997, Hiebert and Lamberg-Karlovsky 1992). Moreover, southeastern Iran in general is known to have many ancient sites associated with early metallurgical activities, most notably Tal-i Iblis. Analysis of the data of Tal-i Iblis has confirmed the presence of copper smelting at Tal-i Iblis from at least the early fifth millennium BCE, if not earlier (Caldwell 1967, Frame 2004).

Recent investigations by one of the present authors (N.E.) at Tal-i Iblis have confirmed this early date for this innovation. Hakemi's excavations (1997) at the site of Shahdad led to discovery of more than 700 metal objects made of bronze, lead, silver and gold. 670 of them are bronze objects, including 350 vessels, 239 pins and 81 other objects, such as axes, stamp seals, rings, bracelets, instruments, plates, flag and weapons. In addition, his excavations at Workshop D in the artisan's quarter of Shahdad led to the discovery of a great complex of Bronze Age copper smelting installations. Most of the metal artifacts found at Shahdad were composed of arsenical copper and only a few have proportions of tin in their composition (Meier 2011). Found in situ in Workshop D were furnaces, crucibles, moulds and metal objects, proving that metal production occurred at the site. In this paper, we aim to highlight some of the key aspects of the ancient metallurgy documented at Shahdad and their implications for our understanding of the archaeometallurgy of southwestern Asia as a whole.

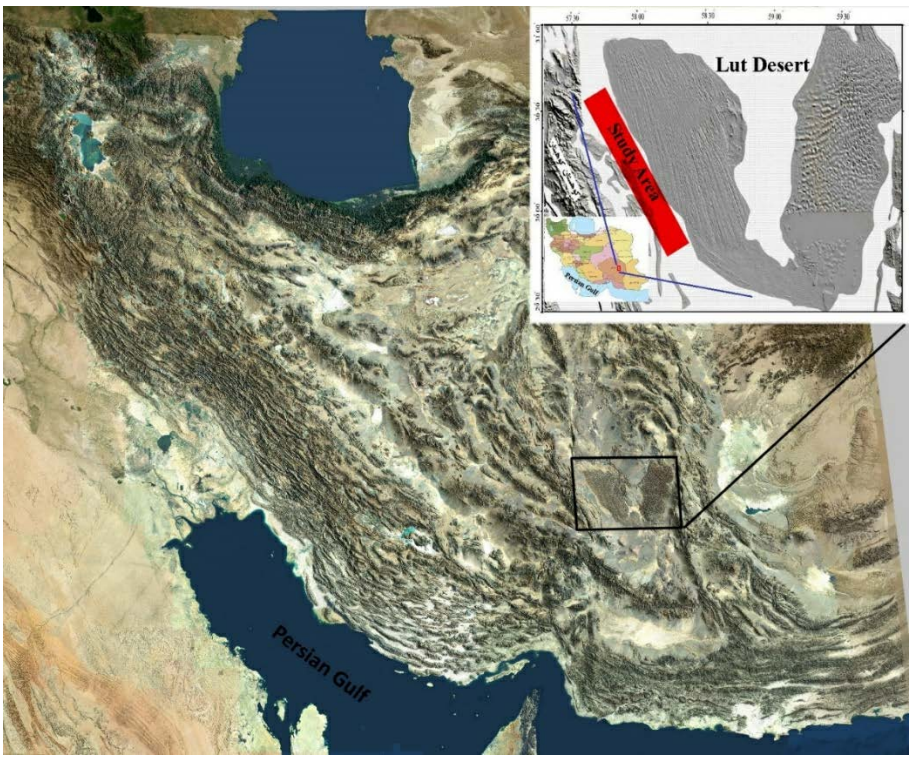

Fig 1: Map showing the study area to the west of the Lut Desert

Shahdad

The history of archaeological activities at the site of Shahdad dates back half a century. Thirteen seasons of archaeological excavations and surveys at the site

have conclusively shown that it was an important urban center on the Iranian plateau during the Bronze Age. Excavations led by Ali Hakemi of the Archaeological Service of Iran began in 1969 and continued until 1978 (Hakemi 1997). Hakemi's excavations led to the discovery of many graves, altogether containing several thousand spectacular grave goods (Hakemi 1997), including impressive human statuettes, numerous stone and ceramic containers, as well as ornamental finds. As a result of the excavations, a total of 383 graves were uncovered. In the 90s, excavations at Shahdad were resumed under the direction of M. A. Kaboli (1997, 2001, 2002) for four seasons. Kaboli concentrated excavation in well preserved residential areas of the site. His important work in the northern extension of the 3rd millennium BCE settlement uncovered two architectural complexes. These two residential compounds noticeably increased our understanding of the urban fabric of Shahdad, previously only known through its graves and workshops. The finds in these newly exposed areas demonstrated the intensive involvement of Shahdad in the processing and trade of valuable raw materials.

During recent fieldwork at Shahdad (2016), one of the present authors aimed to determine the extent of the metalworking area of the site. The materials related to metalworking activities such as bits of slag are scattered across the north-eastern quadrant of the site, with an extension over more than 10 hectares (Fig 2). Workshop D, which was already excavated by H. Hakemi and Bayani (1997), is located in this area, where they found an architectural complex with five small and rather modest houses, built using pisé and a single-line of mud bricks, that appears to have been suddenly knocked down by a disastrous flood that sealed the rooms' contents (Vidale 2006-2008, Eskandari et al. 2021). Although Hakemi (1992, 1997) insisted on considering the elaborate ovens found in each house as copper-processing furnaces, they are more likely domestic fireplaces (Meier 2011; Meier 2017). Reanalysis of the distribution of the artefacts found in these excavations suggests that—notwithstanding the undeniable presence of crucibles, casting moulds, pits lined with copper slag and other less identifiable copper-smelting and/or melting indicators—the most evident activity performed in many of these rooms at the precise moment of the flood was the breaking and grinding of large amounts of copper ore on large granite slabs using pestles (Eskandari et al. 2021).

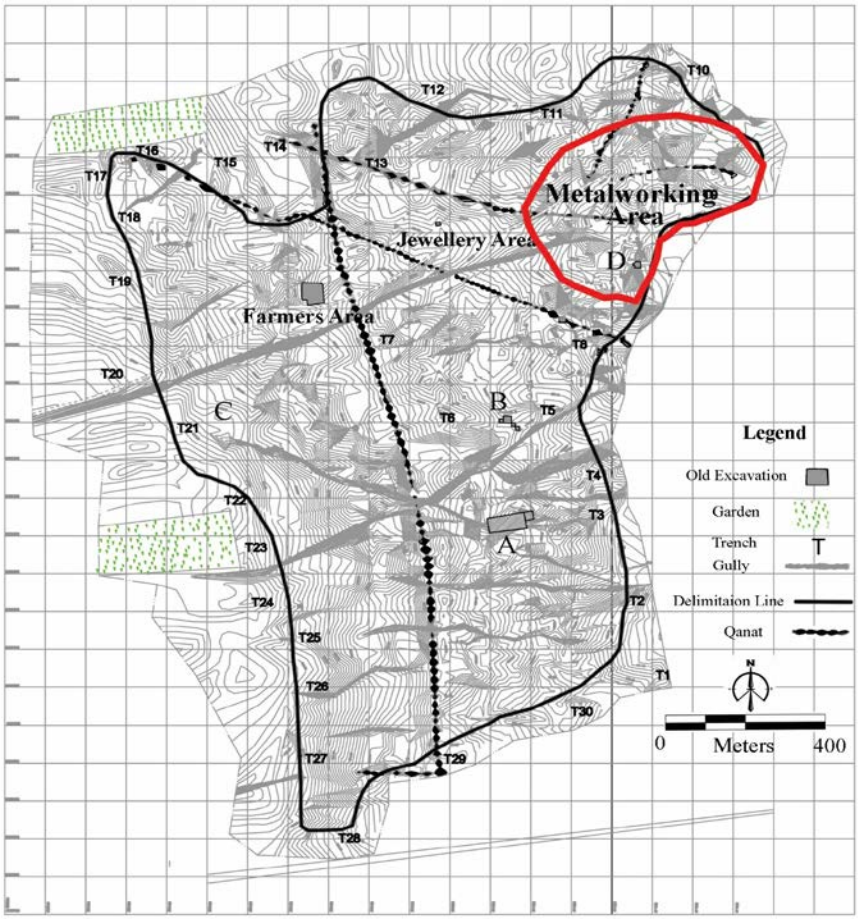

Fig 2. Topographic map of Shahdad showing the metalworking area of the site.

Materials and Methods

The distribution of ceramics and slag extents over the entire area and there is no sign of separation among the localities of enrichment (Fig. 3). Slag and ceramics under analysis here were collected from surface surveys of the area (Figs. 4 & 5). The ceramic and slag specimens were first inspected macroscopically and then examined from a mineralogical point of view. The slag pieces from Shahdad are characterized by their small size overall, ranging only from 2-4 cm. They are mostly black in colour. Numerous specific textures still remain on the surface of the slags, including from copper smelting residues such as colour-mélange structure (green-dotted copper accumulations as well as reddish bands formed due to the oxidation of iron near the surface). The shapes and external traits of the slag identify these specimens as belonging to the categories of flow-slag, herd-slag and Calotte, providing information about their process of generation (Bachmann, 1982). Unfortunately, slag has different forms and traits, even resulting from similar smelting process, or alternatively, can show similar forms from diverse smelting processes (de Rijk, 2003). Further analysis is therefore needed to reconstruct the processes used at Shahdad.

In the first stage of the research, some of samples were only analysed with optical and reflected light microscopy. Observations were carried out on the cross-section of slag and ceramics by using Zeiss Primo Star Microscope (Zeiss). The

Primo Star Microscope is well-suited for reflected light imaging and mineralogical studies on archaeological materials. The images were then studied with the Zeiss Calypso software package.

Fig 3. Shahdad; the view from the western part and the scatter of ceramics and slag on the surface.

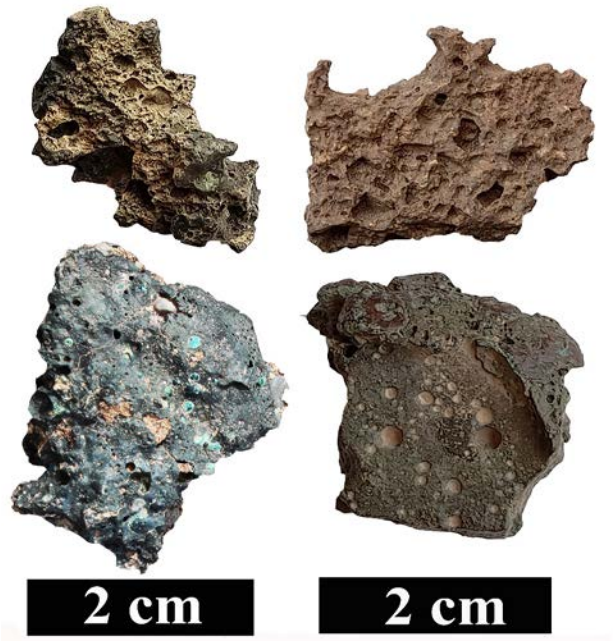

Fig 4. Diverse slag types with copper residues on the surface. They are classified as based slag and smelting slag due to their bubbly surface character.

The ceramics from Shahdad are very unique in terms of their shape, form and surface characteristics. The typical Shahdad wares are the predominant pottery type on the explored surface of the area (Fig 5). These are very coarse grained, with many dark mineral additives, which were surprisingly recognized as pyroxene. The matrix and core of the ceramics are very clayey and reddish in colour. The additives appearing on the surface are very well processed and have roughly the same size. The surface of the ceramics seems to be made very primitively with no decoration and shows that the ceramics were mostly were baked with insufficient temperature, based on the bichromy observed in cross-section (Fig 5). These ceramics are normally very light, but surprisingly have dense fabric structures with less than expected porosity.

Fig 5. Shahdad predominant pottery type with bichoromy character in section and very coarse grain fabrication.

Results from Technological Metallurgical Remains

Based on the surface character of the observed slags—such as high porosity, flow structure, low weight and dark colour—some ought to be classified as progress slags, mostly smelting and roasting slags (Fig 4) (Hauptmann 2017; Hess et al., 1998). Flow-slag is the dominant form of slag in Shahdad, however. These pieces were formed during the pouring from the furnace after smelting and contain pores on their upper surfaces due to the loss of gases through rapid cooling (Liu et al., 2015). Flow-slags are compact in structure and are grey to metallic grey in colour. Slags which were cooled within the kiln, in contrast to the flow-slag, show no flow structure on the surface and contain many heavy metal inclusions that were absorbed throughout the smelting. These mainly contain residues of copper as tiny droplets on the surface (Keesmann et al., 1983a). Slag formed at lower temperatures displays more pores due to the fast evaporation of volatiles from the top surface of the melt during solidification. In this stage the slag doesn't have a high viscosity due to the high temperature (Bourgarit, 2019). The slag that formed at the bottom of furnace contained more metallic residues, according to the specific weights of the progressively heavier metallic constituents. Heavy metals dropped down by means of specific weight (McDonnell, 1991). Calotte-form slag appears regularly in ancient iron technology. Their oval-bottomed form is generated by the shape of the base of the furnace (Keesmann et al., 1983b).

The slag from Shahdad was classified by means of their glassy matrix and specific mineralogical characterization. The slag cross sections are illustrated in Fig 6. In addition to slag samples, two pieces of ore were studied to obtain information on the industrialized ore composition in Shahdad. All of the studied slags had high porosity with many accumulations of copper, containing phases within or surrounded by them. The greenish surface of Sample I is due to the

presence of pyroxenes within the glassy part of the slag. Pyroxene is an interesting phase in archaeometallurgy, because the ratio of $FeO:SiO_2$ is 1:1. Pyroxene is frequently reported in archaeometallurgy and its formation is due to low-temperature reactions; its existence provides data on the viscosity of the samples and thus the ore which has been smelted (Hauptmann, 2007; Hauptmann et al., 1999). Samples II and III present a black matrix, resulting from the high temperature of melting and production of viscous glassy fraction (Bottaini et al., 2016). The surface structure of these slags reflects high oxidation processes, which appear as reddish and yellowish zones on the surface of the samples.

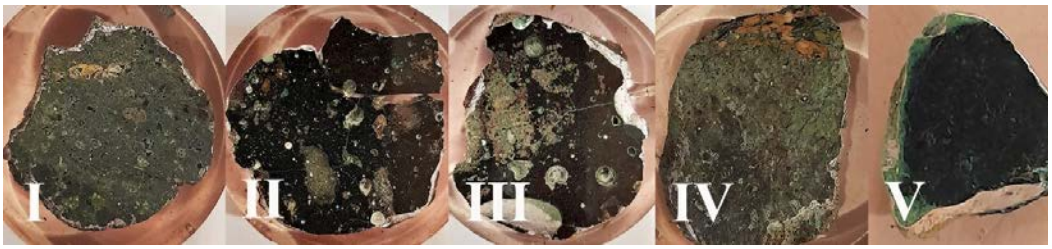

Fig 6. Studied samples by optical microscopy

For preliminary research on slag, we can consider their formation from three points of view (Emami, 2017);

- Glass forming minerals and their conditions, which provide information on the temperature and the raw material composition;
- Metals and metal droplets, which provide information on the composition of metals;
- Ore, which supplies information on the kind of ores which were smelted.

Archaeometallurgical remains usually provide evidence of metallurgical constructions and associated features such as furnaces, ceramic vases, tuyeres. They are assumed to be components of metallurgical “chaines operatoires” in a region (Thornton and Rehren, 2007). The slags studied here are mainly characterized as related to copper smelting. Copper slag mostly comprises various crystallised oxides (e.g., iron, manganese, etc.), olivines, and pyroxenes inserted in a more-or-less glassy matrix. The mineralogy of these slags is directly related to the initial charge and the working conditions predominant in the production process (Bourgarit, 2019).

It has long been assumed that the earliest types of copper ore (copper-bearing ores) that were smelted were oxides and carbonates, and that the application of sulphides was practiced later in time (Hauptmann et al., 1999; Kaniuth, 2007). As a matter of fact, the extraction of metals from sulphide bearing ores might be very complex in the past (Emami and Shahsavari, 2020). Additionally, it can be suggested that the detailed metallurgical process was influenced by the geological formations and types of ore outcrops naturally occurring in a given region. During the Chalcolithic of Iran, oxide extractive metallurgy was much easier than an industry based on sulphides. The most important copper sulphide in prehistory was chalcopyrite $CuFeS_2$. To extract copper from this structure, Fe and S should be separated, which was too complex for the earliest phases of copper-smelting. In this case, the great affinity of Fe to Si enables the separation of Cu, followed by the formation of pyroxene within the

glassy matrix of slag (Figs 7). However, the great affinity of S for bonding to Cu has proven to support the separation of Cu from the slag by its high gravity as tiny droplets (Hezarkhani and Keesmann, 1996). Important phases in iron-rich silicate slags have been studied and introduced in the system of $CaO–FeO–Al_2O_3–SiO_2$. Based on this system, dioside and hedenbergite (i.e., clinopyroxenes) often occurred within the structure of slag samples (Keesmann 1989). Consequently, these examples have direct relevance speculation regarding the use of crucible-based sulphide for smelting processes. It is possible that the EBA metallurgical tradition was interested in surface-deposited carbonates and chlorides for co-smelting oxide/sulphide (even sulpho-arsenides) directly in the crucible. In the case of Shahdad, surprising evidence includes the existence of pyroxene as silica association to Cu-bearing ores and the sulphide droplets, which are both predominant as regards the efficiency of extraction (Fig. 8). The neo-formed copper-sulfide droplets in a composition near to chalcocite (Cu_2S) or covellite (CuS) can be removed from the silica melt due to their low melting points and viscosity, appearing within the glassy slag (Hauptmann et al., 2003; Emami 2018). The astonishing outcomes revealed that the predominant extractive ore in Shahdad was covellite (CuS) (Figs 9, 10). The only other example of extracted copper from covellite was found at Toroud in northern Iran (Emami, 2014). Covellite can be distinguished from chalcocite through its typical orange inner reflex colour in dark field microscopy (Emami, 2002).

Fig 7. Pyroxene in the slag as sign of extractive sulphide in the early stage of separation

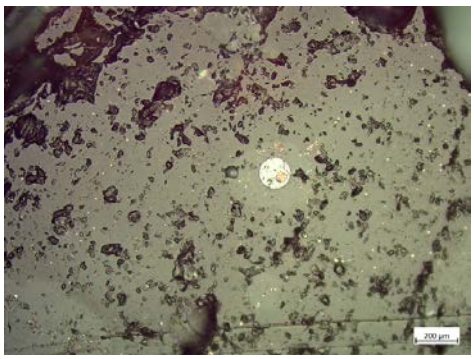

Fig 8. Copper droplet within the glassy slag. Copper enriched in the core and surrounded by sulphide.

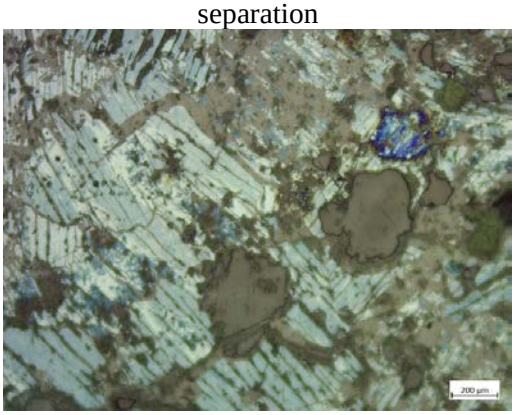

Fig 9. Covellite crystal under normal light

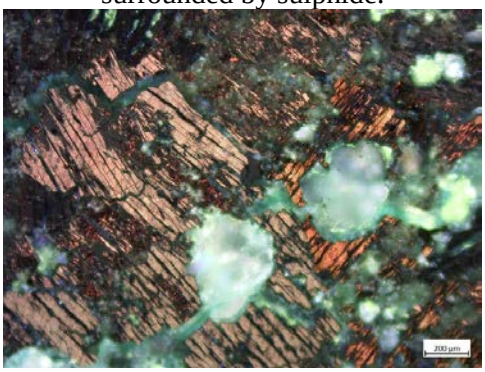

Fig 10. Covellite crystal under polarized light in dark field with oil condenser.

Pottery

The ceramics investigated at Shahdad have proven to be a very interesting aspect of metallurgy during the early Chalcolithic of Iran. In the first stage of study, we examined the ceramic matrix and temper. The matrix of pottery with dense fabrics and low porosity is similar to ceramics used for other purposes (Maggetti, 2001). The reddish colour of the matrix is caused by the high Fe content of clayey reservoirs, and/or the high temperature reaction and oxidation process of Fe embedded within the crystal structure of some clays, e.g., chlorite. This aspect will be studied in another complimentary framework in the future. The additives consist of quartz and high amounts of augite (based on the observation via geological loupe, as well as their birefringence color) that appear to have all been crushed fragments of igneous rock. According to the composition of the body, such pottery is suitable for bearing high temperatures, like other highly temperature-resistant clays used in crucibles (Rademakers and Farci, 2018).

With regard to their use-function, the cearmics from Shahdad evoked exactly the old question of “melting or smelting?” Smelting requires related devices or associated utensils, such as crucibles, which can come in the form of ceramic vessels (Craddock, 1999). It has often been difficult to discern the type of metallurgical actions that known crucibles were used for, however (Humphris et al., 2009). The ceramics used as crucibles indeed have the same characteristics as general clay-based pottery. Moreover, smelting a copper ore may affect the ceramic texture and alter the fabric through the melting process. Specifically, the cooling process may leave layered traces of copper within the inner surface of a ceramic (Fig 11). The first preliminary observation of ceramics in question should concern their design, shape and fabrication (Bayley and Rehren 2007). Secondarily, microscopic observation of the many diverse characteristics should target signatures of the metal charge within the fabric. This is difficult to discuss the multiple usages of crucibles, which may have been involved in the melting of different metals or metallic bearing rocks, due to the chemical heterogeneity of their composition. Thus, the interpretation of these suspected crucible fragments requires a strong elemental interpretation and discussion. Despite these limitations, a great deal can be learned from Shahdad by means of different designs in the side handle of the crucibles, which was routine as far east as Iran (Thornton 2009; Rehren et al., 2013).

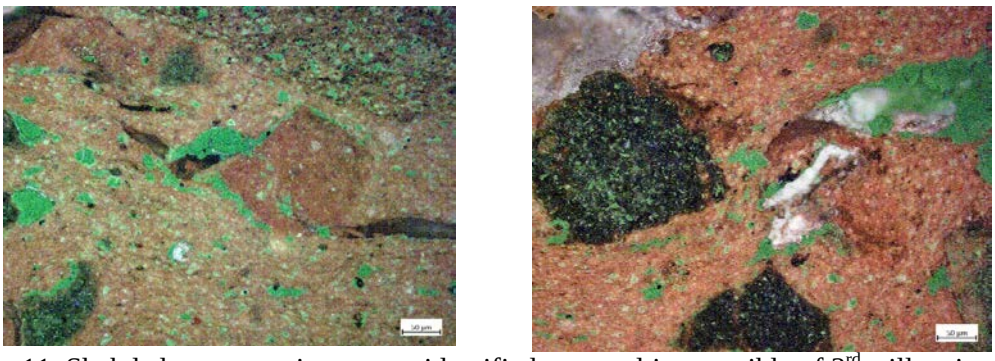

Fig 11. Shahdad coarse-grain pottery, identified as asmelting crucible of 3rd millennium BCE. Note the remains of copper carbonate and copper oxide within the ceramic fabric.

Conclusion

We have presented several slags and ceramics (crucible fragments) from Early Bronze Age contexts at Shahdad, southeastern Iran. The metal extraction process has traditionally provided the majority of the knowledge on metallurgic and pyro-technological processes on the southeastern Iranian Plateau during the Early Bronze Age. This study has revised some aspects concerning metallurgical processes performed at Shahdad and their subsequent impact on the mineralogical characterization of the remaining metallurgical objects, e.g., slag and technical ceramics. The artefacts have been investigated microscopically and mineralogically in order to identify traces that can help identify the raw ores used and their chemical compositions. Our results indicate that the presence of Cu, Sn, Fe, and S all correlate most closely to chalcosite and chalcopyrite bearing ore reservoirs, and furthermore, that these were not purely accidental choices. Additionally, the data suggests that ores belonging to the ophiolitic gangue reservoirs may possibly come from Makran orogeny.

Microscopic observation of the metallurgical remains from Shahdad has indicated that the copper ores used at the site consisted primarily of covelline bearing ores. On the basis of the information gathered in this study, three technical objectives should be highlighted for future study. How was copper production organized, and could there have been hierarchical structures in metallurgical operations occurring in the domestic periphery of Shahdad? What was the complete “chaine operatoire,” from ore processing to the final product? How were the observed technological features fitted to Shahdad socio-ecological conditions, and is it possible to reconstruct a technological lineage of any kind? As a matter of fact, the smelting strategy observed was implemented under controlled access, including the repertoires available at the time, the raw materials in use, and technological circumstances. Finally, the evident complexity of metallurgy at Shahdad—and the amount of the site’s area that remains to be explored through excavation—may eventually allow us to establish more precise knowledge of the timing of innovations and/or the adaptation of technological features which have been observed in the overburden of Shahdad and as yet have not been documented in situ.

Acknowledgments

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ردیابی مجدد متالورژی مس در منطقه شهداد (هزاره سوم قبل از میلاد)

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چکیده

شهداد در حاشیه غربی بیابان لوت واقع شده است و یکی از مراکز شهرنشینی اولیه را در خود جای داده است. این منطقه تاکنون موضوع پژوهش‌های باستان شناختی و فلزشناسی متعددی بوده است. محوطه عصر مفرغی شهداد مدارک و شواهد فراوانی از فعالیت‌های فلزکاری کهن را ارائه کرده است و پژوهش‌های پیشین روند توسعه تکنولوژیکی فلزکاری و اهمیت آن در این محوطه را تا حدودی نشان داده است. طی بررسی‌ها و کاوش‌های باستان شناسی صورت گرفته در محوطه شهداد، مدارکی نظیر سنگ خام مس، قالب‌های فلزگری، بوته‌های فلزگری، کوره‌ها، سرباره‌ها و اشیای متعددی فلزی مربوط به هزاره سوم پ.م بدست آمده است. طی بررسی صورت گرفته توسط نگارندگان در محوطه شهداد، نمونه‌های سرباره فلز و همچنین قطعات سفال به منظور انجام مطالعات ساختارشناسی و ریز ساختارشناسی برداشت شد تا بتوان به اطلاعاتی از تجربیات صنعتگران ساکنان منطقه در هزاره سوم پ.م دست یافت. در محوطه شهداد، سه گونه متفاوت سرباره فلز با توجه به رنگ، بافت بیرونی و ساختارشان تشخیص داده شد. نتایج مطالعات مقدماتی انجام شده منجر شد تا اطلاعاتی جدید از فلزکاری کهن در شهداد داشته باشیم. نتایج نشان داد که فلزکاران شهداد به طور عمده از مس سولفیدی استفاده می‌کرده‌اند. از نتایج جالب توجه این پژوهش می توان به سفال‌های قرمز محوطه اشاره کرد که به نوعی در ارتباط با فلزکاری در این محوطه بوده‌اند. سفال ها حاوی ترکیبات کربانته و اکسیدی مس هستند که نشان از ارتباط با صنعت فلزکاری شهداد دارد و در فرایند استحصال مس مورد استفاده قرار گرفته اند.

واژه‌های کلیدی: شهداد، فلزکاری کهن، ذوب مس، عصر مفرغ، تخصص پذیری پیشه وری.

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The Newly-Donated Urartian in Scription from Bastam by Rusa II

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(19-36)

Abstract

The Urartians ruled over the shores of Lakes of Van, Sevan and Urmia from *ca*. the ninth to seventh centuries BCE. While there are only several stone and rock inscriptions remaining in northwestern Iran, a newly-discovered Urartian stone inscription has been donated to the Maku Office of the Cultural Heritage Ministry of the province and is presently stored in the Urmia Museum. It was discovered during a construction project behind the fortification of Bastam. The stone block has been inscribed with a sixteen-line Urartian cuneiform text. As the block is damaged, especially on its right side, it appears that the missing lines are greater in number than the preserved lines, requiring some reconstruction to interpret the text. The inscription dates to the reign of Rusa II, Argišti II's son, who founded the Bastam fortification. The text concerns the perfect construction of "The Small City of Rusa" with the support of Ḫaldi. The inscription also includes a rare curse-formula. But, there are several questions remaining to be answered. What is the context of the inscription? What are the possible reconstructions of the inscription? What other texts have similar terminal curse-formulae? Where was the stone block possibly installed? This article is written with the help of the field and library research and it aims to introduce and reconstruct the inscription text in order to raise the possibility that the stone block may have been installed at the place where the king received tribute. It seems that the original context of the inscription might have been a place or gate of reception by the king.

Keywords: Bastam, Rusa, Stone Inscription, Curse Formula.

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Introduction

The Urartians ruled over the regions between and on the shores of Lake Van and Çildir Lakes (Eastern Turkey), Sevan Lake (Armenia), Lake Urmia (Northwestern Iran) (Zimansky, 1995: 104; Barnett, 2008: 322). Kleiss and Hauptmann (1976) commented that Urartu extended along an east-west gradient from the upper Euphrates in Turkey to the area of Ardabil in Iran, and from north-south between Çildir Lake in northeastern Turkey and Gyumri or Leninaken in northwestern Armenia to Rowanduz in northeastern Iraq. According to Belli (2003-2004: 13), the kingdom reached the South Caucasus in north, Northwestern Iran in east, and the Euphrates in west. Biscione (2009: 2) proposed that the Urartian kingdom developed between the Tigris River and the Iranian Plateau. Kleiss (2009: 27) commented that regions to the southwest, northwest and areas to the east of Lake Urmia belonged to the Urartian kingdom from about 800 BCE onward. Köroğlu (2011: 12) mentioned that there are Urartian finds from Gyumri (Leninakan in northwestern Armenia), south to the Taurus Mountains and Rowanduz in northeastern Iraq as well. Recently an inscription reported from Taraghe Moutain, close to Bukan, located to the south of Lake Urmia, may indicate that Urartians extended their influence there, even if they did not control it for a considerable duration (Salvini and Dara 2019).

The Urartian language belonged to neither the Indo-European nor Semitic language families, but rather, had a strong bond with the Hurrian language. The Urartian and Hurrian languages are believed to be driven both from the Hurro-Urartian proto-language (Diakonoff, 1967: 7; Benedict, 1960: 101; Fournet, 2011: 43). Urartians had three writing systems, including Assyrian cuneiform, Urartian cuneiform, and Urartian Hieroglyph. Their royal inscriptions were written on weapons, seals, steles, stone blocks, rocks, tablets, vessels, ceramics, bullae, metal objects, and ornaments.

There are several discoveries excavated from the Urartian fortifications. Rusa II (*ca*. first half of the 7th century BC), son of Argišti, constructed the forts of Bastam, Karmir-blur, Adilcevaz, Kef Kalasi, and Ayanis (Kleiss, 1988: 30-31; Salvini 2008: A 12; Kroll, 2011: 153-159) as the military and administrative centers of different regions (Grekyan, 2013-2014: 66). Rusa's main purpose was to strengthen Urartu against the Sakas and Cimmerians. He reconstructed the country and became the last powerful king of Urartu (Barnett, 2008: 360). His probable innovations of Urartian bullae, tablets and seals are among his contributions.

Bastam is located 9 km northwest of Gharezyaedin, about 40 km from Khoy and 85 km east of Maku, in Western Azerbaijan province. Bastam was called ^{m}*Rusai=URU=TUR* (The Small City of Rusa). The name is not only mentioned in the inscriptions discovered at Bastam but also is mentioned in the inscriptions from Ayanis (Salvini, 2008: 567, A 12-1 V, 1-3). ^{m}*Rusai=URU=TUR* is the most developed Urartian fortification known (Biscione, 2012). It seems that the fortification was conquered and burned, but it was partially reconstructed later (Kroll, 2013: 247). There are several sections within the fort, including Ḫaldi's temple. Moreover, there are houses and public constructions in the lower fort (Kroll: 2013: 248). The Bastam fortification was discovered in 1967 by Germans

and was excavated during 1968 to 1979 except for 1971 and 1976 (www.iranicaonline.org). ^{m}*Rusai=URU=TUR* is also mentioned in the Ayanis inscription (Salvini, 2008: 567, A 12-1 V, 1-3). Additionally, there is a bowl discovered at Karmir-blur with the inscription of Rusa (^{m}*ru-sa-a-ni-i-URU-TUR-gi*) which was probably transferred from Bastam in antiquity (Salvini, 2012: B 12-16). Several types of inscriptions have been discovered at the fortification of Bastam and among them are two building-stone inscriptions, as well as tablets, and inscriptions on stone, bullae and ceramics. Recently, another stone inscription was donated to the Maku Cultural Heritage Office, which was discovered during the construction project behind Bastam Fortification. This stone block has been moved to the Urmia Museum for safekeeping.

It is the aim of this paper to introduce and study this newly-donated inscription from Bastam. Because the beginning of each line of the inscription has been severely damaged, the main question regarding this text therefore concerns possible reconstructions of the missing portions and the overall meaning of its full content. Additionally there are lexical-interpretive challenges in the text in the cases of “in front of” and “reception of the king” that have raised questions for the authors.

Previously discovered Urartian inscriptions at Bastam

1. Bastam construction inscription

There is an inscription from Bastam stored at the National Museum of Iran[i] (Fig. 1) that has been published by several scholars (Lehmann-Haupt, 1928-1935: np. 153A; Melikišvili, 1960: no. 280; König, 1955-1957: no. 129; Harutjunjan, 2011: no. 419; Mashkour, 1966; van den Berghe and de Meyer, 1982-1983: no. 237; Payne, 2006: 284, no. 12.2.1; Salvini, 2008: 579, A 12-7; Helwing and Rahimipour, 2016: 207; Dara, 2017: 123-126).

The inscription in 16 lines of Urartian cuneiform is written in favor of "The Small City of Rusa" and its temple construction. The epigraphy of the inscription uses the renaissance method which was used during the second half of the Urartian dynasty’s rule. The inscription contains the following text:[ii]

1-3. (To God) Ḫaldi, Lord, Rusa, son of Argišti, built this temple. By the favor of Ḫaldi, Rusa, son of Argišti,
4. says (this) stone was empty (unwritten). Nothing (was)
5. here the builder (?). When Ḫaldi
6. determined (willed), I built.
7. I named it “The Small City of Rusa”.
8. Rusa, son of Argišti, says
9. whoever destroys this inscription, whoever
10. erases, whoever destroys (and) ruins,
11. Ḫaldi , Storm God, Sun God, and gods (shall punish him).
12. (his) name cannot be under Sun God.
13. Rusa, son of Argišti,
14. the mighty king, king of the countries,
15. king of country of Bia, king of kings,
16. lord of city of Ṭušpa (Dara, 2017: 126).

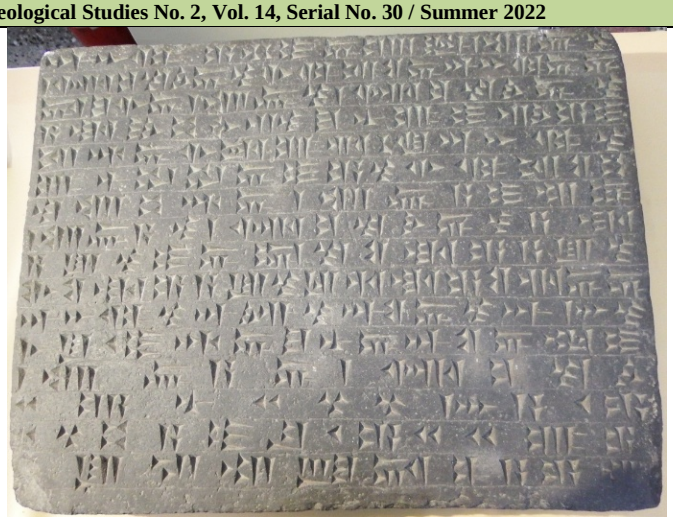

Figure 1 (Dara, 2017: 123)

2. Bastam temple inscription

This inscription was discovered in the foundation of Ḫaldi's temple terrace ruins (Fig. 2) (von Schuler, 1972: 122, *Abb*. 37) and is kept in the warehouse of National Museum of Iran, number 6595.[iii]

The six-line inscription on this piece of stone is severely damaged, but the epigraphy is in the renaissance method, meaning that it was likely written during Rusa II's reign. Harutjunjan (2001: 390, 510), Payne (2006: 324) and Dara (2017: 129) published this inscription as well but Salvini's reconstruction seems more complete (Salvini, 2008: 577, A 12-5)[iv] with respect to the Karmir-blur, Adilcevaz, Armavir, and Ayanis temple inscriptions. According to the first and third lines, the inscription is an offering related to the construction of Ḫaldi's Temple.

Figure 2 (Dara, 2017: 127)

Kroll reported seven small inscribed fragments of stone, which were discovered during the Bastam excavations of 1972 to 1975 and 1978, which are preserved in National Museum of Iran warehouse (1979, 159; 1988b, 159 *Abb.* 3, 1). There are only traces of signs preserved on the fragments. There are also fragments of a smashed stone inscriptions reported, which could possibly pertain to the installation the inscription by Rusa, son of Argišti (von Schuler, 1970: 105 Taf. 48/1-2; Harutjunjan, 2001: 343; 420; Payne, 2006, 295).

3.Tablets

Urartian tablets have been discovered at Bastam during the excavations of 1969, 1970, 1973 and 1974 which are in National Museum of Iran (Salvini, 1979: 115). Tablets could bring crucial and significant information about the details of daily life in antiquity. Unfortunately, they are sometimes discovered after severe damages but even a small piece can be a blessing. The first tablets include the subjects of agriculture (Fig. 3a) and bread rations (Fig. 3b) and are regarded as commandments. Šeini's tablet (Fig. 3c) is damaged severely but also seems to be a command. Additionally, a fragment of a sheep list (Fig. 3d) and a list of numbers are preserved.

Figure 3 a-d (Dara, 2017: 136)

The agricultural command tablet is inscribed on the reverse of the tablet no. 882[v]. The text[vi] includes the king (most probably Rusa II) commanding his subordinates Išpiliúqu, the seal bearer or holder, and Lubšúṣini, the fortification lord or officer or guardian, about the agricultural activities of the region and about how to deal with Adiabdi, the rebel (?) (Salvini, 2012: CT Ba-1; Dara, 2017: 139-142).

The second tablet (no. 881)[vii] bears an inscription on the reverse[viii] as the command of the king to the same person named Lubšúṣini to give three bread rations daily to the people of Ameriši and two bread rations to the people of Ḫalbi (Salvini, 2012: CT Ba-2; Dara, 2017: 145-148).[ix]

Tablet no. 339[x] is severely damaged but some parts of the inscription are preserved.[xi] The inscription concerns Šeini, the official.

Another tablet (no. 11771)[xii] was discovered during the excavation of the Bastam bone room. This specimen is severely damaged but it seems that it is a list of sheep or sheep bearers (Dara, 2017: 155-156).[xiii] According to Zimansky, the bone room of Bastam was not used as meat storage and the bones could be related

to sacrifices, slaughtered animals or the king's meal leftovers (1979, 55; 1988, 107). Kroll suggested that the bone rooms were to keep the meat. Bone rooms seem to be the innovation of Rusa, as no other such rooms have been discovered from the constructions of previous Urartian kings (1984, 165-168; 2019, 187-191). There are similar bone rooms discovered at Toprakkale and Karmir-blur, however. In the 1949 excavations at Karmir-blur, a small room with several bones was discovered between two store-rooms at the center of the citadel. According to Zimansky, these rooms had more than a local significance (Zimansky, 1979: 54). The author suggests that perhaps these rooms were not built everywhere but were an Urartian custom in the larger fortifications and perhaps were an innovation of Rusa II.

Finally, fragments of tablets have also been discovered through the excavations of Bastam in 1969 (von Sculer, 1972: 122). Therefore, they also might have been inscribed during the reign of Rusa II or onwards. One of them seems to be a numeral or list or an economic text of Bastam and may be the beginning of a longer list (von Schuler, 1972: 122; Harutjunjan, 2001: 391; 512).

4. Ceramics

Several pieces of inscribed ceramic vessels discovered in Bastam (Kroll, 1979: 221; Salvini, 2012: 225-250; Dara, 2017: 201-224). The vessels were used to store wine, oil, water, wheat, and barley (Salvini, 2012: 223). Therefore, they were mostly inscribed in Urartian cuneiform and hieroglyphs to indicate their measurement and according to their capacity. Three of the inscriptions are inscribed on the edge of the vessels with the short version of ^{m}*ru-URU-TUR* and are stored at the National Museum of Iran (Fig. 4).[xiv]

Figure 4a (Dara, 2017: 220)

5. Bullae

Bullae are small lumps of clay, in a variety of shapes ranging from elongated pyramids to tear-shaped, which are attached to different kinds of objects and vessels as tags. Some of the Urartian bullae are inscribed but most of them are sealed. Urartians inscribed or sealed bullae have been discovered at several Urartian sites, such as Bastam, where 1418 examples were discovered, mainly in in the upper levels of the bone room (Dara, 2021: 1). They are stored at the National Musem of Iran.

The contents of the inscriptions on the bullae were about the storage

numerals, city names, measures, and officials or people's names (Dara, 2017: 225-242). The bullae in Bastam were formed by pressing clay over knots and cords that were once clearly tied to something as possibly documents or baskets or bones (Zimansky, 1979: 54-55).

The bullae of Bastam are sometimes inscribed with *KIŠIB* (seal) (Dara, 2017: 228, 230, 231, 239-242), personal names and toponyms indicating differen lands, regions and cities (ibid: 232-238). On some, such as as bulla no. 13320, Ba 78-146[xv] (Fig. 5a) and no. 51115, BA 78-423[xvi] (Fig. 5b) "The Small City of Rusa" is mentioned.

Figure 5a (Photo by Maryam Dara)

Figure 5b (Photo by Maryam Dara)

There is not a single Urartian seal discovered at Bastam,[xvii] but several seal impressions have been identified on the bullae and tablets from the site, which provide us with significant information. The Urartian inscribed cylinder and stamp seal impressions could imply the seal bearer official degree, name, region, beliefs, and royal or public information.

The most common seal impressions at Bastam belong to Rusa II (Dara, 2021)[xviii] (Fig. 6a) and an official named Aṣuli (Dara, 2022[xix] (Fig. 6b). The figural scenes of these seal impressions are quite different from each other.[xx]

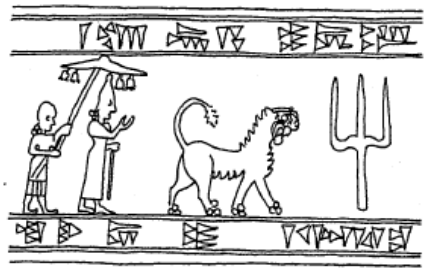

Figure 6a (Seidl, 1988: 146, B 2)

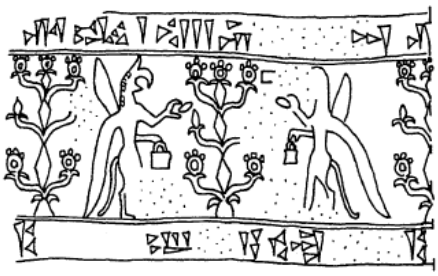

Figure 6b (Seidl, 1979: 137, A 1)

The newly identified inscription

A large broken stone block made of a pink sedimentary rock has been donated to Maku Office of the Cultural Heritage Ministry. Recently, this stone block was transported to the Urmia Museum from Maku. It was discovered during the course of the construction of the Agh Chay Dam behind the Bastam fortification, east of Bastam village in 1996 (Fig. 7).

Figure 7. The discovery point of the inscription

The stone block is 64 cm high, 56.5 cm wide and 19 cm thick. There is a sixteen-line Urartian cuneiform inscription inscribed on this piece of stone. The text is limited between about four-centimeter margins carved as thin lines and the signs are about 3 cm tall (Fig. 8).

Figure 8. Obverse of the newly donated stone inscription

The upper and lower parts of the obverse of the stone block are almost unharmed and unbroken (Fig. 9a). Additionally, the right side of the stone block is not broken nor missing, but has been damaged by hammering (Fig. 9b). The left side of the obverse, which would bear the beginning of the inscription lines is severely damaged and some parts are missing entirely (Fig. 9c). Therefore, it seems that the inscription starts from the upper part of the stone block and ends on its lower part and is complete. The end of the lines at the right side of the obverse is almost completely preserved with only slight damages. But unfortunately a large part of the left side of the obverse has lost, causing the main damage to the beginning of each line of the inscription. The reverse of the stone block is unwritten (Fig. 9d). There also are traces of sediment and fractures around the stone block.

The epigraphy of the Urartian cuneiform inscription is in the shape of stretched and needle-like signs and wedges. This epigraphy was used from Rusa I's reign to the end of Urartian reign (Salvini, 2012: 321-322).

The gap between the signs is increased in the last nine lines. It is possible that the scribe did not pay attention to the length of the text and the text was shorter than expected. Therefore the scribe was obliged to add to the gaps between the signs to fit the length of the text with the size of the stone block.

Figure 9a. Upper part of the stone

Figure 9b. Right side of the reverse of the stone block

Figure 9c. Left side of the reverse of the stone block

Figure 9d. Reverse of the stone block

1. Transliteration

As mentioned earlier, the left side of most of the lines was lost. Therefore the authors had to reconstruct the beginning of many lines. Therefore the proposed reconstruction of the text is as following:

1. [^{D}Ḫal-di-i-ni-ni uš-ma-ši]-ni ^{m}ʳ ruʾ-sa-[a-še]
2. [^{m}ar-giš-te-Ḫi-ni-še i-ni] ʿÉʾ.GAL ba-du-ʿsiʾ-[i-e]
3. [ši-di-iš-tú-ni ^{m}ru-sa ar]-ri-giš-te-[Ḫi-ni]-še
4. [x x x x x x x] ʿiʾ ze-e-i-x-x-ni
5. [x x x x x x x] i zi di tú i-e-še
6. [x x x x x] ar-ni-ú-ši-ni-li iš-ti-ʿniʾ
7. [x x x x x]-hi ʿÉʾ.GAL-ka-i ša-tú-ú-ʿbiʾ
8. [x x x x x x]-e ʿšúʾ-Ḫi-e te-ru-ú-ʿbiʾ
9. [ši-di-iš-tú-bi] ʿtiʾ-ni ^{m}ru-ʿsaʾ-a-i URU.ʿTURʾ
10. [a-li ^{m}ru-sa] ʿarʾ-giš-te-hi ʿMANʾ *DAN-NU* a-lu-[še]
11. [x x x x x x]-a-e URU ʿ^{m}ʾru-sa-a-[še]
12. [^{m}ar-giš-te-Ḫi-ni-še] ʿa-liʾ a-lu-še i-ʿniʾ DUB-[te]
13. [tú-li-e a-lu-še pi]-tú-li-e a-lu-[še]
14. [x x x x a-i-ni]-e i-ni-li du-li$_{12}$-ʿeʾ
15. [a-lu-še u-li-še ti-ú-li-e ú-li]-i tú-ri-ʿeʾ
16. [tú-ri-ni-ni ^{D}Ḫal-di-še] ʿIMʾ-še ^{D}UTU-še DINGIR^{ʿMEŠʾ} -[še]

2.Translation

1. [By the favor of Ḫaldi], Rusa,
2-3. [son of Argišti, built this] fortification perfectly. [Rusa, son of] Argišti,
4-5. (not clear to be translated)
6. […] the achievement here
7. […] in front of the fort I received
8. I built (or put or install) the new […].

9. [I built]. (Its) name (is) “The Small City of Rusa” (or I called it “The Small City of Rusa”).
10. [Rusa], Son of Argišti, mighty king, [says] whoever
11. […] the city. Rusa,
12-13. [son of Argišti], says whoever [destroys] this inscription, [whoever] erases (it), whoever
14. […] says to another one to do these
15. […says to another one] to destroy, to eliminate,
16. [to destroy, Ḫaldi], Storm Deity, Sun Deity, other deities (shall punish him).

Discussion

As mentioned earlier, there are several different Urartian cuneiform inscription discovered at Bastam inscribed with the name of "Small City of Rusa". The newly donated stone block bears the name of the city as well. Each line of the stone block inscription could have had 15 to 16 cuneiform signs. There are 110 signs of the text remaining after the damages to the stone block and more are missing.

Some of the damaged signs have been reconstructed by the authors according to other Urartian inscriptions with similar contents. It seemed that line 10 was the most complete and preserved line and unharmed, therefore the length of the other lines has been guessed according to line 10, where the beginning and ending of it are preserved. The other lines have been reconstructed accordingly.

Uš-ma-ši-ni or *al-su-i-ši-ni* could have been reconstructed in line 1 as the length of both words could fit the damaged part and both are very common in the Urartian inscriptions with almost similar meaning. It is most possible that the royal construction is mentioned as the favor and by the assistance of Ḫaldi.

Rusa II constructed “The Small City of Rusa” (*^{m}Rusai=URU=TUR*) perfectly (Lines 1-2). The king insists on the perfection of the royal construction as a common formula in line 2. And the king mentions his name as the son of king Argišti (Lines 2 and 3). Later, the king announces his achievement in this land (Line 6).

According to line 7, "in front of" the fortification (*ʿÉ˺.GAL-ka-i*) was the place that he received something and with respect to the original place where the inscription has been discovered, it is possible that here was the place of the reception. By “in front of the fortification” one comes to the idea that the inscription might have been installed outside or near the entrance gate of the fort. This means that tribute or offerings to Rusa II were possibly received at this point, which is outside and in front of the fort. Of course this can be proposed if the discovery point of the inscription was the original installation point of the inscription. But, there also is another possibility that "I received" is at the beginning of another sentence in line 7 and has no relation with the prior words. This means that something is mentioned in front of the fortification in the first part of line 7 and then the king received something mentioned in line 8, the beginning of which is severely damaged.

Additionally, according to line 8 Rusa has built a “new” (*ʿšú˺-ḫi-e*) construction or put or installed a “new” inscription in the honor of the place he built. Unfortunately, due to the construction project and activities at the point of the stone inscription, the discovery of evidence of any construction, gate, room,

hall or wall where the inscription might have been installed has been foreclosed by the destruction of this part of the site. The text itself could still, however, lead us to possible interpretations.

The terminal curse-formula of the inscription begins at line 10 and lasts for six lines; it seems that a large part of the inscription is comprised of this curse. It is in fact a rare curse-formula (Dara, 2018), but it resembles the Tashborun inscription curse, which reads “Whoever destroys this inscription, whoever erases it, whoever says another to do it, destroys it, eliminates it, conquers the city of Luḫiu, destroys, Ḫaldi, Storm God, Sun God, gods (punish him) under (the control of) Sun God” (Salvini, 2008: A 5-1, § 15-24).[xxi] There are minor differences between the two cursing formulae and both were rarely used in royal inscriptions.

Conclusion

“The Small City of Rusa” (*^{m}Rusai=URU=TUR*), or the Bastam fortification, was the greatest fortification of Urartu. A number of significant inscriptions of different types have been discovered at Bastam mentioning *^{m}Rusai=URU=TUR*. There were two previously discovered and published stone inscriptions regarding the foundation of “The Small City of Rusa” and its temple. Inscribed bullae, tablets, and ceramics also specifically mention “The Small City of Rusa” have also been discovered. Recently a newly donated stone block with a sixteen-line Urartian cuneiform inscription has been studied by the authors which is currently stored in the Urmia Museum. The authors propose it was installed at a significant point of the fortress based on its textual content. The inscription is damaged, but still there are pieces of information it can provide. “The Small City of Rusa” is mentioned in the inscription and illustrates that the stone block was installed on a construction related to the fortress.

Rusa II, son of Argišti, by the favour of Ḫaldi, the Supreme Urartian god, built the fortress and commanded this inscription to be written. The fortification was constructed “perfectly” and the king also mentioned his achievement in this place.

Based on the text, it seems that the king received something as tribute at the point where the inscription originally installed, which could possibly correspond to its findspot, but this remains uncertain and irresolvable. This is because, unfortunately, the original place of the inscription’s discovery has been destroyed by the dam construction but still the text can bring light to some possible ideas about Bastam fortification.

In any event, the text indicates this was the place of reception and that Rusa installed this stone block to be present at that place, as mentioned, “in front of the fortification.” Of course, this is more a speculation and proposal by the authors than a definite fact. But, there also is another possibility that "I received" should be understood to scan at the beginning of another sentence from in line 7, and would thus not be related to the other words in this line, but rather should be understood as the beginning of another sentence continuing into line 8, the beginning of which is severely damaged. This would mean that something is mentioned as being in front of the fortification in the first sentence and then the king received something mentioned in the next sentence. Unlike the other

inscriptions discovered at Bastam, this stone inscription ends with a long and rather rare curse-formula.

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کتیبهٔ به تازگی اهداشدهٔ متعلق به روسا دوم در بسطام

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چکیده

اورارتوها بر سواحل دریاچه‌های وان و چیلدیر در ترکیه، دریاچهٔ سوان در ارمنستان و دریاچهٔ ارومیه در ایران در حدود سده‌های نهم تا هفتم پیش از میلاد حکومت می‌کردند. از شمال غرب ایران در نواحی آذربایجان شرقی و آذربایجان غربی آثار اورارتویی از جمله سنگ و صخره‌نبشته‌های بسیاری به دست آمده است. به تازگی سنگ‌نبشته‌ای به ادارهٔ میراث فرهنگی ماکو اهدا شد و سپس به موزهٔ آذربایجان غربی انتقال داده شد. این بلوک سنگی در جریان عملیات سدسازی در پشت قلعهٔ بسطام به دست آمده بود. بر این سنگ‌نبشته شانزده سطر کتیبهٔ میخی اورارتویی نوشته شده است. سمت راست این بلوک سنگی تقریباً سالم‌تر و در واقع پایان هر سطر کتیبه است که باقی مانده است. اما، سمت چپ آسیب بسیاری دیده و ابتدای بسیاری از سطرها از میان رفته است. بر این سنگ‌نبشته حدود صد نشانهٔ میخی دیده می‌شود و بیش از این تعداد از میان رفته که نیاز به بازسازی متن داشت. متن کتیبه به دوران شاهی روسا دوم، پسر آرگیشتی دوم، بنیان‌گذار دژ بسطام یا «شهر کوچک روسا» تعلق دارد که بزرگ‌ترین دژ اورارتویی محسوب می‌شود. نفرین پایانی سنگ-نبشته نیز نسبتاً طولانی است و کمتر دیده شده است. پرسش‌هایی از این قبیل برای پژوهشگران وجود داشت؛ محتوای کتیبه چیست؟ بخش‌های از میان رفتهٔ کتیبه را چگونه و بر اساس کدام متن‌های اورارتویی می‌توان بازسازی کرد؟ نفرین‌های پایانی مشابه نفرین‌نامهٔ این کتیبه کدامند؟ این کتیبه احتمالاً در کدام بخش از دژ بسطام کار گذاشته شده بود؟ بنا بر این پژوهشگران به کمک مطالعات کتابخانه‌ای و میدانی بر آن شدند که کتیبه‌های به دست آمده از بسطام را در این مقاله آورده و در ادامه سنگ‌نبشتهٔ به تازگی اهداشده را معرفی کنند و بازسازی و تحلیل خود از متن آن را ارائه نمایند. این احتمال وجود دارد که کتیبه در مکان دریافت چیزی مانند مالیات یا هدایا کار گذاشته شده بود.

واژه‌های کلیدی: بسطام، روسا، سنگ‌نبشته، ماکو، اورارتوها.

i . The inscription is 71.5 cm long on top, 71 cm in the bottom, and 55 cm wide. There are 3 to 4 cm borders between the lines and the signs are 3 cm high (Dara, 2017: 123-126).

ii . 1. Dḫal-di-e EN i-ni É.BÁRA mru-sa-še

2. mar-giš-te-ḫi-ni-še ši-di-iš-tú-ni Dḫal-di-ni-ni

3. uš-ma-ši-ni mru-sa-še mar-giš-te-ḫi-ni-še

4. a-li qar-bi sal-zi ma-nu ú-i gi-e-i

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5. iš-ti-ni ši-da-ú-ri šú-ki Dḫal-di-še
6. ú-bar-du-du-ni i-e-še ši-di-iš-tú-bi
7. te-ru-bi ti-ni ^{m}ru-sa-a-i URU.TUR
8.^{m}ru-sa-a-še ^{m}ar-giš-te-ḫi-ni-še a-li
9. a-lu-še i-ni DUB-te tú-li-e a-lu-še
10. pi-tú-li-e a-lu-še ip-ḫu-li-e tú-ri-ni-ni
11.^{D}ḫal-di-še ^{D}IM-še ^{D}UTU-ni-še DINGIR^{MEŠ}-še
12. mì-ku-u-i ti-ni ma-nu-ni ^{D}UTU-ni-ka-i
13.^{m}ru-sa-a-ni ^{m}ar-giš-te-ḫi
14. MAN *DAN-NU* MAN KUR.KUR^{MEŠ}-a-u-e
15.ᶠMANᵀ ^{KUR}bi-a-i-na-u-e MAN MAN-ú-e
16. [a]-lu-si ^{URU}ṭu-uš-pa-a-e URU (Dara, 2017: 125)

[iii] . It is a broken piece of stone with 32 cm long, 19 cm wide, and 15 cm thick at most. There are traces of 6 lines inscription left on it and the cuneiform signs are 3 cm high (Dara, 2017: 129).

[iv] . 1’ [] x []
2’ [(zi-el-di-e MAN-e ar-du-li-ni a-li a-šú-li)] ᶠ^{D}ḫal-di-niᵀ [(É ku-i-zi)]
3’ [(zi-el-di ši-la-ni-ni i-šá-ni ši-i-ni ^{É}si-ir-ḫa-n)]i-ni ma-ni-[(ni na-ḫi-zi)]
4’ [(ši-al-a-di-e kam-ni su-ri ku-i-zi ši-la-ni)]-ni ^{D}ḫa[(l-di-ni É)]
5’ [(mì-i a-i-ni-i zu-ma-gi-e áš-du-ú-ni a-li)]-ᶠe áš^{T}-d[(u-li 2-am-di-ni)]
6’ [mu-ú-ri a-ši-i-ni a-še ši-i-ú-li-e zu-ma)]-ᶠṭi$_5$ᵀ-[(i-ni ^{É}si-ir-ḫa-ni-ni)]

[v] . The tablet is 8 and 7.6 cm long in two sides. It is about 6.3 cm wide. The thickness is 1.3 cm on top and 1.5 cm on the bottom. The signs are 1.4 cm high (Dara, 2017: 138).

[vi] . 1. LUGAL-še a-li ti-e
2. iš-pi-li-ú-qu ^{LÚ}NA$_4$.DIB
3. ^{m}lu-ub-šú-ṣi-ni ^{LÚ}É.GAL
4. ba-ú-še ’a-al-du
5. LUGAL-li ba-ú-še/DU$_{11}$? TI DINGIR
6. gu-ni ^{GIŠ}ú-du-u-e
7. ḫu-tú-ma-gi ma-nu-bi
8. ^{m}lu-ub-še-ṣi-ni-da ^{LÚ}É. GAL
9. a-tú-ú-nu ^{m}a-di-ab-di-i
10. ^{LÚ}GABA.RI ^{LÚ}NAM^{MEŠ}
11. ^{URU}a-i-su-ab-zu-ni
12. ḫi-ni a-la-gi šá-te-e
13. ^{ĞIŠ}ú-du-u ^{m}a-di-ab-di (Dara, 2017: 139-140)

[vii] . The tablet is 8.3 cm long in right and 6 cm long in its left. The width is 7.3 cm. The thickness is at most 1.2 cm on the top and 1.4 cm in the bottom. The signs are 0.5 cm high (Dara, 2017: 145).

[viii] . 1. [LUGAL]-še a-li ti-e
2. ^{m}lu-ub-šú-ṣi-ni-di ^{LÚ}É.GAL
3.ᶠa-laᵀ-gi e-ku-ú-di-e
4. a-li-li ^{LÚ}a-me-ri-e-ši
5. ma-nu-ú-la-li ar-di-li
6. 3-di NINDA^{MEŠ} 1-di LÚ^{MEŠ}
7. a-tar-a a-li-e ^{LÚ}hal-bi
8. ma-nu-ú-li ar-di-li
9. 2-di NINDA^{MEŠ} 1-di LÚ^{MEŠ}
10. 1-di-ni *U$_4$-ME* i-ni
11. i-da-a-ni a-la-gi-e (Dara, 2017: 145-146)

[ix] . This is the command or an announcement to decide for the portion of the bread for two groups or tribes or families of Ameriši and Ḫalbi. It is possible that these two groups lived in the region or under the command of The small city of Rusa. It is also possible that the ration of the bread was distributed to the people by some economic or social reasons or a pattern was decided for their ration. As Amerišis take more ration of the bread it seems that they were the upper level or in better position what so ever. It is also possible that Ḫalbis were punished by the commanders to take less ration. Another possibility is that this decision is made according to the wether, war,

surrounding situation or the famine.

[x] . The tablet is 3.4 cm long, 3.7 cm wide, and 1.8 cm thick. The signs are 0.3 cm high. The tablet is broken and the inscription is severely damaged that the reverse is broken in to six pieces (Dara, 2017: 150).

[xi] . 1. ^{m}še-i-ni-[še ba]-ú-še
2. ši-˹ú-ni˺ [ti]-i-e
3. ˹^{m}še˺-i-[ni-i]-e-di ^{LÚ}NAM-di
4. [^{m}x]-ú-[x-x-]ni ^{LÚ}NA$_4$.DIB
5. ^{m}ma-[x-x-n]i ^{LÚ} ˹IG]˺?.LÁ
6. za-ni-[da-bi] TI DINGIR [gu]-ni (Dara, 2017: 151)

[xii] . The tablet is broken and is 4.5 cm long, 3.5 cm in the left and 1.5 cm in the right side. The broken side is 5 cm long. The thickness is 2 cm and the wedges are 0.3 to 0.5 cm tall (Dara, 2017: 155).

[xiii] . 1. UDU 1-ḫi ^{m}a-ru-[…]
2. UDU 1-ḫi ^{m}mì-nu[…]
3.UDU 1-ḫi ^{m} ˹ul˺[…]
4.UDU ˹1-ḫi ^{m}˺[…] (Dara, 2017: 155)

[xiv] . The authors supposes that the short version was used on the ceramic to make it easier or possibly this method was common on daily-life inscriptions.

[xv] . It is 4.9 cm long, 3 cm wide and 2.5 cm thick. Its inscription is as following:
1. [a-ku]-ki šá-li ^{m}ru-sa-a-še ^{m}ar-giš-te-[ḫi-ni-še]
2. [^{GIŠ}]GU.ZA te-ru-ú-ni ^{m}ru-sa-ḫi-na-a
3. ˹^{KUR}˺qi-il-ba-ni-ka i-ni-li ^{GIŠ}ZU^{MEŠ}
4. ˹LÚ˺ ^{GIŠ}NAGAR^{MEŠ}
5. [TI].BAR-li
6. ^{m}ru-sa-(i) URU.TUR
7. ^{KUR}a-la-’a-ni
1. That (or the same) year Rusa, [son of] Argišti, 2. installed (his) throne in the city of Rusa 3. in front of [region] Qilbani. These timbers 4. carpenters 5. ?s 6. The Small City of Rusa, 7. the region of Ala (Dara, 2017: 236-237)

[xvi] . This bulla is 4 in 3.4 in 2.1 cm. Its inscription is as following:
1. ^{m}ru.[URU.TUR] ˹^{KUR}˺ ˹a-la-’a˺
2.^{m}ḫa-nu-ú-i ^{LÚ}*TE-RI*
1. [The small city of] Rusa, the region of Ala, 2. (Mr.) Ḫanu, the palace Head or Master (Dara, 2017: 238).

[xvii]. Zimansky suggests it is possible that Rusa’s seal was reused even after him (Zimansky, 1988: 123). It is also possible that the seals of the king were used by high ranked officials appointed by the king himself to use his seal and as the seals were widely used by these officials they were used even after Rusa. Seidl thinks that the stamp seals with hieroglyph inscriptions could have been in the possession of the lower ranked officials and the scenes on them could be divided in to two groups of royal and everyday use (Seidl, 1976: 146). Therefore, the personal and unofficial seals had hieroglyphic seal inscriptions (Ibid: 61).

[xviii] . ^{m}ru-sa-i i-ni KIŠIB ^{m}ar-giš-te-ḫi-ni-i
This (is) the seal of Rusa, son of Argišti (Dara, 2021)

[xix] . ^{LÚ}a-ṣu-li (or ^{LÚ}A.NIN-li) KIŠIB 2. ^{LÚ}a-ṣu-li ? (aṣuli)
The seal of aṣuli (Dara, 2022)

[xx] . Rusa's seal impression contains the shade bearer, the king, the lion and the trident while the other one includes the mythical creatures as griffins, sphinx and genes facing the sacred tree. Other scenes as two men in a ritual ceremony (Dara, 2017: 257) are also discovered on the bullae from Batam.

[xxi] . mi-nu-a- še a-li-e a-lu- še i-ni DUB-te tu-li-e a-lu- še pi-tu-[li]-e a-Iu- še a-i-ni-i i-ni-li du-li-e a-lu- še u-li- še ti-u-li-i-e i-e- še ^{URU}lu-ḫi-u-ni-ni ḫa-u-bi tu-r[i-ni-n]i ^{D}ḫal-di- še ^{D}IM- še ^{D}UTU- še DINGJR^{MEŠ} še ma-a-ni ^{D}UTU-ni pi-i-ni mi-i ar-ḫi u-ru-li-a-ni mi-I i-na-a-i-ni mi-i na-a-ra-a a-u-i-e u[lu-li-e] (Salvini, 2008: A 5-1, § 15-24).

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The Creative Millennia: Highlighting the Transitional Neolithic (ca. 9800-8000 BCE) in the Central Zagros, Iran

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(37-57)

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Abstract

The Central Zagros received pioneering research on the emergence of early agricultural and village life by R. Braidwood in 1959-60. However, later shifts in research toward the Levant put the Central Zagros in shadow for several decades until recently, when investigations have once again highlighted its key place in the Neolithization processes in West Asia. Unlike the Levant, where a protracted change from the Epipaleolithic to the Neolithic is seen, the border line between these two periods is evidently sharp in the Central Zagros suggesting that unprecedented features appeared during the first two millennia of the Holocene, a foundational time that is poorly known in the region. In light of new evidence, this period is addressed here under the chronological term 'Transitional Neolithic' (ca. 9800-8000 BCE). Current datasets suggest that, following an environmental improvement at the end of the Younger Dryas, local communities engaged in short-term inhabitations, collective or communal ceremonies, and had an increasing reliance on the wild progenitors of early domestic plant and animal species. This time span's close interactions with natural resources provided people with growing ecological knowledge. We may think of longer occupation in desirable places and thereby population increases in the 9th millennium BCE. This instead could have gradually resulted in an environmental depression, however, caused either by population growth or by possible unfavorable climatic events. Archaeological evidence shows that from the mid-9th millennium BCE on, a change happened in subsistence strategies toward low-level food production. In fact, this was an eco-cultural event that broadened the human diet. The central Zagros saw multiple creative behaviors during both the early and late phases of the Transitional Neolithic, providing people with a robust foundation for the succeeding truly Neolithic way of life that took shape during the 8th millennium BCE.

Keywords: Central Zagros, Transitional Neolithic, Neolithization, Ecological Knowledge, Low-level Food Production.

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1. Introduction

Since 1959-60, when R. Braidwood investigated Kermanshah to obtain evidence of early domestication and sedentary life (Braidwood 1961; Braidwood et al. 1960), the central Zagros has been a constant topic of discussion in this field. Previous research undertaken in the 1960-70s indicated a gap between the Late Epipaleolithic and the Early Neolithic in the region (see Hole 1999). Recent investigations, however, have narrowed it (Darabi et al. 2011; Matthews et al. 2013; Riehl et al. 2013; Richter et al. 2021), though the end of the Epipaleolithic is still obscure. We are still unaware of possible human habitation during the dry, cold climate of the Younger Dryas (ca. 11,000-9800 BCE) at the end of the Pleistocene. It is rather easier to explain data correlated with the Epipaleolithic and Neolithic entities while the period in between remains enigmatic despite its status as a fundamental stage in human history. When it comes to the investigation of the Neolithization process, one needs to give special attention to the first two millennia of the Holocene, a time span which is little known across the entire Zagros region as compared to the Levant and Anatolia. It is now widely believed that the Zagros played a key role, especially with regard to initial animal herding, particularly of goats (see Bangsgaard et al. 2021; Dally et al. 2021; Zeder 2002; 2005; 2008; Zeder and Hesse 2000). Indeed, this topic has predominated research on the Transitional Neolithic in the region while other aspects of human life are poorly investigated.

To date, only a few archaeological sites—including Sheikhi Abad (Matthews et al. 2013), Chogha Golan (Conard et al. 2013), Asiab (Bangsgaard et al. 2019; Darabi et al. 2018; 2019; Richter 2021) and Chia Sabz East (Darabi et al. 2011; 2013) —have represented the Transitional Neolithic (ca. 9800-8000 BCE) in the central Zagros. Other sites such as Jani (Matthews et al. 2013), Ghazanchi (Mashkour et al. 2021) and Kelk-e Asad Morad (Moradi et al. 2016) appear to have been established during the later phase of this time period, most likely during the 9th millennium BCE, though their chronology is not yet well-clarified (Figs. 1 & 2). As a whole, the excavated area correlated with this time does not yet exceed a few square meters, an issue remaining as a major research barrier in the region.

In the western Fertile Crescent, a continuous protracted change from Late Epipaleolithic to Early Neolithic has generally been assumed (see Ibanez et al. 2018; Watkins 2018). On the contrary, the eastern Fertile Crescent, specifically the central Zagros, appears to have witnessed a distinct trajectory suggesting an unprecedent radical shift in human life over the same time period, except for the chipped stone industry showing a kind of continuity from the previous period in some techno-typological criteria (Kozlowski 1999; Kozlowski and Aurenche 2005; Nishiaki and Darabi 2018; Olszewski 1994). In order to gain a better understanding of Neolithic, we need to address the preceding time spanning the transition from the Late Epipaleolithic to the Early Neolithic, a period that has yet been given the least attention, despite representing the roots of later socio-economic developments. Therefore, this article aims to highlight the Transitional Neolithic period in the Central Zagros by discussing how local communities of the region engaged with new variable environmental or anthropogenic issues and how creative they were in adopting new various strategies over this foundational time period preceding a truly Neolithic way of life.

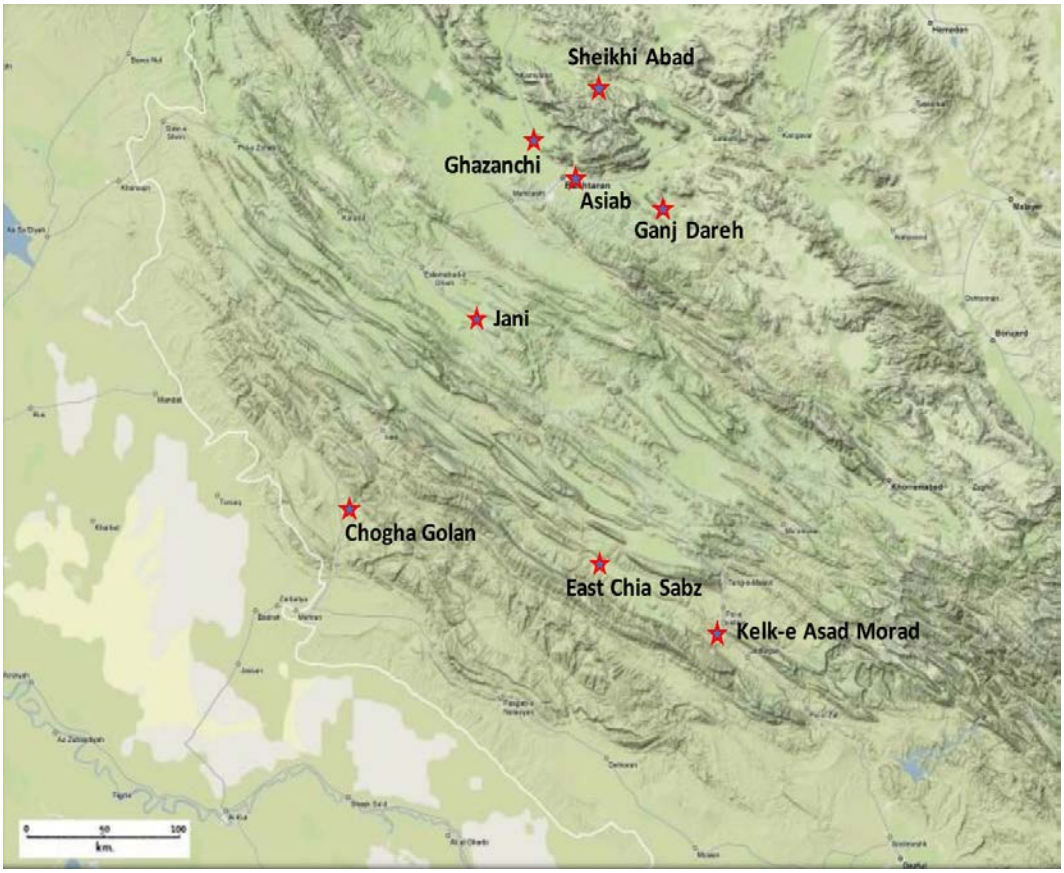

Fig. 1. Locations of the Transitional Neolithic sites in the Central Zagros

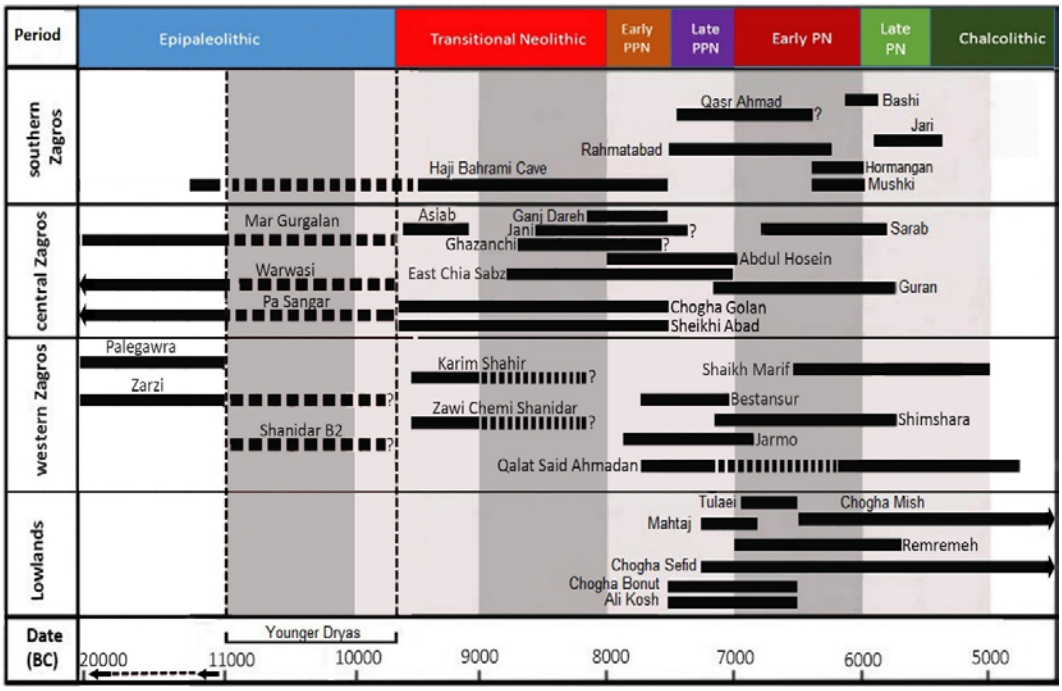

Fig. 2. Chronological Position of the Transitional Neolithic sites

2. A chronological-terminological consideration

The time period discussed here was first described by Braidwood as 'the era of incipient food production' (ca. 10,000-7,000 BCE) characterized by open-air sites, circular structures and the predominance of stone tools made on blade and bladelet as well as the presence of morphologically wild animal and plant species (Braidwood 1961, 1973). Until recent decades the lack of settlement predating the 8th millennium BCE would have played a key role in suggesting the hitherto most commonly used chronology proposed by McDonald (1979) who divided the Neolithic period into 'Early', 'Middle' and 'Late' phases in the Central Zagros. In the western Zagros, however, excavations at earlier sites such as at Zawi Chemi, Shanidar, Shanidar B1, and Karim Shahir encouraged Solecki to apply the term 'Proto-Neolithic' (11,000-8,300 BCE) for addressing the transition from the Pleistocene to the Holocene (Solecki and Solecki 1983; Solecki et al. 2004). Following Özdoğan (2005), Fazeli Nashli and Matthews (2013; also see Matthews and Fazeli Nashli 2022) utilized the terms 'formative zone' and 'learning zone' to refer to the primary and secondary centers of Neolithization respectively. They also refer to these terms as 'becoming Neolithic' and 'being Neolithic.' More recently, Matthews and Fazeli Nashli (2022) have put the transitional period under a long chronological rubric of the 'Early Neolithic' (9,800-7,000 BCE). They have also termed the preceding time marking the Pleistocene-Holocene boundary, ca. 11,000-9,800 BCE, as 'the Epipaleolithic-Neolithic transition,' a time that coincides with the Younger Dryas. Although it is generally believed that this harsh climate might have forced communities to change their residential focus in favor of lower altitudes (Darabi 2012; 2015; Hole 1970; 1996), they mention the sites of Shanidar B1, Zawi Chemi, Shanidar and Karim Shahir as the currently known settlements dating to this period. Nevertheless, this time remains as the most obscure period in the Zagros until new evidence can shed more light on it. In a broader geographic context, the Transitional Neolithic chronologically overlaps with the PPNA (ca. 9,800-8,600 BCE) and EPPNB (ca. 8,600-8,000 BCE) (see Simmons 2007; Ibanez et al. 2018), a time span that saw initial attempts towards cultivation in the Levant and also coincided with the abrupt appearance of a large number of settlements along the Upper Tigris in southeastern Turkey (e.g., Hasankeyf Höyük, Gusir Höyük, Kortik Tepe, Demirköy). As compared with the western Fertile Crescent, the apparent difference of archaeological inventories seen in the Zagros, especially the Central Zagros, could explicitly prohibit us from the application of the Levantine chronological terms (PPNA and PPNB), highlighting the significance of a region-specific chronology (for chronological debate see Darabi 2015; 2019). Instead of the chronological-terminological disputes noted above, the term 'Transitional Neolithic' seems to be more reasonable to address the first two millennia of the Holocene. On the one hand, 'transition' makes evident sense to better show a time that bridges two distinct major periods, i.e., the preceeding Epipaleolithic and succeeding Neolithic. On the other hand, it represents a duration shorter than other associated chronological-terminological terms. From some perspectives, this period can even be divided into two sub-phases (see below). It is obvious that if we place the whole three-thousand-year long period of the early Holocene within just one chronological unit such as the

Proto-Neolithic or Early Neolithic, it does not necessarily help us to better track diachronic cultural change and continuity of communities, since chronological debates are essentially meant to reveal subtle changes through time (Kuijt 2000). The same is true for the term 'initial village' designator for the entire Neolithic period (Hole 1987). This encourages us to make our chronological times as narrow as possible.

3. Interpretation of current data

The time spanning the 10-9th millennia BCE coincided with several crucial social evolutionary steps taken by humans in western Asia. However, it seems that a variety of pathways were paced in this respect, though a general trend can also be seen across this vast region. Both the western and eastern wings of the Fertile Crescent yielded different archaeological inventories suggesting different cultural trajectories during the transition to the Neolithic period. Recently, such a difference has been further discussed from an archaeobotanical viewpoint showing a regional diversity and diverse pathways towards cultivation (Arranz-Otaegui et al. 2016; Asouti 2017; Asouti and Fuller 2013; Fuller et al. 2011; Kabukcu et al. 2021; Riehl 2016). These all bring to light mosaics of transformation towards Neolithic lifestyles that were mostly situated in local environmental and cultural backgrounds at the turn of the Late Pleistocene-Early Holocene, though a protracted and slow transition from the Epipaleolithic to the Early Neolithic can be clearly delineated in the Levant for example (see Watkins 2018). On the contrary, the Central Zagros appears to have witnessed a distinct pathway. The available paleo-environmental evidence extracted from the lake-bed sediments of Zaribar (Stevens et al. 2001) and Hashilan (Rostami et al. 2021) have indicated that, by the end of the harsh climatic event of the Younger Dryas (ca. 11,000-9800 BCE), the temperature and rainfall had increased providing an environmental richness (Fig. 3). This environmental shift has been assumed to be the ecological foundation upon which later socio-economic developments were laid (Darabi 2012; 2015; also see Matthews and Fazeli Nashli 2022).

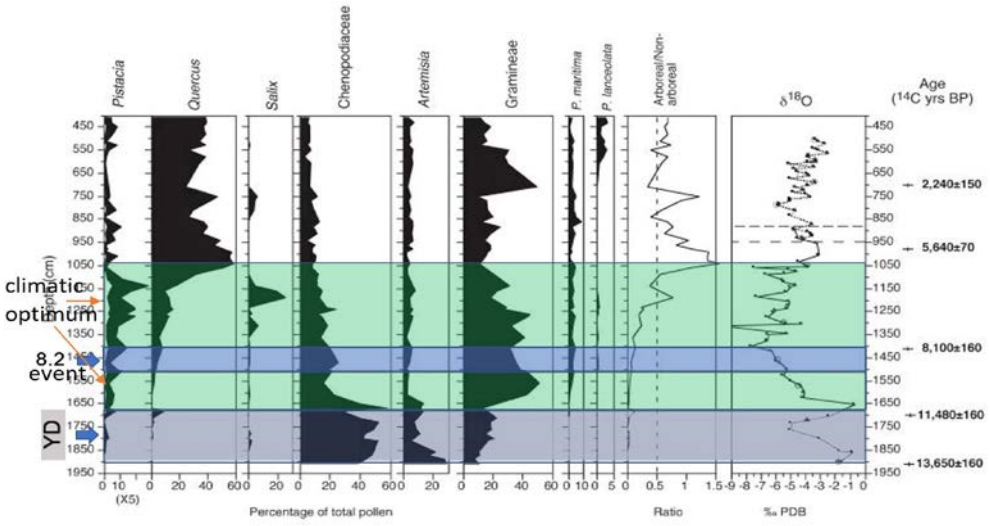

Fig. 3. Pollen diagram of Lake Zaribar cores indicating the YD and its subsequent climatic optimum, a condition that was, of course, interrupted by Rapid Climatic Changes (RCC) such as the 8.2ky event during the Early Holocene in western Iran (modified after Stevens et al. 2001.750, Fig.3).

Interestingly, this climatic optimum is chronologically synchronous with the establishment of new settlements such as Sheikhi Abad (Matthews et al. 2013), Chogha Golan (Conard et al. 2012) and Asiab (Bangsgaard et al. 2018; Darabi et al. 2018; 2019; Richter et al. 2021) in the 10th millennium BCE. It is believed that a diversification of resources provided people with the opportunity to inhabit new niches where they had easy access to a wide range of wild resources (Darabi 2012; 2015). As long as surrounding resources were available, these newly established settlements were periodically under occupation as well. Despite contemporaneous settlements in southeastern Turkey that resulted from sedentary life (see Özdoğan et al. 2011 and contributions therein), the settlements in the Central Zagros correlate with seasonal visits as indicated by the exposure of ash deposits at basal levels of Sheikhi Abad, Chogha Golan and Chia Sabz East. However, the degree of mobility appears to have decreased over time as some communities tended toward longer occupations during the late 9th millennium BCE, a phenomenon which resulted in the establishment of a sedentary life style as indicated by new excavations at Ganj Dareh (ca. 8,200-7,600 BCE) (Darabi et al. 2019). Generally speaking, the mobility changed from circulating to radiating patterns over a long time spanning late Epipaleolithic through late Neolithic though seasonal habitation was maintained through time either by foragers or subsequently herders (Fig. 4; see also Mortensen 1972).

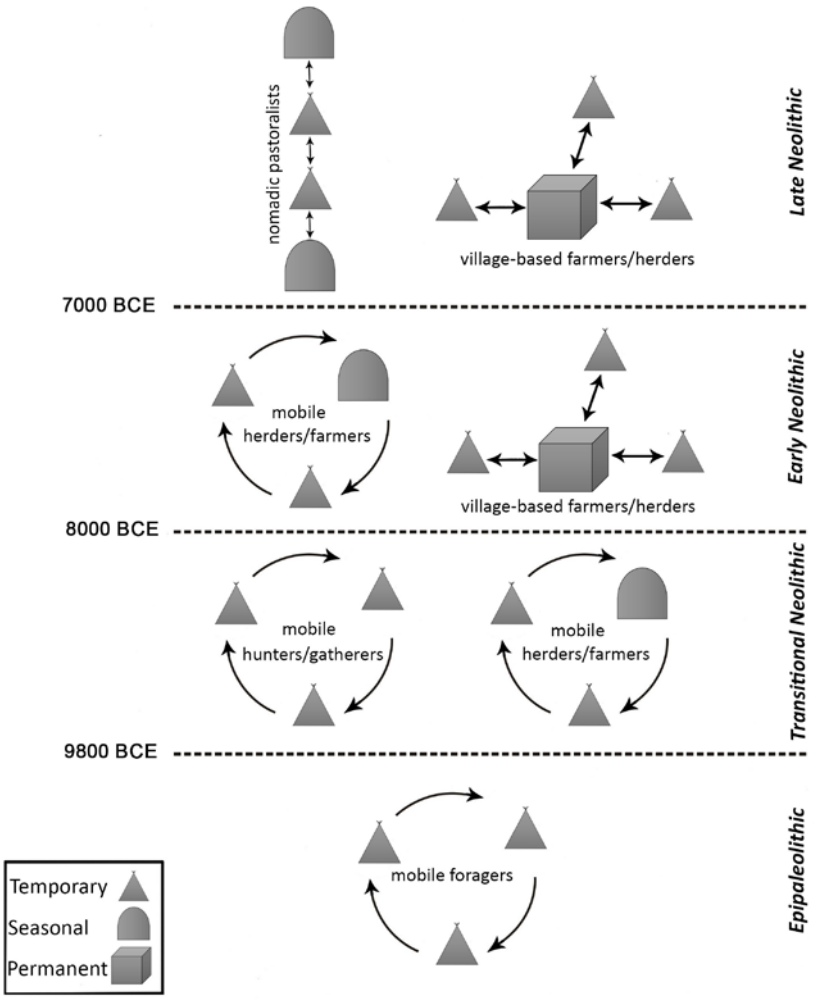

Fig.4. Explanatory model of settlement patterns and variation in mobility from the Late Epiplaeolithic through the Late Neolithic in the Central Zagros region.

In this regard, the Central Zagros seems to have still been inhabited by mobile hunter/gatherers, while from the 9th millennium BCE onward, mobile herders/farmers gradually appeared during later phase of the Transitional Neolithic. This indicates a close correlation between mobility level and subsistence strategy. It is assumed that over the first millennium of the transitional Neolithic, communities were intensively interacting with environmental resources, in particular the wild progenitors of early domesticates. As a result of increasing ecological knowledge inherited over generations, they realized the capabilities of the domesticable species according to 'Niche Construction Theory' (see Smith 2012; Watkins 2018; Zeder 2017). The reasons for the initial environmental manipulation that led to plant cultivating or animal herding have long been under discussion (for a history of the associated assumptions see Simmons 2007; Smith 2015; Wright 1971). Taking a local-scale perspective, the decrease of mobility towards sedentary life should have led to population increase and thereby environmental pressures on local resources. It is under these conditions that communities of the Central Zagros might have extended their subsistence options to feed their growing populations[1] (Darabi 2012, 2015). It should be noted that this environmental depression could have also resulted from climate change. However, our presently available evidence is not yet sufficient to conclusively show this hypothetical correlation. Therefore, one may consider this radical change as an event that had relied on cumulative ecological knowledge but which was triggered by an increasing need for alternative methods to secure food supplies. This idea might be somehow taken in line with 'Diet Breadth Model' which centers on the role played by resource depression (Smith 2015; Winterhalder and Kennett 2006). While placing empirical data against theoretical debates is beyond the scope of this article, the first phase of this transitional period is known as the stage of 'increasing human-environment interactions and inherited ecological knowledge' which was succeeded by the stage of 'low-level food production' in the second half of the 9th millennium BCE. Chronologically, while the former should have taken place over millennia the latter seems to have happened during several centuries in the central Zagros.

Current zooarchaeological evidence points to a hunting strategy concentrated on caprine species. However, micromorphological analysis attests to the presence of animal dung—and thus, animal penning—at Sheikhi Abad and Jani in the late 9th millennium BCE (Matthews et al. 2014). Both previous and new evidence from Ganj Dareh also indicates that goats were herded at the site (Bangsgaard et al. 20121; Zeder and Hesse 2000). Moreover, these specimens were genetically distinct from their wild ancestors, though they had not yet undergone any detectable morphological changes (Daley et al. 2021). The fact that animal domestication is generally considered to be a long-term process coinciding with protracted behavioral, genetic and finally physical change in the species (see Zeder 2011), one may assume that goats were under human control in earlier times during the 9th millennium BCE. In the western Fertile Crescent, pigs and cattle were synchronously herded during the 9th millennium BC. In addition, early signs of sheep domestication come from Anatolia (Vigne et al. 2017).

With regard to the botanical record, a similar process can also be surmised. However, recent studies suggest a shorter time span during which some crops or legumes were cultivated, critiquing the protracted hypothesis of Neolithization process at least in this case (see e.g., Kabucku et al. 2021). It is evident that wild progenitors of early cultivated species were intentionally and intensively exploited during the earlier phase of the Transitional Neolithic. Over time, an increasing reliance on crops and legumes is seen. Archaeobotanical analyses have shown a kind of pre-domestic cultivation practice already in place during the 9th millennium BCE at Chogha Golan and East Chia Sabz, an event deduced from a change from small seeded to large-seeded Fabaceae through time. Moreover, the first morphologically domesticated plants are observed in the beginning of the 8th millennium BCE, as shown by an increase in seed size and non-brittle rachis of barley, emmer and lentil (Riehl et al. 2012; 2013; 2015). Chogha Golan has yielded a long-term intensive reliance on wild crops which fluctuated according to variable climatic conditions through time, but which finally resulted in their domestication (Riehl et al. 2015). At Sheikhi Abad, an 'auditioning' of the locally available species is seen, indicating a selective strategy in plant exploitation. Here, the appearance of domestic barely has also been assigned to the early 8th millennium BCE (Whitlam et al. 2018), which is in line with a broader regional change in the subsistence patterns. As a whole, we may therefore suppose a division of the Transitional Neolithic with regard to subsistence strategy: first, the stage of intensive experimentation with wild species and, second, the stage of manipulation of domesticable species. This is roughly in line with the general trajectory observed in the Levant, where the initial cultivation of wild cereals was sporadically practiced during PPNA and then domesticated varieties appeared during EPPNB (Arranz-Otaegui et al. 2016; Ibanez et al. 2018).

In this respect, the early selective use of specific species suggests a kind of food resource management paving the ground for low-level food production. Recent data from the site of Gusir Höyük in southeastern Turkey has shown just such a development in the way that legume crop progenitors and nuts were intentionally selected during the 10th millennium BCE and then from the mid-9th millennium BCE onward, cereals, specifically wheat, and legume crop progenitors were likely cultivated at the site (Kabucku et al. 2021). However, crop progenitor species played only a small role in plant-based diets of the eastern Fertile Crescent, including the Central Zagros, while legumes and nuts were predominantly consumed during the first two millennia of the Holocene (see Arranz-Otaguei et al. 2016; Asouti 2017; Savard et al. 2006; Tanno and Willcox 2006; Weide et al. 2018; Willcox 2012).

Increasing exploitation of various plant species during the Transitional Neolithic could comply with the emergence and development of grinding stones in the central Zagros. However, one can see a gradual change in grinding stones through time. Although these implements were used for processing different items, including pigments, plant-based food preparation stands as their major function (Wright 1991;1994; 2000). Grinding stones were used much earlier in the Levant and even in the western Zagros. Recent excavations at Palegawra revealed a few samples from Epipaleolithic contexts (Asouti et al. 2020). The techno-typological development of grinding stones is not yet well-known in the Central

Zagros. Nevertheless, a general change from deep mortars to shallow quern-shaped styles can be assumed, supporting an increasing reliance on cereals over a long time spanning transitional Neolithic through late Neolithic. This has been shown at the site of East Chia Sabz (Darabi 2016a).

We may consider a similar diachronic trend in the regional proportion of sickle blades, among other stone tools that are generally set within the so-called 'pre-M'lefatian' (Nishiaki and Darabi 2018) and 'early M'lefatian' industries (Kozlowski 1999; Kozlowski and Aurenche 2005). The former presents a combination of Late Epipaleolithic and Early Neolithic tool types, while the latter indicates an increasing use of pressure technique for detaching blades/bladelets. This may suggest a techno-typological standardization and an apparent progress in craft specialization through time which is consistent with general socio-economic developments. Across the eastern Fertile Crescent, a gradual transition is seen towards pressure percussion as the most widely used knapping technique, and thereby predominant in blade/bladelet production, wheras the western Fertile Crescent displays an application of indirect punch technique and the detachment of blades from unipolar and later bipolar cores resulting in the predominance of various types of projectile points (see Kozlowski & Aurenche 2005).

At a regional scale, research has focused on the emergence of domestication and sedentary life is seen in the Zagros, overlooking social aspects of communities by the onset of the Holocene. It is believed that the beginning of sedentary life paved the ground for initial individual ownership and thereby early trends from egalitarian to non-egalitarian societies in the Central Zagros (Darabi 2016b). Nevertheless, the Transitional Neolithic period is marked by collective or communal efforts, either economically or socially, rather than household activities. The current data upon which one can address social or ritual areas of communities in the central Zagros has hitherto been restricted to the evidence gained from recent excavations at Asiab where the remnants of a large semi-subterranean structure were exposed (Bangsgaard et al. 2019; Darabi et al. 2018; 2019; Richter et al. 2021). The structure, with a likely interior space of approximately 78 m^2, had first been constructed by digging a cut into the underlying natural sediment. The interior space features a bench-like pisé wall that followed its circular shape (Fig. 5). Moreover, a cache of red deer antlers and wild sheep horn cores were incorporated into the bottom of the pisé feature. The floor was seemingly replastered with lime while a remaining depression was also painted with red pigment and a complete horn core from a wild goat was placed into it (Richter et al. 2021). Another significant finding was the discovery of a pit containing a cache of nineteen wild boar crania and mandibles, tightly packed on top of, and next to, each other and intentionally arranged in an east-west direction (Bangsgaard et al. 2019).

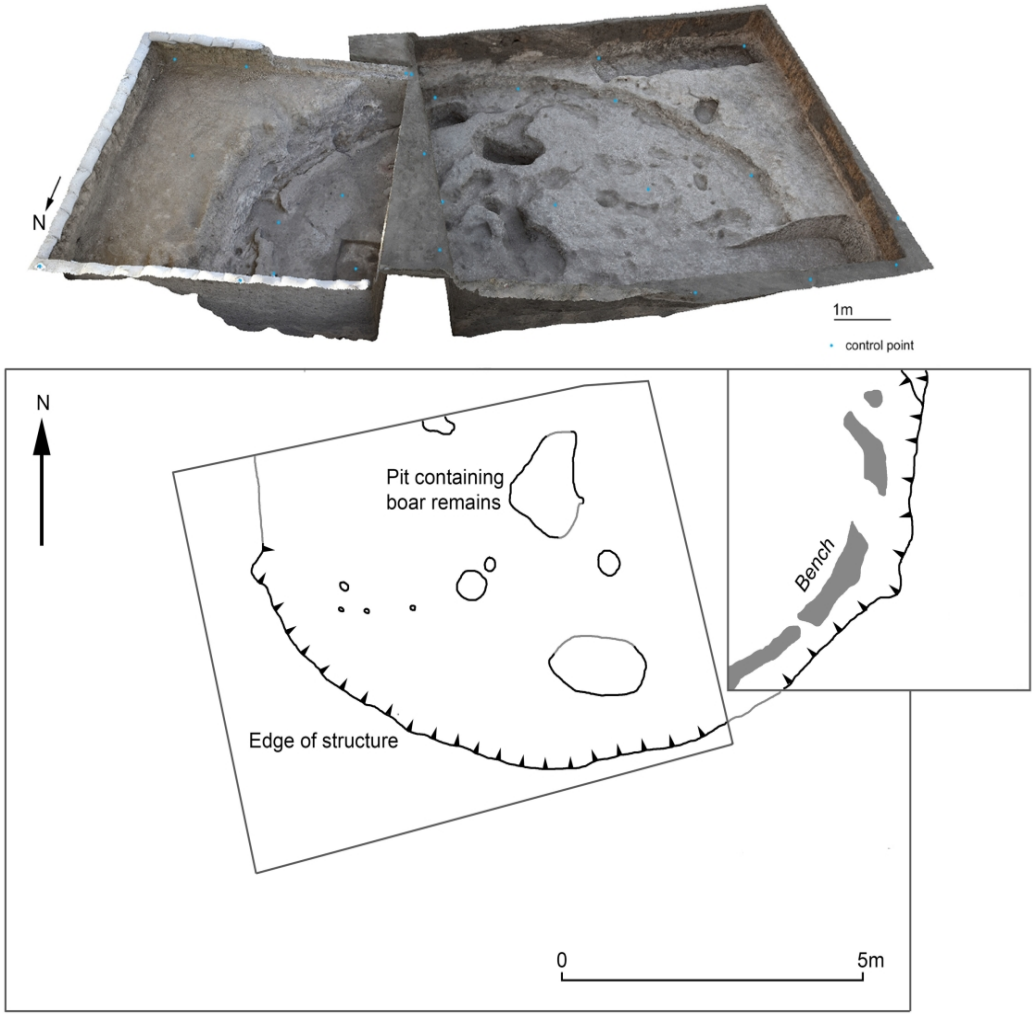

Fig. 5. The semisubterranean communal structure exposed at Asiab (after Bangsgaard et al. 2019:445, fig. 2)

These specific finds, including the general layout and internal features and installations, evidently share similarities with the communal buildings previously known from PPNA sites in the Levant (e.g., Jerf al-Ahmad, Tell ʻAbr 3) and in Anatolia (e.g., Nevalı Çori, Göbekli Tepe, Karahan Tepe, Hallan Çemi). Across the Zagros, a circular structure with a deposit of skulls of wild goats and wing bones of raptors has been reported from Zawi Chemi Shanidar (Solecki 1977). Due to the discovery of communal buildings at a notable number of sites we may suppose them to be a cultural marker of the 10-9th millennia BCE in western Asia. Most scholars have considered them as places for collective events such as meeting, ceremonies or ritual activities (Banning 2011; Finlayson et al. 2011; McBride 2015; Watkins 2004). Some have also taken them as an indication of ideological and ritual change in the course of transition to the Neolithic (Cauvin 2000; Hodder 2018; Verhoeven 2002; Wengrow 2011). In fact, these very early public architectural spaces have also represented the initial symbolism of Neolithic (see Watkins 2004).

In the case of Asiab, the animal deposition could be an indication of feasting and commemorative memory and collective membership in the community. The process of constructing such a large building—from digging out

the soil to putting in place its roof—would have surely been a result of an intensive collective work. Some scholars have advocated that such early feasting events provided communities with maintaining their social cohesion (Kuijt 2000; Zeder 2011). Were the structure not heavily damaged by bio-turbation and especially animal burrows through time, it could have contributed an even better knowledge of the social aspects of the Transitional Neolithic in the Zagros region. Nevertheless, this communal structure at the site indicates that communal buildings were not restricted to just the western or northern Fertile Crescent and that they had also synchronously emerged in the eastern Fertile Crescent together with their counterparts in other regions. On the one hand, it seems that people of Asiab and, at a larger scale, the central Zagros, engaged in a system of wide regional social and cultural interactions, in which similar social and cultural concepts and ideas were communicated between different regions. On the other hand, this highlights a change in ritual and social aspects of the transitional Neolithic communities prior to the emergence of low-level food production, including pre-domestic cultivation and animal management in the central Zagros and, more broadly, the eastern Fertile Crescent.

4. Concluding remarks

While there are undoubtedly general forces that pertain to all examples of agricultural origins wherever it occurred, the progression from food resource management, low-level food production, domestication and finally to an agricultural economy and village-based way of life in any one area is profoundly influenced by a combination of highly localized factors that shape the timing and nature of these developments in distinct ways (Smith 2001; Zeder 2015). This shows the significance of a region-specific perspective which undermines the application of any Levantine-based approach or chronological terminology to the Zagros region. As compared with the Late Epipaleolithic, new features are seen during the Transitional Neolithic in the Central Zagros. The border line between these two periods is much sharper than the Levant, bringing to the fore the idea that the initial communities of the Holocene were creative in shaping their new worlds.

To date, the available datasets suggest that the Transitional Neolithic period saw gradual diachronic changes in various domains, though they are not yet well-traceable through current evidence. While settlement patterns and technology of the communities underwent a gradual change over this time period, a radical change in subsistence towards low-level food production seems to have happened over centuries, most likely during the second half of the 9th millennium BCE. This trajectory divides the Transitional Neolithic into two subsequent phases. In this regard, the early Transitional Neolithic (ca. 9,800-8,500 BCE) saw initial attempts towards gradual change in the degree of mobility from short-term to seasonal settlements and the predominance of the so-called pre-M'lefatian lithic industry as well as an unprecedented high degree of exploitation of wild progenitors of early domesticates.

The onset of this period also witnessed the emergence of communal buildings, synchronously with other areas in west Asia, as attested by the case of Asiab, suggesting the first symbolically-rich built environment in the region. We may therefore highlight the possible roles of these structures in shaping newly

agglomerated communities and how they could have helped with social cohesion and collective decision-making or holding communal feasts or ritual events. Furthermore, the appearance of the communal buildings can be considered as a social outcome of the newly established ways of interaction between humans and their environmental resources during an era when ecological knowledge accumulated over generations. In the Central Zagros at least, the extent to which the presence of communal buildings and thereby collective feastings might have influenced the subsequently shift to resource management and low-level food production cannot be precisely determined, however.

With regard to the late Transitional Neolithic (ca. 8,500-8,000 BCE), current data attests to a change in human-environment interactions represented by pre-domestic cultivation and animal herding. Although one may consider multiple causes triggering this radical change toward domestication and, more broadly, the Neolithization process of the Central Zagros, intensive interactions between humans and domesticable species should have played an important role in this regard. However, it is argued that increasing pressure on environmental resources and resulting shortages, resulting either from population growth or climatic deterioration, seems to have forced people to broaden their diet to include alternative food supplies in the region. In fact, this suggests an early creative resilience by communities over the first two millennia of the Holocene.

Chronologically, one finds early and late sub-phases of the Transitional Neolithic as periods that roughly correspond to PPNA and EPPNB in the Levant where a generally similar process socio-economic transformations can be observed, especially early experimentations with cultivating cereals and their subsequent full- domestication. As noted above, however, different techno-typological criteria of the overall archaeological inventories in the Levant and Zagros highlight distinct but interconnected developments in the process of Neolithization. In the Central Zagros, archaeological evidence such as settlement patterns, lithic technologies and changes in diet clearly show region-specific pathways towards Neolithization, although a general coinciding trend from foraging to cultivating/herding occurred across West Asia. The emergence of communal structures in this vast region also suggests an early cultural interconnectedness, an issue that has also recently been shown by genetic data (see Lazaridis et al. 2022). Generally speaking, the Transitional Neolithic spans a phase of exploration, early experimentation with surrounding resources, and increasing social learning by the Zagros inhabitants, who laid foundations for true domestication, agriculture, and a village-based way of life during the succeeding period of the Early Neolithic (ca. 8,000-7,000 BCE).

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6. Endnotes

1.The main current issue that might be critical to the hypothesis is that population increase is not yet well-evident in the region where a few sites are currently known. Estimation of population density and settlement pattern is facing with multiple constraints. Firstly, we need to keep in mind that small alluvial

intermountain valleys or plains of the central Zagros have been easily subjected to massive alleviation over the Holocene era (also see Hole 1987). Geomorphological investigation by Brookes et al. (1982) showed more than five meters of alluvial sequence along cutbank sections of the Mereg stream, the Mahidasht Plain, and its implications for archaeological survey. Imagine that if the Braidwood's team had not accidently stopped their vehicle on the top of Asiab, this significant site would have remained unknown to us as it is a flat area buried by the sediments. Secondly, subsequent larger post-Neolithic occupations should have buried some of the early Neolithic sites, again making their discovery difficult in the reconnaissance surveys. Thirdly, the scarcity of Neolithic settlements has also been affected by recent developmental activities that overwhelmingly changed the landscape. In fact, this makes sense when more than 20 pre-pottery mounded sites were located by Braidwood and his team (Hole 2011, pers.comm.) but most of them are no longer visible in the region. However, the more intensive surveys are applied the more Neolithic sites are located in the central Zagros. At a wider geographic scale, shorter fertility intervals and thus an increase of population has been assigned to the beginning of Neolithic (see Bocquet-Appel 2011). Generally speaking, it seems reasonable to think of increasing population when some societies started to settle down since the 9th millennium BCE onwards, a phenomenon that is still somehow mirrored by growing numbers of the sites through time. Lastly, this argument may be reminding this impression that 'absence of evidence is not evidence of absence'.

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هزاره‌های خلاق: برجسته‌سازی نوسنگی انتقالی (۸۰۰۰-۹۸۰۰ ق.م.) در زاگرس مرکزی

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چکیده

نخستین پژوهش‌های مرتبط با شروع کشاورزی و روستانشینی در زاگرس مرکزی به سالهای ۶۰-۱۹۵۹ و توسط رابرت بریدوود برمی‌گردد. با این حال، تغییر مسیر پژوهش‌ها به سمت منطقه لوانت (شامات) باعث شد تا به مدت چندین دهه در هاله‌ای از ابهام قرار گیرد، تا اینکه مطالعات اخیر یکبار دیگر نقش آن را در روندهای نوسنگی‌شدن در غرب آسیا برجسته نمودند. برخلاف لوانت، که در آن تغییر تدریجی و بلندمدت از دوره فراپارینه‌سنگی به نوسنگی رخ داده است، مرز بین این دو دوره در زاگرس مرکزی به مراتب مشهود است؛ به طوری که طی دو هزاره نخستِ دوره هولوسن (هزاره دهم و نهم ق.م.) ویژگی‌هایی در این منطقه دیده می‌شود که سابقه نداشته‌اند. این بازه زمانی در واقع به عنوان دوره‌ای بنیادی مورد نظر است که در منطقه زاگرس مرکزی تا حدود بسیار زیادی ناشناخته باقی مانده است. با در نظر گرفتن مدارک و شواهد جدید، این دوره زمانی در این مقاله تحت عنوان «نوسنگی انتقالی» (۸۰۰۰-۹۸۰۰ ق.م.) مورد توجه و بررسی قرار گرفته است. مجموعه داده‌های موجود نشان می‌دهند که پیرو بهبود شرایط محیطی در پایان دوره دریاس جوان، جوامع منطقه روی به سکونت‌های کوتاه مدت، انجام آیین‌های جمعی و اتکای روزافزون بر نیای وحشی اولین گونه-های گیاهی و جانوری اهلی شده آورده‌اند. این زمان مصادف با برهمنکش بالا با منابع محیطی بوده که این امر در افزایش دانش و شناخت مردم از زیست‌بوم پیرامون آنان نقش مهمی ایفاء نموده است. می‌توان گفت که در طی زمان طول سکونت در مکانهای مساعد افزایش یافته و این موضوع به افزایش تدریجی جمعیت در هزاره نهم ق.م. منجر شده است. این موضوع در عوض خود را در فشار تدریجی و البته روزافزون بر روی منابع غذایی منعکس نموده است؛ هرچند این فشار محیطی ممکن است ناشی از رخدادهای احتمالی اقلیمی هم بوده باشد. مدارک باستان‌شناسی بیانگر این است که از اواسط هزاره نهم ق.م. تغییری در سازوکارهای معیشتی جوامع به سوی تولید سطح پایین غذا رخ داده است. در واقع، این امر نوعی اتفاق فرهنگی-محیطی بوده که منجر به توسعه رژیم غذایی شده است. زاگرس مرکزی شاهد رفتارهای خلاقانه جوامع طی مراحل اولیه و ثانویه این دوره نوسنگی انتقالی بوده است و این امر شالوده‌ای محکم را برای زندگی واقعی نوسنگی در هزاره هشتم ق.م. فراهم نموده است.

واژه‌های کلیدی : زاگرس مرکزی، نوسنگی انتقالی، نوسنگی شدن، دانش محیطی، تولید سطح پایین غذا.

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Investigating and Introducing Signs of Achamenid Shekel Coins, from the Collection of Mazandaran Museum

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(59-86)

Abstract

The present paper involves the investigation and identification of the insignia of 240 Achamenid shekels, from the collection of the Mazandaran Museum. Investigation of law enforcement indicates that the collection was seized from looters in the Asalooyeh region (ambiguous locality). Subsequent preliminary work suggests these are typical coins of seven kings who reigned for around 184 years between 522 BC to 338 BC. Some 195 coins of the total 240 have signs, mostly with one sign, while rare samples present up to 9 signs. Numismatists and archaeologists have assigned them various functions, including mint sign, finesse, and weight affirmation. Do the definitions include the studied collection? Why do some of the coins have no signs? The investigations led to the discernment of 567 signs, typically from plain to geometrical and zoomorphic ones. There are many signs in the collection that are similar to known samples in many ways, however, there are unique signs unsimilar to any other marks thus far identified, which are not necessarily mint marks, because they are more obvious than the king's figure that is eroded in most of the cases. Obviously, they are later engravings, whereas, 45 coins lacks any signs. The other conclusion is the transition of concepts of the signs as hidden mysterious messages such as a king death and reign of a new king.

Keywords: Achaemenid, Coin, Shekel, Signs, Mazandaran Museum.

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Introduction

The four primary types of coins minted during the Achaemenid era consist of 1) royal coins 2) satrapy coins 3) provincial coins with a king figure 4) local or non-Iranian coins under Persian domination (Mahmoodabadi and Haratian 1388: 147). The coins are minted as "Daric", i.e., gold, and "Shekel", i.e., silver. The gold coins, Daric, are 8.4g (Dandamaief 1358: 41), probably after "Dara" or "Darius" (A'zami Sangsari 1349: 41), and the silver coins are 5.6g thick lentiform pieces, which were minted following Darius the Great. The coin was named "Shekel", following the Greek "Siglos" (Mahmood Abadi & Haratian 1388: 148), weight units (Ivanof 1359: 90), and weight division according to the Persian "Maneh" (Bayat 1365: 77).

The case study coins, as Achamenid coins, are part of a collection of 276 silver coins of the so-called Shekel type with an average weight of 5.6g weight that were seized from looters, probably from the Asalooyeh area. There is a figure of an archer king, or armed king with a dagger or spear, on the obverse, and a concavity on the reverse. The concavities tend to extend across the width or length of the coins, indicating the bulging part of the anvil that prevented any coin to slide after the hammer hit (Lenormant 1873: 259). Sometimes, there are various designs on both sides, in some cases only on one side, that was impressed via 2-3 mm dies. Some scholars haved suggested that the small abbreviations and signs were used as designs or mysterious signs (Bablon 1388: 21), abbreviations and icons (ibid: index), signs (Bayani 1370: 187), monograms (Eftekhari 1393: 70), or surcharge and countermarks (Jafari Dehaghi 1391: 25). The pesent paper introduces the designs simply as "signs."

Numismatists usually focus, in the main, on the overall designs of coins and rarely work to identify signs; classifications and analysis of the semiotic content of coins is therefore a lacuna in numismatic studies. For a more detailed study, 240 coins of higher quality were separated from the whole collection. Through documentation, preliminary investigations indicated that 45 coins were bare of any signs, while the other 195 specimens have signs. In total, this study recognized 567 signs (Table 1). The engraved designs and signs on the coins of the collection vary from plain, for example circle depressions, to complex designs including wheel of the sun or broken cross, crescent moons, probable rings of power, anchors, and zoomorphic designs such as camels, turtles, ducks, chickens and roosters. Statistically, most of the signs appears on the coins of Artaxerxes II, while the lowest rate is on the Cyrus the Younger's coins.

The creation of a database of the designs is one of the most important achievement of the present research, to be used as a reference resource toward more comprehensive descriptive data and fuller recognition of Achaemenid coins. The most significant question in this research concerns the reason of minting such signs and icons. Considering that some

of the signs are directly engraved on the king's figure, who ordered the distortion of the king's figure? If these signs are engravings that appeared during his lifetime, was it a violation or an offensive action against supremacy of the king? If they are the emblems of different mints, why do some coins depicting the same king lack any sign? Does this mean that some mints did not require engraving the same signs?

It appears some of the signs are in fact mint marks, while the other engravings directly on the king face are countermarks that new monarchs, minted in order to continue the use of coinage authorized by earlier kings. Therefore, the signs provide a context to convey a hidden and mysterious message including kingly death and sign of the reign of new king, or it could be the signature or endorsement of the financial manager that certified earlier coins through the succession of new economic cycles, i.e., an indication of reassessment of finesse and weights. The present paper addresses these questions, considering the problems and ambiguities.

Table 1. the case studies and the statistics of the engravings on the coins of the Mazandaran Collection.

Number and statistics of Signs						
line	The name of the king	type	Number of coins	Coins with the signs	Number of the signs	Number of plates
1	Darius I	III	5	5	18	1
2	Xerxes	II	43	34	103	2
3	Artaxerxes I	-	6	5	19	3
4	Darius II	-	3	3	9	4
5	Cyrus the younger	-	4	3	8	5
6	Artaxerxes II	I	8	5	14	6
		II	74	68	269	7
		III	77	59	81	8
7	Artaxerxes III	I	5	4	12	9
		II	6	3	6	10
8	unrecognizable coins	-	9	6	28	11

Research method

The first stage of the research is classification of the coins from the Mazandaran Collection, because despite of uniformity and similarity of the Achamenid coins, they reveal numerous variations. However, a few samples remained inscrutable and, to some extent, unsimilar to any known examples. Already in the 19th century the numismatist Barkley Head faced this problem and acknowledged the difficulty of stylistic uniformity and the lack of inscriptions (Head, 1887: 28). Different types of coins from a given king, probably from different mints, doubled the difficulty. Carradice suggests this variation can be attributed to "fundamental stylistic differences indicat[ing] that coins [were] minted in more than one place,

however, it has remained unproven." Classification of the coins within the present paper, was performed according to references to the earliest and latest numismatists, evidence including the coins of Darius I that were discovered at Persepolis, their weight, erosion rate, the kings' garments, the simplicity or complexity of designs that indicate development of coinage, the crown (Kidaris) or a symbol of the royal power (Pope 1387:508), the clothing of a bronze statue that wears a skirt (Ghirshman 1964: 55), and/or various historical reports including the reference of Sandanice from Lydia to leather trousers and clothing, and bodysuit forms (Modi 1937: 173), number of pleats (Thompson 2002: 30), sleeve forms compared to objective instances (Shapour Shahbazi 2012: 60), armaments and bows that the Achaemenids significantly used (Roshan Zamir 1355: 33), daggers or so-called "Achinach" short-swords (Zoka 1350: 69), the short Persian sword or light Persian sword (Walser 1965: 106), and another efficient armor as "Arashtayasha" spear [Arashti] (Pordavood 1382: 46).

Considering earlier references, coins of seven Achamenid kings were recognized, except for "Arses" (338-336 BC) and "Darius III" (336-330 BC), i.e., the latest Achamenid kings. In the collection, there is only one type of Darius I, of whom we know of at least three types of coins; one type of Xerxes, of whom we know of two types of coins; respectively, one types from Artaxerxes I, Darius II, and the Young Cyrus; three types of Artaxerxes II; and finally, two types of Artaxerxes III. The timespan ranges from 522-338 BC, covering 184 years of the history of Achamenid dynasty. However, variations in signage appeared on the Achaemenid shekels, except for the satrapy coins. According to Eimhoff, Bablon suggests that the engraving signs on the Satrapy coins, including coins of Cilicia, only appeared from the reign of Artaxerxes II onward (405-395 BC). For example, there is a honey bee on one the coinages of Maloos, at the same time, the letter "T", a broken cross, a cluster of wheat, and a seal appear on the coins. Later, there are many signs and Greek words on the coins of Maloos, during the reign of Artaxerxes III (359-338 BC), Arses (338-337 BC), and Darius III (337-330 BC). During the dominance of the Achaemenids, there were many letters on the coins of Nagidoos and Soli that functioned as judges' emblems. During the reign of Artaxerxes II and III, Greek letters appeared on the Aramaic coins of Mazes. The Greek signs, minted on the reverse of the dirham of the Satrap Aryarat, before 331 BC, and there were appeared Greek letters and weight indices on many coins of Taris (Babylon 1388: 21).

Various Achamenid numismatic sources rarely present a table or even a few simple images, and even when they do, they go through it quickly, usually summarizing the signs and never present the icons and signs. For example, when Babylon introduces figures of the coins, presents a table of 77 signs as "abbreviations and icons" without any reference to the case study coins (Fig. 1).

Fig. 1: Signs and icons on the coins of Achamenid kings and subsidiary kinglets (Babylon 2009).

Bayani introduces 6 signs on the shekels of the Iranian National Museum Collection, respectively, for 1-Xerxes, 2-Unknown king, 3-Darius I, 4-Darius II, 5, 6- and again Xerxes, while she does not define her reasons. **(**Bayani, 1991: 187**)** (Fig. 2). In another example, George Hill (1919) in "Notes on the Imperial Persian Coinage" in *the Journal of Hellenic Studies* published 187 signs in the catalogue of the British Museum and the Iranian volume (Hill 1919: 126), which republished again as "Royal coins of Iran" 1977.

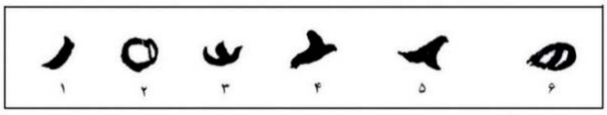

Fig. 2 Signs on coins (Bayani, 1370: 187)

The Following figures, in black, are negative points or concavities of the coined designs on the coins. In the collection, some of the designs are completely involved in the scene, however, they mostly include a composition of negative and outlined elements (Hill 1922: 98). Some of Hill's presentations are completely comparable and similar to the collection of Mazandaran at Sari (Fig. 3).

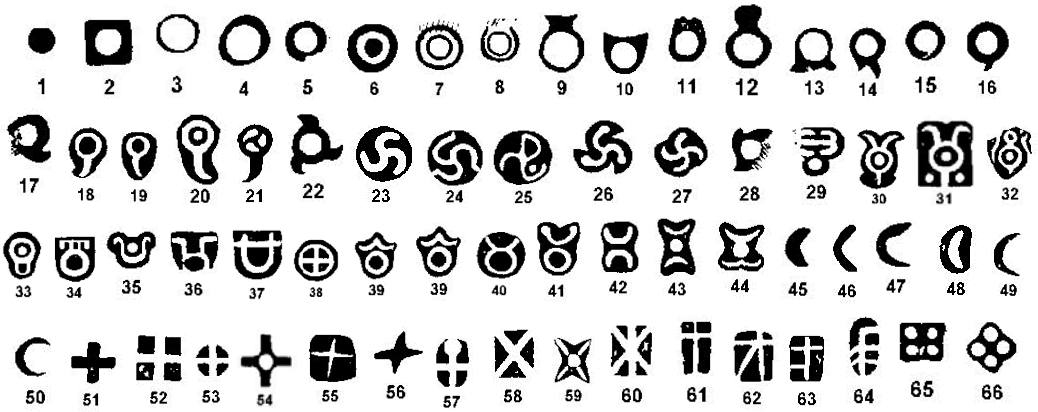

Fig. 3: signs and icons from the catalogue of the British Museum (Hill, 1922: 98).

Methodology

Following deoxidation, weighing, and measurement of a subsample of coins, the authors took images, using a digital camera, then produced a technical diagram with computer and manual skills. Then Photoshop's Invert filter was applied, produced negative images of dies, which was followed by clear drawings (Fig. 4).

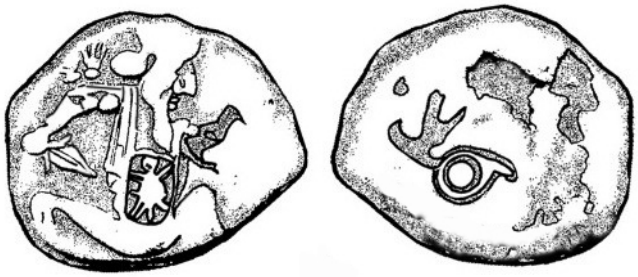

Fig. 4: An example of drawing coin and designs. A coin of Artaxerxes II. (Drawing: Saman Soortiji)

Regardless of the concave designs of simple dies, there are designs that appeared within a framework of difference of the concavities and bulges. Therefore, various lines including thick, thin, and tram point to clarify all concavities and convexities. The authors observed the engravings of the collection as small, medium and large and more obvious than usual. Clockwise, there is an explanation and drawing for each of the designs, including the number of the coin, property number, Roman numeral of the design code, and a brief explanation about location of the designs on the reverse or obverse. Considering the explanations and tables, one can easily recognize the exact position of the signs, on the coin or the king figure, with a certain number.

Introducing the signs of the coins of the Mazandaran Collection, by kings

Tables 1-11 introduce the signs and icons that were engraved on the coins of the Mazandaran Collection for every given king. As mentioned earlier, there are various types of the coins of seven kings, the signs present a high number of variations, so one can find repeated types. It should be noted that the abbreviation of the part includes coin numbers and property numbers, which Roman numerals are documented, and briefly explains clockwise on the obverse and reverse of the coins.

Coins of Darius I (Fig. 5 – Plate 1):

No. 1 (property No.10961) **Obverse:** I- leaning back and on the waist. II- in front of the abdomen and on the left hand. **Reverse:** III- almost in the middle, at 9 o'clock.

No. 2 (property No.10997) **Obverse:** I- back of the waist. II- in front of the shoulder and on the left hand **Reverse:** concavity of the anvil, at the left side next to the edge at 10 o'clock.

No. 3 (property No.11038) **Obverse:** I- in front of the shoulder, on the left hand. **Reverse:** II- right, at 4 o'clock.

No. 4 (property No.11018) **Obverse:** I- on the bow, left hand. II- back, on the right elbow. III- back, near the edge of the coin. **Reverse:** IV- right, 3 o'clock. V- right, 2 o'clock. VI- left, 9 o'clock.

No. 5 (property No.11140) **Obverse:** I-back, right forearm. II- On the left foot. **Reverse:** III- right, 3 o'clock. IV- on the depression near the center, 3 o'clock.

Fig. 5: Darius of coins, The Mazandaran Collection. (Drawing: Saman Soortiji)

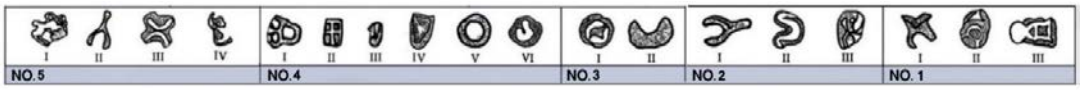

Plate 1: Signs of the coins of Darius I. (Drawing: Saman Soortiji)

Coins of Xerxes (Fig.6 – Plate 2):

No. 6 (property No.11068) **Obverse:** I- in front of the crown and forehead. II- in front of the beard and part of the arm. **Reverse:** III- down, 6 o'clock. IV- left, 9 o'clock.
No. 8 (property No.11112) **Obverse:** I- in front of the abdomen and the surface of the spear. II- In front of the face. III- In front of the face. **Reverse:** no signs.
No. 9 (property No.11030) **Obverse:** I- Behind the head. II- On the chest. III- on the abdomen. IV- in front of the abdomen and on the bow. V- in front of the face, on the beard and left arm. VI- In front of the king on the bow. **Reverse:** VII -on the left anvil depression, 9 o'clock. VIII- Right, 9 o'clock.
No. 11 (property No.11011) **Obverse:** I- on the right thigh. II- in front of the abdomen, on the spear. III- on the abdomen. **Reverse:** no signs.
No. 12 (property No.10919) **Obverse:** I-Behind the waist. **Reverse:** no signs.
No. 13 (property No.11014) **Obverse:** I- in front of the king, on the abdomen and spear. II- in front of the face. III- Behind the thigh and on the heel of the right foot. **Reverse:** IV- right, 5 o'clock. V- center of the coin and on the recess.
No. 14 (property No.11098) **Obverse:** I- in front of the face. II- on the left arm in front of the chest. **Reverse:** no signs.
No. 15 (property No.11118) **Obverse:** I- in front of the chest, on the left arm. II- on the abdomen and spear. **Reverse:** III- left, 7 o'clock. IV- center. V- left, 8 o'clock.
No. 16 (property No.11035) **Obverse:** I- in front of the abdomen, on the spear. **Reverse:** II- left, 7 o'clock. III- left, 9 o'clock. IV- on the anvil depression, 12 o'clock. V- on the recess, 12 o'clock position.
No. 18 (property No.11146) **Obverse:** I- in front of the chest, on the right arm. **Reverse:** no signs.
No. 21 (property No.11026) **Obverse:** I- in front of the chest and face. **Reverse:** II- left, 8 o'clock.
No. 22 (property No.10972) **Obverse:** I- in front of the king on the left wrist and bow. **Reverse:** no signs.
No. 23 (property No.10965) **Obverse:** I-in front of the king on the left wrist and bow. **Reverse:** no signs.
No. 24 (property No.10968) **Obverse:** no signs. **Reverse:** I- left, 9 o'clock.
No. 25 (property No.11010) **Obverse:** no signs. **Reverse:** I- 9 o'clock. II- 3 o'clock.
No. 26 (property No.11134) **Obverse:** no signs.**Reverse:** I- On the recess of the anvil, 12 o'clock.
No. 27 (property No.11037) **Obverse:** no signs.**Reverse:** I- right, 9 o'clock position. II- 11 o'clock position.
No. 29 (property No.11044) **Obverse:** I- in front of the chest, on the spear. **Reverse:** no signs.

No. 30 (property No.10934) **Obverse:** I- in front of the face. II- on the chest III- on the right shoulder, near the neck. IV- on the left thigh V- in front of the left arm and bow. VI- in front of the abdomen, on the spear. **Reverse:** VII- 2 o'clock position.
No. 31 (property No.11009) **Obverse:** no signs. **Reverse:** I- left, 2 o'clock position.
No. 32 (property No.10937) **Obverse:** I- in front of the king and on the forearm and left wrist. II-behind the waist. in the back of the waist. **Reverse:**IV- left, in the 10 o'clock position. V- left, in the 9 o'clock position.
No. 33 (property No.10944) **Obverse:** I- on the arm and forearm of the right hand. II- in front of the waist and on the left knee and spear. **Reverse:** no signs.
No. 34 (property No.11154) **Obverse:** I- on part of the face and left arm .**Reverse:** no signs.
No. 36 (property No.10969) **Obverse:** I- in front of the knee, on the bayonet blade. **Reverse:** II- right, in the 3 o'clock position.
No. 37 (property No.11093) **Obverse:** I- behind the right arm. II- in front of the face III- behind the waist. **Reverse:** no signs.
No. 38 (property No.11080) **Obverse:** I- in front of the face. **Reverse:** no signs.
No. 39 (property No.10928) **Obverse:** I- behind the shoulder, on the right arm. II- the back of the waist and the top of the right leg. III- on the chest and abdomen. **Reverse:** IV- center.V- right, 4 o'clock. VI- right, 1 o'clock.
No. 41 (property No.11057) **Obverse:** no signs. **Reverse:** I- left, 1 o'clock.
No. 42 (property No.10930) **Obverse:** I- in front of the chest and on the left arm. II- in front of the beard and in the range of the bow. III- in front of the chest and under the left forearm. **Reverse:** IV- left, in the 9 o'clock position. V- left, in the 8 o'clock position.
No. 43 (property No.11089) **Obverse:** I- on the chest. II- The back of the waist. III-below the waist and on the thighs. **Reverse:** IV- left, 8 o'clock. V- in the 9 o'clock position. VI- center, on the anvil depression.VII- down, 6 o'clock.
No. 44 (property No. 11078) **Obverse:** I- behind the waist. **Reverse:** II- right, in the 3 o'clock position.
No. 45 (property No.11077) **Obverse:** I- in front of the face and part of the nose and beard. II- on the chest. **Reverse:** III- right, in the position of 3 o'clock. IV- on the recess of the anvil and approximately in the position of 6 o'clock.
No. 46 (property No.11151) **Obverse:** I- in front of the face. II- above the head and on the crown. III- in front of the face in the position of the bow. **Reverse:** IV- near the center, in the 6 o'clock position.V- left, in the 9 o'clock position.
No. 48 (property No.11156) **Obverse:** I- the back of the shoulder and the right arm. II- on the chest. III- the back of the waist and the right leg.**Reverse:** no signs.

Fig. 6: Xerxes' of the coins from the Mazandaran Collection in the Type 2 subdivision. (Drawing: Saman Soortiji)

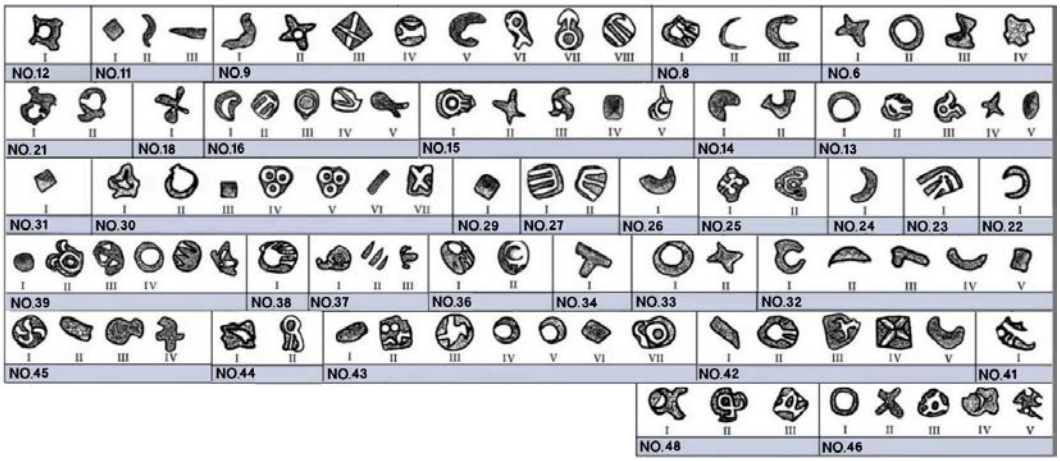

Plate 2: Signs of the coins of Xerxes. (Drawing: Saman Soortiji)

Coins of Artaxerxes I (Fig. 7- Plate 3):

No. 49 (property No.11065) **Obverse:** I- in front of the abdomen, above the knee and part of the spear. **Reverse:** II- lower, anvil depression, 6 o'clock. III- top left, 10 o'clock.IV- left, 9 o'clock.V- near the edge, 8 o'clock. VI- down, on the recess of the anvil, 6 o'clock position - above the sign number II.

No. 50 (property No.11051) **Obverse:** I- behind the waist. **Reverse:** II- down, at 5 o'clock.

No. 51 (property No.10986) **Obverse:** I- on the left knee. **Reverse:** II- in the 9 o'clock position.

No. 52 (property No.11129) **Obverse:** I- in front of the neck in the range of the bow. **Reverse:** II- left, in the 10 o'clock position. III- left, 9 o'clock IV- near the edge at 9 o'clock.

No. 54 (property No.11138) **Obverse:** I- on the chest. II- on the waist and above the left knee. III- in front of the chest, on the left forearm, in the range of the bow. **Reverse:** IV- down, in the 6 o'clock position. V- left, 9 o'clock.

Fig. 7: Artaxerxes I of the coins from the Mazandaran Collection. (Drawing: Saman Soortiji)

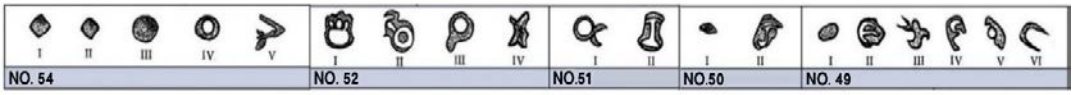

Plate 3: Signs of the coins of *Artaxerxes I*. (Drawing: Saman Soortiji)

Coins of Darius II (Fig. 8 – Plate 4):

No. 55 (property No.11084) **Obverse:** I- in front of the face. II- in front of the abdomen and on a part of the spear. **Reverse:** III- left, in the position of 8 o'clock.
No. 56 (property No. 11019) **Obverse:** I- In front of the chest, on the left forearm and bow. **Reverse:** no signs.
No. 57 (property No.10932) **Obverse:** I- on the waist. II- on the chest. III- on the face. **Reverse:** IV- top, 12 o'clock. V- right, 2 o'clock.

Fig. 8: Darius II of the coins from the Mazandaran Collection. (Drawing: Saman Soortiji)

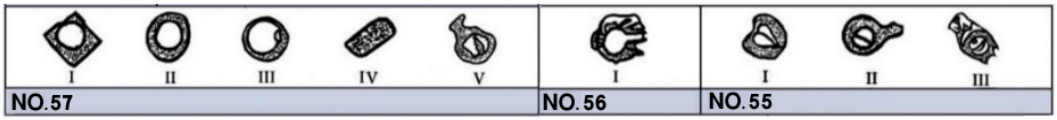

Plate 4: Signs of the coins of Darius II. (Drawing: Saman Soortiji)

Coins of Cyrus the Younger (Fig. 9 – Plate 5):

No. 58 (property No.11061) **Obverse:** I- behind the king, tangent to the elbow. **Reverse:**II- in the 1 o'clock.
No. 60 (property No.11071) **Obverse:** I- below the waist and on the thigh of the right leg II- behind the shoulder and on the end of the spear. III- on the chest.**Reverse:** no signs.
No. 61 (property No.11049) **Obverse:** I- behind the waist. II- in front of the face. **Reverse:**III- left, in the position of 10 o'clock.

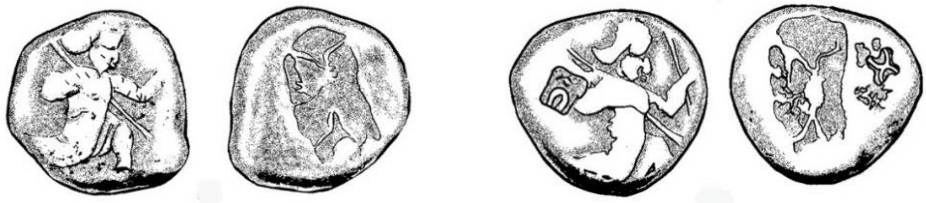

Fig 9: Coins cautiously assigned to Cyrus the Younger. (Drawing: Saman Soortiji)

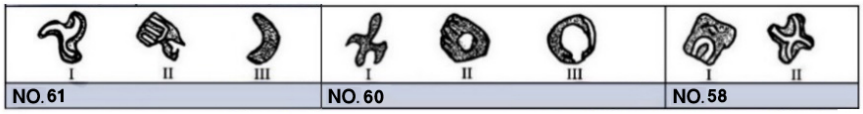

Plate 5: Signs of the coins of Cyrus the Younger. (Drawing: Saman Soortiji)

Coins of Artaxerxes II-Type I (Fig. 10 – Plate 6):

No. 64 (property No.10985) **Obverse:** I- in front of the face. II- in front of the left foot in the range of the bow. **Reverse:** III- down, in the 7 o'clock position.
No. 65 (property No.11063) **Obverse:** I- on the chest. **Reverse:**II- right, at 4 o'clock.
No. 66 (property No.10925) **Obverse:** I- in front of the left elbow and on the bow. II- below the left elbow and in front of the chest. **Reverse:** III- left, 10 o'clock.
No. 67 (property No.11066) **Obverse:** I- opposite and below the left elbow, in front of the chest. **Reverse:** II- right, 4 o'clock. III- left, in the position of 8 o'clock. IV- left, in the position of 9 o'clock.
No. 68 (property No.11054) **Obverse:** no signs. **Reverse:** I- right, in the 4 o'clock position. II- right, in the 3 o'clock position.

Fig. 10: *Artaxerxes* II- Type I, of the coins from the Mazandaran Collection. (Drawing:Saman Soortiji)

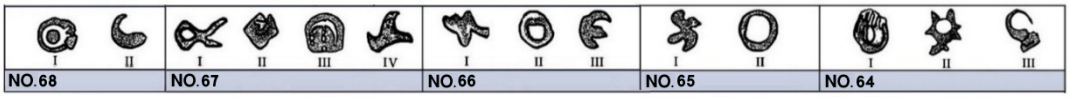

Plate 6: signs of the coins of *Artaxerxes II*-Type I. (Drawing: Saman Soortiji)

Coins of Artaxerxes II-Type II (Fig. 11 – Plate 7):

No. 70 (property No.10921) **Obverse:**I- in front of the chest, on the elbow of the left hand and bow. **Reverse:**II- left, 9 o'clock.

No. 71 (property No.10935) **Obverse:** I- in front of the chest and on the left wrist. II- the back of the neck and close to the edge. III- on the abdomen. IV- in front of the abdomen, on the left forearm. V- opposite the face. **Reverse:** VI- left, in the 10 o'clock position. VII- right, in the 4 o'clock position.

No. 72 (property No.10945) **Obverse:** I- on the left forearm and bow. II- on the abdomen. **Reverse:** III- right, in the position of 3. IV- left, 10 o'clock.

No. 73 (property No.10931) **Obverse:** I- on the left arm and shoulder. **Reverse:** II- in the center and on the anvil depression.

No. 75 (property No.11006) **Obverse:** I- on the chest II- on the abdomen.III- in front of the abdomen on the left thigh. IV- in front of the chest. **Reverse:** V- left, in the position of 8 o'clock.. VI- top, 12 o'clock. VII- center. VIII- left and at 9 o'clock.

No. 76 (property No.10953) **Obverse:** I- in front and on the face. II- in front of the abdomen and under the left arm. III- on the chest **Reverse:** IV- right, in the position of 3. V- top, 11 o'clock. VI- left, 10 o'clock. VII- left, 9 o'clock.

No. 77 (property No.11056) **Obverse:** I- on the chest II- opposite, on the thigh of the left leg III- opposite, on the left leg. **Reverse:** no signs.

No. 78 (property No.11050) **Obverse:** I- behind the waist and on the king's dagger. **Reverse:** no signs.

No. 79 (property No.11021) **Obverse:** no signs. **Reverse:** I- left, in the 9 o'clock position.

No. 82 (property No.11122) **Obverse:**I- Behind the waist. II- in front of the face. III- in front of the abdomen and above the left knee. **Reverse:** IV- right, in the 5 o,clock position. V- in the center.

No. 83 (property No.10994) **Obverse:** I- i on the chest. II- behind the king and on the right arm. III- in front of the shoulder, on the left arm**Reverse:** IV-center.

No. 84 (property No.11042) **Obverse:** no signs. **Reverse:** I- top, at 10 o'clock. II- top, at 12 o'clock. III- cener.

No. 85 (property No.11141) **Obverse:** I- in front of the face and part of the nose and beard. **Reverse:** II- leftt, at 10 o'clock. III-center. IV- leftt, at 10 o'clock.

No. 86 (property No.10941) **Obverse:** I- in front of the chest and on the left arm and part of the beard. II- on the waist III- on the back of the shoulder, on the right arm. IV- behind the waist and on the dagger -V behind the king and on the toe of the right foot. VI- on the chest. VII- Behind the king and on the right arm.**Reverse:** VIII- right, at 3 o'clock. IX- leftt, at 9 o'clock.

No. 87 (property No.11069) **Obverse:** I- on the chest and left arm **Reverse:**II-center. III- right, at 1 o'clock. IV- leftt, at 10 o'clock. V- leftt, at 10 o'clock.

No. 88 (property No.11139) **Obverse:** I- behind. II- in front of the shoulder, on the left arm. **Reverse:** III-center. IV- leftt, at 10 o'clock.

No. 89 (property No.11031) **Obverse:** I- the back. II- in front of the neck and on the left forearm and bow. III- on the chest and abdomen. **Reverse:** IV- downt, at 6 o'clock.

No. 90 (property No.11095) **Obverse:**I- on the right arm **Reverse:** no signs.

No. 91 (property No.11013) **Obverse:** I- in front of the face and part of the bow. **Reverse:** II- center. III- leftt, at 9 o'clock. IV- right, at 1 o'clock.

No. 92 (property No.10980) **Obverse:** I- on the chest. II- In front of the chest on the left forearm and bow. **Reverse:** III- right, at 4 o'clock. IV- right, at 5 o'clock.

No. 93 (property No.11081) **Obverse:** no signs. **Reverse:** I- at 9 o'clock.

No. 94 (property No.11135) **Obverse:** I- behind the shoulder and on a part of the right arm. **Reverse:** II- top, at 9 o'clock.

No. 95 (property No.11100) **Obverse:** I- in front of the chest and on the left arm. **Reverse:** II- down, at 6 o'clock. III- leftt, at 9 o'clock. IV- at 10 o'clock.V- right, at 1 o'clock.

No. 96 (property No.10975) **Obverse:** I- in front of the chest and under the arm and left elbow. II- in front of the abdomen in the arc range. **Reverse:** III- at 9 o'clock. IV- left, at 7 o'clock. V- center.

No. 98 (property No.11123) **Obverse:**I- on the chest. II- on the mouth, beard and left shoulder. **Reverse:** III- almost centered and inclined to the 9 o'clock position.

No. 99 (property No.11148) **Obverse:**I- on the chest. II- in front of the waist, on the left knee. III- on the neck. IV in front of the chest, on the left elbow. **Reverse:** no signs.

No. 100 (property No.11003) **Obverse:**I- on the chest.**Reverse:** no signs.

No. 101 (property No.11034) **Obverse:** I- in front of the face and part of the nose. **Reverse:** no signs.

No. 102 (property No.11033) **Obverse:** I- behind the waist, on the right arm. II- in front of the face. **Reverse:** no signs.

No. 103 (property No.11022) **Obverse:** I- in front of the chest, abdomen and part of the left arm. **Reverse:** II- right, at 9 o'clock. III- top, at 1 o'clock. IV- left, at 3 o'clock.

No. 104 (property No.10942) **Obverse:** I- in front of the abdomen. II- in front of the chest, below the elbow. III- on the chest. **Reverse:** IV- at 6 o'clock. V- at 9 o'clock. VI- left, tangent to the previous sign at 10 o'clock.

No. 105 (property No.11085) **Obverse:** I- behind. II- on the chest. **Reverse:**III- in the 10 o'clock position. IV- in the 6 o'clock position. V- in the 10 o'clock position. VI- in the 1 o'clock position.

No. 107 (property No.10949) **Obverse:** I- the top of the crown. II- above the crown III- behind the waist and on the right elbow. IV- in front of the face **Reverse:**V- down, at 6 o'clock. VI- in the 8 o'clock position. VII- in the 11 o'clock position.

No. 109 (property No.11108) **Obverse:**I- **Reverse:** II- left, at 9 o'clock. III- almost in the center. IV- left, at 9 o'clock. V- down, at 6 o'clock. VI- right, at 3 o'clock. VII- left, at 7 o'clock. VIII- right, at 3 o'clock.

No. 110 (property No.11088) **Obverse:** I- in front of the chest, on the left arm. II- on the chest and abdomen.**Reverse:** III- left, at 10 o'clock.

No. 111 (property No.11028) **Obverse:** I- on the face, neck and chest. **Reverse:** II- almost in the center. III- left, at 9 o'clock. IV- right, at 2 o'clock.

No. 112 (property No.11128) **Obverse:** I- in front of the chest. II- on the chest. III- on the waist. IV- in front of the left knee. **Reverse:** V- left, at 8 o'clock. VI- center.

No. 113 (property No.11143) **Obverse:** no signs. **Reverse:** I- top, at 12 o'clock.

No. 114 (property No.11045) **Obverse:** I- in front of the chest and on the left arm. II- on the chest. III- in front of the face. IV- opposite, on the left wrist. **Reverse:** V- top, at 5 o'clock. VI- left, at 11 o'clock.

No. 115 (property No.11067) **Obverse:** I- in front of the face, on the nose and part of the beard. II- on the chest **Reverse:** III- right, at 3 o'clock. IV- right, at 2 o'clock. V- in the 10 o'clock position.

No. 116 (property No.11074) **Obverse:** I- on the neck and beard. II- on the chest. **Reverse:** III- right, at 2 o'clock. IV- left, at 8 o'clock.

No. 117 (property No.11091) **Obverse:** I- in front of the face, near the edge and the range of the bow **Reverse:** no signs.

No. 118 (property No.11110**) Obverse:** I- in front of the face and on a part of the beard. **Reverse:** II- right, at 8 o'clock. III- left, at 10 o'clock. IV- left, at 5 o'clock.

No. 119 (property No.11126) **Obverse:** no signs. **Reverse:** I- left, at 11 o'clock. II- left, at 10 o'clock.

No. 120 (property No.11114) **Obverse:** no signs. **Reverse:** I- right, at 5 o'clock. II- right, at 4 o'clock. III- right, at 5 o'clock. IV- center. V- left, at 9 o'clock. VI- down, at 6 o'clock.

No. 121 (property No.11025) **Obverse:** I- In front of the face and tangent to the nose. II- in front of the left knee. **Reverse:** III-center. IV-top, at 12 o'clock.

No. 122 (property No.10970) **Obverse:** I- on the chest. II- on the face. **Reverse:** III- center. IV- left, at 11 o'clock.

No. 123 (property No.10974) **Obverse:** I- on the chest and part of the beard. II- In front of the chest, part of the left arm. III- in front of the chest and face and on the left arm. **Reverse:** IV- center. V- left, at 10 o'clock.

No. 124 (property No.10933) **Obverse:** I- in front of the chest, on the left arm. **Reverse:** II- center.

No. 125 (property No.10926) **Obverse:** I- on the back and on part of the king's hair. **Reverse:** no signs.

No. 126 (property No.11052) **Obverse:** I- in front of the face, on the left elbow and the range of the bow. II- on the abdomen and waist. III- in front of the chest, below the elbow of the left hand. **Reverse:** no signs.

No. 127 (property No.11137) **Obverse:** I- on the forehead and crown. **Reverse:** II- In the 9 o'clock position.

No. 129 (property No.10992) **Obverse:** I- in front of the face. II- on the forehead and face. III- on the back of the shoulder, on the right arm IV- on the back and on the waist. V- in front of the chest and on the left arm. **Reverse:** VI- center.

No. 130 (property No.11105) **Obverse:** I- on the face. II- in front of the face. III- on the chest. IV- on the abdomen. **Reverse:** V- left, at 9 o'clock. VI- left, at 11 o'clock.

No. 131 (property No.10967) **Obverse:** I- on the chest. II- behind the waist, on the dagger. **Reverse:** no signs.

No. 132 (property No.11158) **Obverse:** I- In front of the face. **Reverse:** II- left, at 9 o'clock. III- right, at 3 o'clock.

No. 133 (property No.10947) **Obverse:** I- behind the waist, on the dagger grip. II- in front of the face, on the left wrist and bow. III- on the chest. **Reverse:** IV- right, at 4 o'clock. V- center. VI-top, at 12 o'clock.

No. 134 (property No.11136) **Obverse:** I- on the back of the shoulder, on the right arm. II-on the abdomen. III- on the chest. IV- in front of the chest. V- opposite the face. VI- in front of the chest, on the elbow and left forearm, in the range of the bow .**Reverse:** VII- left, at 10 o'clock. VIII- center.

No. 135 (property No.10954) **Obverse:** I- behind, on the right arm. II- behind the waist, on the dagger. III- on the face. –IV behind. **Reverse:** V- right, at 3 o'clock. VI- right, at 5 o'clock. VII- left, at 9 o'clock.

No. 137 (property No.10996) **Obverse:** I- on the chest and abdomen. **Reverse:** II- center. III- In the 2 o'clock position.

No. 138 (property No.11064) **Obverse:** I-in front of the chest. II- on the waist. **Reverse:** III-center.

No. 139 (property No.11144) **Obverse:** I- in front of the chest, on the arm. **Reverse:** II- In the 3 o'clock position.

No. 140 (property No.11020) **Obverse:** I- behind, on the right arm. II- on the face. III- the back of the waist. IV- on the chest. V - in front of the face, chest and left arm. VI- on the left leg. **Reverse:** VII-center. VIII- left, at 9 o'clock.

No. 141 (property No.10984) **Obverse:** I- back of the waist, on the right arm. II- on the chest. III- on the abdomen. IV- on the waist.V- in front of the chest and abdomen. **Reverse:** VI- left, at 9 o'clock. VII- down, at 6 o'clock. VIII- right, at 5 o'clock. IX- left, at 9 o'clock.

No. 142 (property No.10939) **Obverse:** I- on the chest. **Reverse:** II- down, at 6 o'clock. III- left, at 9 o'clock. IV- right, at 3 o'clock. V- top, at 12 o'clock.

No. 143 (property No.10964) **Obverse:** I- in front of the chest, part of the left forearm. II- in front of the abdomen. **Reverse:** no signs.

Fig. 11: *Artaxerxes* II-Type II, of the coins from the Mazandaran Collection. (Drawing:Saman Soortiji)

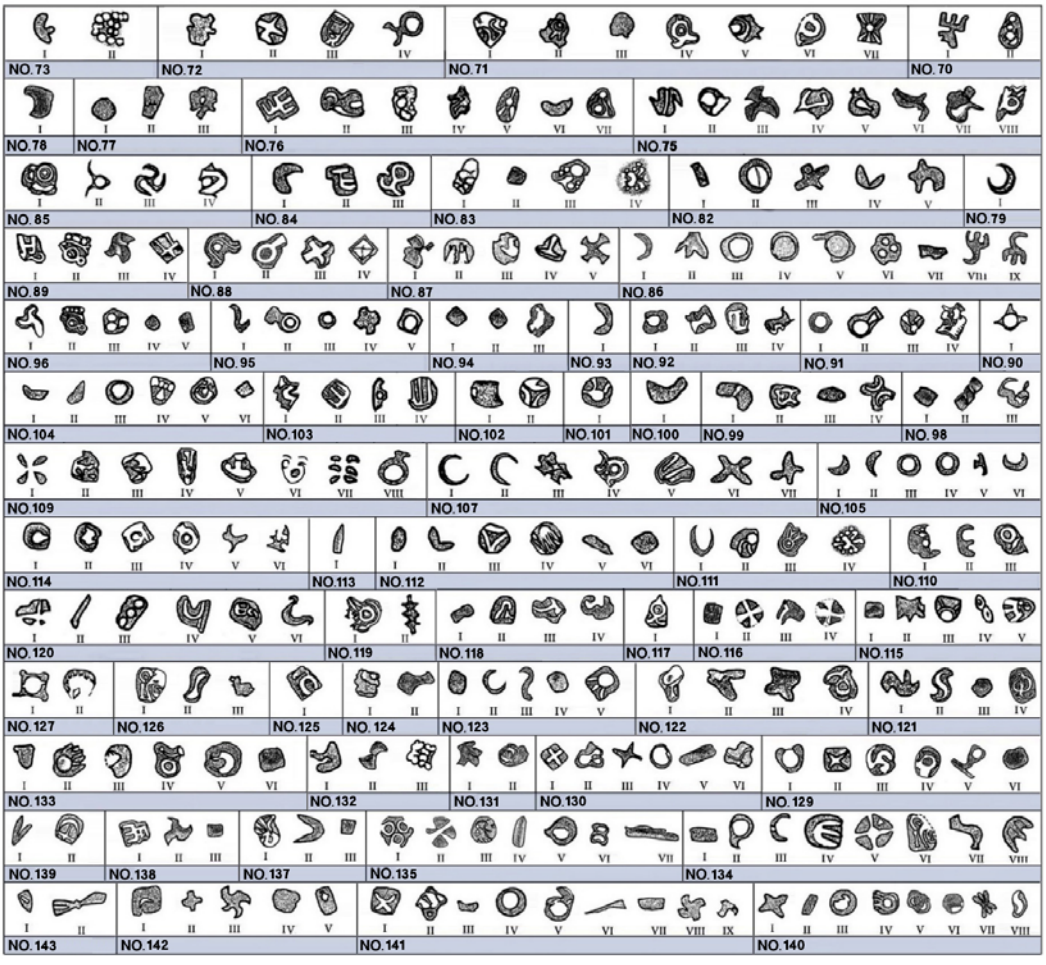

Plate 7: signs of the coins of *Artaxerxes II*-Type II. (Drawing: Saman Soortiji)

4-6-3. coins of Artaxerxes II- Type III (fig. 12- plate 8):

No. 145 (property No.11131) **Obverse:** no signs. **Reverse:** I- top, at 12 o'clock.

No. 146 (property No.11116) **Obverse:** no signs. **Reverse:** I- down, at 6 o'clock. II- center. III- top, at 1 o'clock.

No. 148 (property No.11130) **Obverse:**I- in front of the waist, on the left knee. **Reverse:** no signs.

No. 150 (property No.11002) **Obverse:** I- on the abdomen. II- in front of the chest, on the left arm. **Reverse:** III- left, at 8 o'clock. IV- left, at 9 o'clock.

No. 152 (property No.11012) **Obverse:** I- on the abdomen **Reverse:** II- left, at 9 o'clock. III- left, at 7 o'clock.

No. 153 (property No.11104) **Obverse:** I- in front of the face, part of the beard. II- in front of the chest and abdomen. III- on the neck and chest. **Reverse:** no signs.

No. 154 (property No.11102) **Obverse:** no signs. **Reverse:** I- left, at 9 o'clock.

No. 155 (property No. 10993) **Obverse:** I- behind the head and right arm. II- behind the waist, on the right leg and dagger. III- Behind the waist, on the dagger. IV- in front of the chest on the left arm. **Reverse:**V- left, at 8 o'clock.

No. 156 (property No.10929) **Obverse:** I- on the chest, shoulders and beard. **Reverse:** no signs.

No. 157 (property No.11157) **Obverse:** I- on the face. **Reverse:** no signs.

No. 158 (property No.11039) **Obverse:** I- on the mouth, beard and left arm. II- behind. III-in front of the face. **Reverse:** IV- In the 4 o'clock position. V- left, at 3 o'clock. VI- right, at 9 o'clock.

No. 159 (property No.11062) **Obverse:** I- on the chest. **Reverse:** II- left, at 9 o'clock. III- left, at 10 o'clock.

No. 161 (property No.11079) **Obverse:** I- in front of the face and on the left wrist and bow. **Reverse:** no signs

No. 162 (property No.11027) **Obverse:** I- in front of the chest and under the left arm. **Reverse:** no signs.

No. 163 (property No.10943) **Obverse:** no signs.**Reverse:** I- right, at 2 o'clock. II- left, at 8 o'clock.

No. 164 (property No.11125) **Obverse:** I- behind the shoulder, on the right arm. II- in front of the face, on the left elbow and the range of the bow. **Reverse:** III-center. IV- left, at 9 o'clock.

No. 165 (property No.10963) **Obverse:**no signs. **Reverse:** I- left, at 9 o'clock. II- top, at 9 o'clock.

No. 166 (property No.10959) **Obverse:** no signs. **Reverse:** I- left, at 10 o'clock.

No. 167 (property No.10995) **Obverse:** I- back, on the waist. II- on the chest. III- Behind the waist, on the dagger. IV- on the left waist and thigh. **Reverse:** no signs.

No. 168 (property No.10952) **Obverse:** I- in front of the chest, on the left arm. **Reverse:** no signs.

No. 169 (property No.11083) **Obverse:** I- in front of the face, above the left arm and bow. II- in front of the face, on the left elbow. III- in front of the abdomen, on the bow. **Reverse:** IV- right, at 3 o'clock.

No. 171 (property No.10955) **Obverse:** I- in front of the abdomen, knees and bow. **Reverse:** II- right, at 3 o'clock.

No. 172 (property No.11097) **Obverse:** I- in front of the chest, on the left elbow and bow. II- in front of the abdomen, above the left knee, on the bow. **Reverse:** III- right, at 5 o'clock.

No. 173 (property No.11132) **Obverse:** no signs.**Reverse:** I- left, at 9 o'clock.

No. 175 (property No.11090) **Obverse:** no signs. **Reverse:** I- left, at 9 o'clock. II- right, at 3 o'clock. III- center.

No. 176 (property No.11029) **Obverse:** I- In front of the chest, on the left arm. II- on the chest. **Reverse:** III- Down, at 7 o'clock. IV- right, at 5 o'clock. V- left, at 9 o'clock.

No. 177 (property No.11120) **Obverse:** I- on the chest. **Reverse:** II- left, at 10 o'clock.

No. 178 (property No.11150) **Obverse:** I- in front of the chest, under the left arm. **Reverse:** II- center.

No. 179 (property No.11048) **Obverse:** no signs. **Reverse:** I- right, at 5 o'clock.
No. 184 (property No.10977) **Obverse:** I- on the abdomen. II- in front of the face, top of the arm and left elbow. **Reverse:** no signs.
No. 185 (property No.10976) **Obverse:** I- on the chest. II- on the face. III- In front of the face, on the left forearm and the range of the bow. **Reverse:** IV- right, at 5 o'clock.
No. 186 (property No.11015) **Obverse:** I- the back of the hed and part of the hair. II- in front of the face.
Reverse: III- left, at 11 o'clock. IV- left, at 9 o'clock. V- right, at 3 o'clock. VI- right, at 2 o'clock. VII- left, at 8 o'clock. VIII- right, at 1 o'clock.
No. 187 (property no. 11113) **Obverse**: I-below the waist and on the right knee. **Reverse:** no sign.
No. 188 (property no. 11005) **Obverse**: I- behind the chest, on the arm and right forearm II- on the chest and abdomen. **Reverse:** III-center. IV-top, at 11 o'clock.
No. 189 (property no. 10958) **Obverse**: I- in front of the chest. II- on the chest. III- in front of the abdomen and in the range of the bow. **Reverse:** IV- right, at 4 o'clock. V- left, at 10 o'clock. VI- left, at 9 o'clock. VII- right, at 5 o'clock.
No. 190 (property no. 10940) **Obverse**: **I-** behind the king on the right arm. II- behind the waist, on the dagger. **Reverse:** III- right, at 4 o'clock. IV- right, at 3 o'clock. V- top, at 12 o'clock.
No. 191 (property no. 11040) **Obverse**: no sign. **Reverse:** I- left, at 8 o'clock.
No. 192 (property no. 10922) **Obverse**: I- on the chest. II- on the abdomen. III- in front of the abdomen. IV- in front of the face and on the left arm. **Reverse:** V- at 3 o'clock. VI- down, at 6 o'clock. VII- left, at 10 o'clock.
No. 193 (property no. 10927) **Obverse**: no sign. **Reverse:** I- center.
No. 194 (property no. 11076) **Obverse**: I- in front of the abdomen and the left knee. **Reverse:** II-center.
No. 195 (property no. 11082) **Obverse**: I- behind the shoulders and chest. II- in front of the chest, on the left arm. **Reverse:** III- right, at 5 o'clock. IV- left, at 9 o'clock.
No. 197 (property no. 10978) **Obverse**: I- on the face and beard. II- on the chest. III- on the crown and face. **Reverse:** no sign.
No. 199 (property no. 11087) **Obverse**: no sign. **Reverse:** I- down, at 6 o'clock. II- top, at 12 o'clock. III - right, at 5 o'clock.
No. 200 (property no. 10998) **Obverse**: I- on the chest and abdomen. **Reverse:** II- at 12 o'clock. III-top, above the previous sign, at 12 o'clock.
No. 201 (property no. 11072) **Obverse**: I- on the chest and left arm. **Reverse:** II- at 8 o'clock.
No. 202 (property no. 10981) **Obverse**: I- on the nose, lips and front of the face. II- on the crown and forehead. **Reverse:** III- left, at 9 o'clock . IV- at 11 o'clock. V- left, at 8 o'clock. VI- near the center.
No. 203 (property no. 11024) **Obverse**: I- in front of the face and above the left forearm. II- on the chest. III- on the abdomen. **Reverse:** IV- right, at 5 o'clock. V- at 10 o'clock. VI- left, at 10 o'clock.
No. 205 (property no. 11121) **Obverse**: I- on the face. II- on the chest. III- in front of the face and part of the left arm. IV- behind the shoulder, on the forearm and right wrist. **Reverse:** V- center. VI- left, at 10 o'clock.
No. 207 (property no. 10956) **Obverse**: I- in front of the face. II- behind the right shoulder. III- the back of the waist and right forearm. IV- on the face. **Reverse:** V- right, at 3 o'clock. VI- left, at 9 o'clock.
No. 208 (property no. 11016) **Obverse**: I- in front of the face and in the range of the bow. II- in front of the chest, on the left arm. **Reverse:** I- left, at 9 o'clock. II- left, at 10 o'clock.
No. 209 (property no. 10971) **Obverse**: no sign. **Reverse:** I- right, at 2 o'clock.

No. 210 (property no. 11149) **Obverse**: I- on the waist. **Reverse:** no sign.
No. 212 (property no. 10991) **Obverse**: no sign. **Reverse:** I- left, at 10 o'clock. II- approximately at 12 o'clock and close to the center.
No. 214 (property no. 11004) **Obverse**: I- behind the waist, on the dagger. II- in front of the face, part of the nose and mouth. **Reverse:** no sign.
No. 215 (property no. 10960) **Obverse**: I- in front of the face. II- in front of the chest, on the left arm. **Reverse:** III- left, at 11 o'clock. IV- left, at 10 o'clock. V- left, at 8 o'clock.
No. 217 (property no. 11103) **Obverse**: I- front of the face, part of the left arm. II- in front of the face. **Reverse:** no sign.
No. 218 (property no. 10999) **Obverse**: I- in front of the face, on the left arm. II- in front of the chest, on the left forearm. III- behind the waist, on the dagger. **Reverse:** IV- top, at 12 o'clock. V-left, at 9 o'clock.
No. 219 (property no. 11060) **Obverse**: I- on the chest. II- in front of and on a part of the abdomen. **Reverse:** right, at 5 o'clock.
No. 220 (property no. 10938) **Obverse**: I- on the chest. II- on the hair. III- on the shoulders. IV- on the chest. V- in front of the chest, on the left arm. **Reverse:** VI- right, at 2 o'clock. VII- center. VIII- left, at 10 o'clock. IX- top, at 1 o'clock.

Fig. 12: *Artaxerxes* II-Type III, of the coins from the Mazandaran Collection. (Drawing: Saman Soortiji)

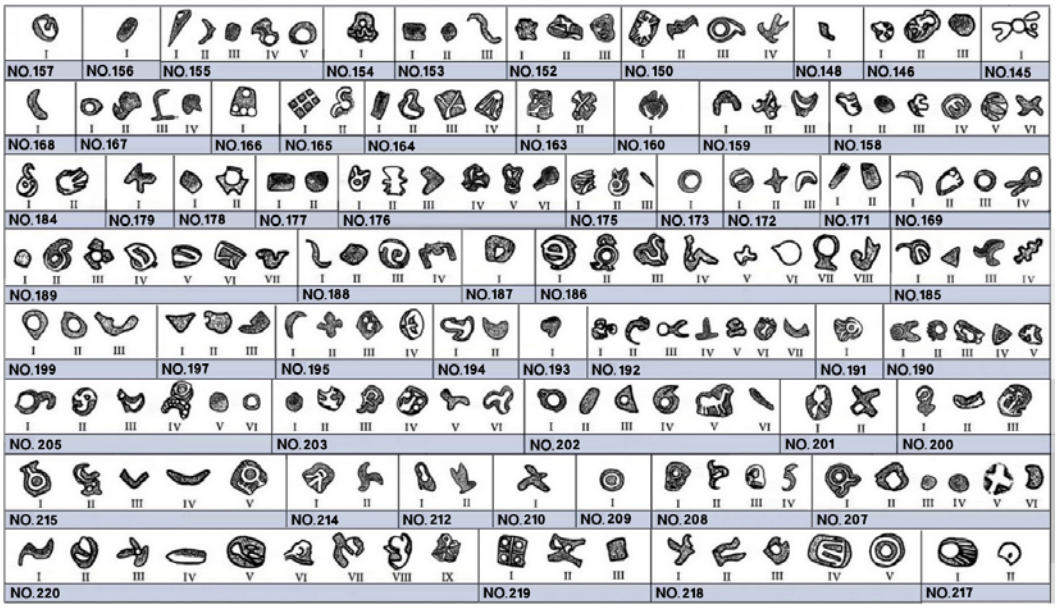

Plate 8: signs of the coins of *Artaxerxes II*-Type III. (Drawing: Saman Soortiji)

4-7-1. Coins of Artaxerxes III-Type I (Fig. 13 – Plate 9):

No. 221 (property no. 10919) **Obverse**: I- in front of the crown. **Reverse:** II- left, at 8 o'clock.

No. 222 (property no. 11109) **Obverse**: I- on the chest. **Reverse:** II- center.

No. 223 (property no. 10966) **Obverse**: I- behind the waist, under the right arm. **Reverse:** no sign.

No. 225 (property no. 11119) **Obverse**: I- behind. II- in front of the neck and face. III-behind. IV- in front of the face and crown. **Reverse:** V- right, at 5 o'clock. VI- left, at 8. o'clock.VII- right, 2 o'clock.

Fig. 13: *Artaxerxes* III-Type I, of the coins from the Mazandaran Collection. (Drawing: Saman Soortiji)

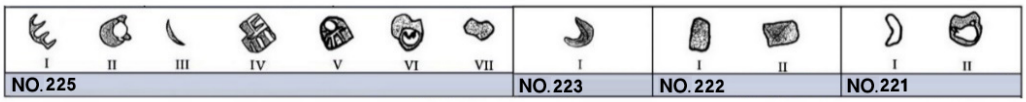

Plate 9: Signs of the coins of *Artaxerxes III*-Type I. (Drawing:Saman Soortiji)

4-7-2. coins of Artaxerxes III- Type II (fig. 14- plate 10):

No. 226 (property no. 11127) **Obverse**: I- in front of the face, on the left arm. **Reverse:** II- left, at 10 o'clock. III- center.

No. 228 (property no. 10983) **Obverse**: no sign. **Reverse:** I- at 8 o'clock. II- at 4 o'clock.

No. 229 (property no. 10987) **Obverse**: no sign. **Reverse:** I- right, at 2 o'clock.

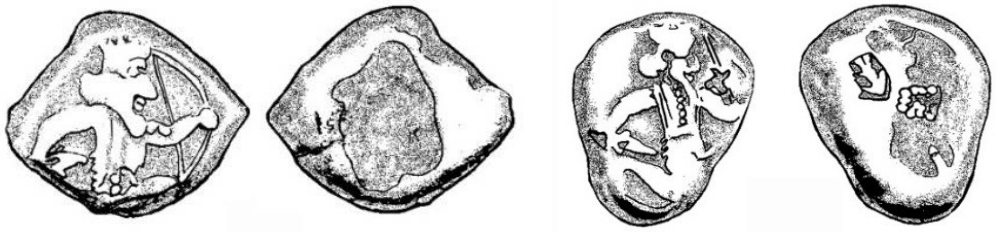

Fig. 14: *Artaxerxes* III- type II, of the coins from the Mazandaran Collection. (Drawing: Saman Soortiji)

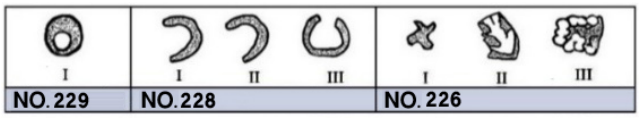

Plate 10: Signs of the coins of *Artaxerxes III*-Type II. (Drawing: Saman Soortiji)

Unrecognizable coins (Fig. 15 – Plate 11)

The main design or the figure of king on these coins is highly eroded and unrecognizable, however, its sign as a king is at least obvious. It means the signs were engraved after minting, typically after a long time interval. This is another reason to deny the signs as mint marks. However, there are no signs on 45 coins of the total 240 coins in the collection.

No. 232 (property no. 11106) **Obverse**: I- center. II- Right, inclined to the center. III- left. **Reverse:** IV- right, at 5 o'clock. V- left, at 9 o'clock.
No. 233 (property no. 11147) **Obverse**: I- on the left arm. II- on the chest and waist. **Reverse:** no sign.
No. 234 (property no. 10988) **Obverse**: I- opposite the face. II- on the heel of the right foot. III- on the chest. IV- on the waist and thigh of the left leg. **Reverse:** V- top, at 11 o'clock.
No. 235 (property no. 10924) **Obverse**: I- behind the king and on the left arm. II- on the crown. III- on the shoulder and right arm. IV- on the right forearm. **Reverse:** V- at 9 o'clock. VI- at 3 o'clock.VII- center.
No. 238 (property no. 11046) **Obverse**: I- behind the waist, on the right arm. II- on the chest. III- in front of the chest and on the left arm. **Reverse:** no sign.
No. 239 (property no. 11047) **Obverse**: I- right. II- top, left. III- center. IV- left. **Reverse:** V- center. VI - left, at 9 o'clock.

Fig. 15: Of the unrecognizable coins, from the Mazandaran Collection. (Drawing:Saman Soortiji)

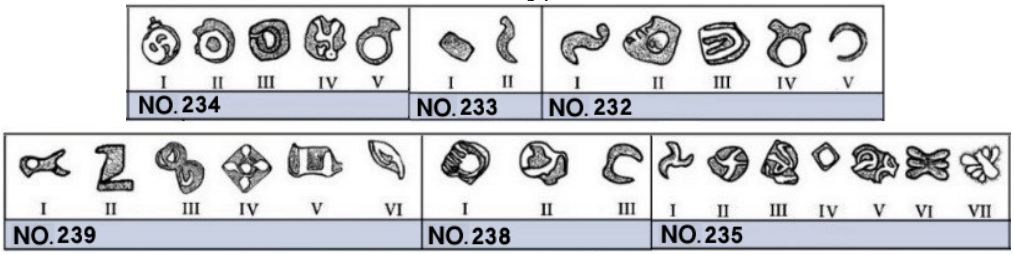

Plate 11: Signs and icons on unrecognizable coins. (Drawing:Saman Soortiji)

Investigation and analysis of the signs of the Achamenid coins from the Mazandaran Collection

Coins have conceptual implications, in addition to their economical function. “As an official manifestation of power, coins are minted to propagate and present political ideas and/or ideological concepts” (Lukonin 1389: 86). The definition, which the authors wonder if includes the Achaemenid coinage, and the main and secondary designs of the coins. Bablon, who has conducted most of the research on Achaemenid coinage, suggests the signs are “mysterious signs”, with uncertainty about representation of mintmarks. It would be neccessary to use research on later coins for greater understanding. For example, during the Parthian period, the beginning letter of any mint represents mint marks, just like the Achamenid satrap coins. The location of identification letters gradually becomes more organized, where mintmarks are positioned under the throne or the bow (Bayani 1353: 13). If the organisation of Parthian coins resulted from earlier experimentations, one can suggest that some of the signs on the Achamenid coins were mintmarks, however, some of the coins have no signs, whereas a few signs are positioned directly on the face or body of the king, despite enough space being available for them to be located elsewhere. Considering the position of the king, such distortions could be reasonable. Therefore, this could strenghthen the possibility of a transitional context of evident and understandable concepts or conveyance of hidden and mysterious messages, despite the simple and small forms of the designs.

For example, during the Achaemenid period, the kings’ death did not cause the coins to fall out of economic circulation, indeed, the previous regent’s coins were used alongside newly minted coins. Probably, the design that appears on the king’s face, chest, or abdomen, convey the earlier king’s death and, at the same time, the reign of a new king. However, there are exceptions, for example, there is not any sign directly on the body or the main design of the king within the corpus of Darius’ coins in the Mazandaran Collection. To explain the conveyance of concepts and messages of icons, Alipoor (1387: 25) analyzed designs according to Saussure’s (Saussure 1378: 58) theory, and also the theory of Charles

Sanders Peirce, suggesting these marks may have been iconic systems including languages, and codes. Accordingly, one can understand the implications, historical, and cultural information about the contemporary society that made these coins. Also, Sojudi believes that "every piece of art has another semiotic function, which is communicational function" (Sojudi 1382: 6). Understanding these icons and messages demanded knowledge of the codes. There would thus be a correlation between "signifier and signified", which was interpreted considering the appropriate codes (Zamiran 1382: 131, 152). For example, in the coins with an archer king that faces to the left, the bow signifies the icon and the signified is the outer universe. It means the king, as an obvious conceptual category, has the other implicit meaning that is Sovereignty over the people and the representative of the gods on earth. Considering the present paper, one can use the graphics, indices, and iconic explanations to compare the case study collection (Alipur 1387: 25) (Table 2).

Table 2: Iconic level of Achamenid coins (Alipur, 2008: 25)

Graphic level	Index level	Iconic level
Archer king	The warrior king	The king sovereignty
Looking to left side	Part of the king's garment	Denticulate walls of a sacred place
Looking to left side	Looking to left side	Public support against devil powers
bow	Hunting and war instrument	Anahita the goddess of water and creation
arrow	Hunting and war instrument	Tishtar goddess of rain
crown	Part of the king's garment	Mithra the goddess

The right side, in all religions, is the location of the good and the gods, while the left side represents the location of evils and hell (Chevalier and Gerberan 1382: 184). Anahita means powerful and fresh waters that is indicated with a crescent icon and is the originator of all waters, the source of all fertilization (Hook 1359: 38-40). The figure of Anahita, or the divine mother, with her dependent goddesses always relates to the moon, because menstruation coincides to the moon phases (Hall 1380: 280), and concavity, convexity, and bow are of the main icons of water, which are also signs of the goddess Anahita (Eqtedari 1354: 98). As the explanation of Tir, Tishtar is the brilliant and magnificent star, the first star and the origination of all waters, the source of rain and fertilization (Heinz 1368: 35-36). The goddess' signs are arrows, triangular arrowheads, and stars (Bahar 1352: 76). However, Tir was worshiped as the goddess of writing and calligraphy that manifested in cuneiform letters as triangles, wedges (Eqtedari 1354: 975). Crown signs indicate solar gods and sun (Cooper 1379: 198). Some

scholars relate Mithra to the sun who gradually replaced by the sun (Cooment 1380: 27).

One problem that arises, however, is that there is no certain border between the categories and signs, and every given sign could be a composition of the three groups. Chandler says, “being iconic sign of a graphic or an icon depends on the application of the sign” (Chandler 1994). Because the contemporary coin producers used them for the conveyance of political messages and manifestations of the ruling class, in addition to their economic application, the iconic level of the signs would be more obvious (Alipur 1387: 27). As, to an extent, we know the iconic possibilities of the signs and probable reasons of the coinage, we should mention that the signs in the collection, out of the main designs or the body and the king’s armor, which are unexplainable, regarding variety and number, however, there are designs that directly engraved on the face or chest of the king. If one intends to describe the issue according the model, the location of the designs probably is the expression of death of the king and removal of his sovereignty, at the same time, a message that implicates reign of a new king. Considering the classification of the signs on the coins of the Mazandaran Collection, one can suggest that designs that directly coined on the face are generally smaller and more plain, while the signs on chest and abdomen are bigger and more complex. It means mints using small dies, probably announced the new reign by the command of the new king who preserved the honor of the late king. All of the examples with engravings on the face, abdomen, and chest are as following (Plate 12):

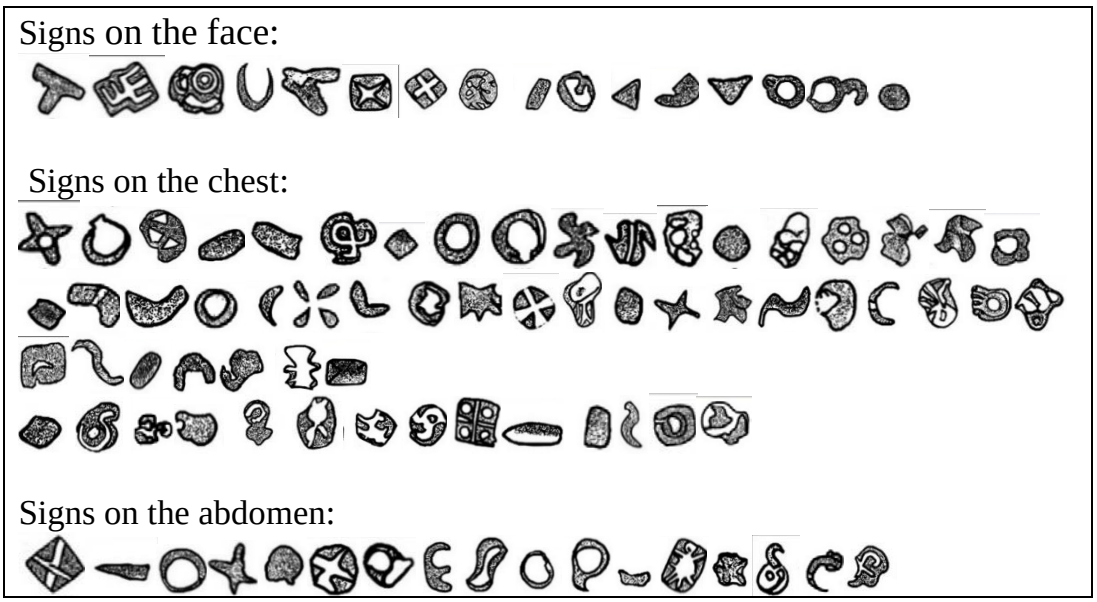

Plate 12: position of engravings on the coins, Mazandaran (Drawing:Saman Soortiji)

If one suggests the signs as icons and mintmarks, it should be explained that some of the coins have no signs. It means engraving signs were not common, or the Achamenid mints never obliged to use mintmarks.

Conclusion

The timing of the case study collection ranges from 338 to 522 BCE, i.e., a 184-year period covering the reign of seven kings. The variation and abundance of the signs in this collection are considerable. The number of signs and icons on the obverse and reverse of a given coin vary from one to nine. In total, 567 various signs were recognized that vary from plain designs including circles, crescents, or concave squares to more complex designs such as geometrical designs and zoomorphic designs such as one-hump camels, turtles, ducsk, hens, roosters, and so on. The conclusions indicate signs that these marks are similar to known samples, whereas there are the others that lack any similar sample.

Most numismatists have suggested that these signs are mint-marks, considering that satrapy coins have signs, abbreviations, and inscriptions as mint-mark, or the regularity of location of letters and images in later coins resulted from earlier coins. However, the conclusions drawn here suggest the signs, at least in the royal coins, are not necessarily mint-marks, for 45 coins have no sign at all. The main figure of king is eroded on some of the coins, however, and there are very obvious signs on the same coins. Therefore, it would be concluded that they are later engravings on earlier coins, which could not represent mint-marks. The signs, cautiously, can be suggested as the signature and confirmation of a financial manager who certified the weight and purity of the coins, or a hidden message for people, while death of king did not cause removal of coins from circulation.

According to the shortage of resources, it is premature to suggest further interpretation of the signs beyond the discussion above, despite no definitive assessments having been reached here. We hope that future research and excavations can make use of the database we have presented here to reveal other aspects of Achaemenid culture and civilization.

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بررسی و معرفی علائم سکه های شکل هخامنشی، از مجموعه موزه مازندران

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چکیده

این مقاله به بررسی و معرفی علائم ضرب شده بر ۲۴۰ عدد از سکه‌های شِکِل "شاهنشاهی هخامنشی" که در مخزن گنجینه‌ی مازندران نگهداری می شود، پرداخته است. تحقیقات پرسنل نیروی انتظامی بیانگر آن است که این مجموعه توسط حفاران غیرمجاز از حوالی بندر عسلویه (بدون ذکر محل دقیق) به دست آمده است. بررسی‌ها گونه‌های مختلف از سکه‌های هفت شاه را در فاصله سال‌های۵۲۲ ق.م تا ۳۳۸ ق.م در بازه‌ی زمانی حدود۱۸۴ سال معرفی کرده است. از بین ۲۴۰ عدد سکه‌ی منتخب،۱۹۵عدد آن‌ها دارای علائم است. بعضی دارای۱ علامت و تعداد اندکی تا ۹ علامت مختلف دارند. سکه-شناسان و باستان‌شناسان برای آن‌ها کاربردهای مختلفی قائل شدند که نشان ضرابخانه، تأیید عیار و وزن از آن جمله است. اما آیا این تعاریف، شامل مجموعه مورد بررسی نیز می‌شود؟ چرا تعدادی از سکه‌ها فاقد علامت است؟ نتایج بررسی سکه‌ها منجر به شناسایی۵۶۷ علامت در انواع ساده تا طرح‌های هندسی و نقوش جانوری شده است. در این مجموعه، علائمی است که از بسیاری جهات، به نمونه‌های شناخته شده شباهت دارد اما در عین حال علائمی وجود دارد که فاقد نمونه‌های مشابه است. این علائم لزوماً معرف محل ضرب نیست زیرا نسبت به تصویر شاه که در مواردی بسیار سایش یافته، از وضوح عالی برخوردارند و مشخصاً با فاصله زمانی زیاد بر سکه‌ها حک شده اند و همچنین ۴۵ عدد از سکه‌ها هم اساساً فاقد علامت است. یکی دیگر از نتایج این مقاله، موضوع انتقال مفاهیم به واسطه‌ی این نقوش در قالب پیام‌های مستتر و رمز گونه مثل فوت شاه و در عین‌حال روی کار آمدن شاه جدید است.

واژه‌های کلیدی: هخامنشی، سکه، شکل، علائم، مجموعه موزه مازندران.

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Gird-i Ashoan during the Late Chalcolithic, Based on the Second Season of Excavation in Northwestern Iran

Mahnaz Sharifi [1]

(87-110)

Abstract

Excavations at Gird-i Ashoan, an archaeological mound in Piranshahr County in the Lower Zab Basin, have provided remarkable insights into the cultural traditions of the region during the Late Chalcolithic. Whilst reflecting some indigenous peculiarities, its material culture exhibits broad affinities with Northwestern Iran, the Caucasus, and Anatolia. This evinces the spread of the Late Chalcolithic (LC) cultures, especially LC2–3, over vast territories, which could imply either population movements or the spread of a certain pastoralist subsistence system. The central stimulus was favorable climatic conditions, presumably a significant reduction in cold that fostered a climate almost similar to present conditions. Building on the finds from Gird-i Ashoan, the present paper addresses the reasons for the chaff-faced pottery's extension over a wide geographic area from the Caucasus to Mesopotamia, northern Syria and northwestern Iran. Excavations at the site brought to light a Late Chalcolithic settlement of an unprecedentedly substantial range, consisting of about 8 m of continuous deposits. The pottery assemblages from the site include chaff-faced ware and Painted Pisdeli ware, suggesting that the site's strongest interactions were with the Caucasus, Anatolia, and Mesopotamia.

Keywords: Northwestern Iran, Lower Zab Basin, Late Chalcolithic, Chaff-faced Ware, Painted Pisdeli ware.

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Introduction

The Chalcolithic period is characterized by several transformations. The most notable is an increase in the frequency of settlements compared to the Neolithic, resulting in a pattern hinging on environmental conditions and potentials. Archaeological investigations evince the growth of settlements in both extent and number in most parts of Iran, especially the western slopes of the Zagros and the northwest. Such cultural realms as Dalma and Pisdeli in the northwest would have gradually spread over more areas, and the pertinent communities mainly relied on agriculture and pastoralism. In this period the role of hunting and gathering in local subsistence systems reached its lowest level.

Among the known cultures of northwestern and western Iran in the early Chalcolithic is what is represented by the so-called Dalma pottery tradition. Our rather limited understanding of the culture primarily derives from the excavations of Dalma Tepe (Hamlin 1975), the second earliest known culture across the Lake Urmia basin (Hamlin 1975; Henrickson and Vitali 1987), with the first being Hajji Firuz (Voigt 1983). In effect, Dalma formed part of a larger culture that extended, with slight regional discrepancies, over vast territories, among them being Mesopotamia (Hall and Woolley 1927; Jasim 1985), the Caucasus (Chataigner 2010), and Anatolia (Yildirim and Gates 2007, 283; Garrard 1996; Halil Tekin 2005). The Dalma horizon is supplanted by the mid/late Chalcolithic traditions of Pisdeli (LC1) and the Chaff-Faced Ware (CFW) traditions (LCII-LCIII). Chronologically, the latter succeed the Ubain period in northern Mesopotamia.

In the South Caucasus, the western Zagros and northwestern Iran, the systematic use of chaff, and hence the CFW effect, is attested at least from the very beginning of the 5th millennium BCE with the development of the Dalma culture. In spite of its heavy chaff temper, however, Dalma ware can hardly be considered as marking the beginning of the “Chaff-Faced Ware” era *stricto sensu* (Marro 2022). The period is marked by the spread of the technological horizon of the Chaff-Faced ware, which represents a widespread cultural phenomenon covering vast territories (Palumbi 2011:211; Helwing 2012: 204), which display a fairly consistent set of cultural attributes (Helwing 2012: 207).

In addition to the Urmia Lake Basin, the Chaff-Faced Ware cultural realm comprises several expanses extending from the Caucasus and North and East Mesopotamia to large parts of Anatolia as well as to northwestern and limited parts of western Iran (Marro 2012, 2022; Lyonnet 2017 ; Museybli 2016 ; Gerritsen et al. 2010; Balossi, Restelli 2012; Nannucci 2016). In the Early Chalcolithic, the so-called Dalma culture represents a distinct pottery tradition associated with simple mudbrick/packed clay architecture that was for the first time reported from northwest Iran (Fazeli Nashli & Matthews 2022; Hamlin 1975; Marro 2022) and later in the excavations of Se Gabi in eastern Central Zagros (Young 1969) and the Early/Mid and Late Chalcolithic contexts at Tepe Qeshlaq (Sharifi 2020; Sharifi & Motarjem 2018). The Late Chalcolithic marked the arrival of the Pisdeli Ware and Chaff-Faced Ware types. In northwestern Iran, the Zab Basin, thanks to its geographic proximity, exhibits widespread indications of interfaces with South Caucasia and East Anatolia, so that it shares close cultural affinities with the Anatolian sites (Gerritsen et al. 2010; Balossi and Restelli 2012; Nannucci 2016), Caucasia (Museybli 2016; Gerritsen et al. 2010) and Syria

(Brustolon and Rova 2006; Kelly and Buccellati 2019).

The presence of the CFW across vast regions was initially linked to the migrations of Mesopotamian groups to Transcaucasia (Marro 2010: 52). Yet, thorough comparison of CFW assemblages excavated from the Caucasus down to the Fertile Crescent, it is now argued that this widespread occurrence does not result, contrary to a frequent opinion, from the migrations of Mesopotamian groups into Transcaucasia; rather, it developed from a local evolution dating back at least to 4500 BCE. The territory spanned by CFW thus constitutes some kind of oikoumene, whose center of gravity is probably located in the Highlands, between the Euphrates and the Kura Basins but not in the Fertile Crescent (Marro 2010). The bearers of the CFW culture appear to have lived side by side with the bearers of the Kura-Araxes culture for a certain while, before the latter supplanted the CFW culture.

At Gird-i Ashoan, the surface layers represented ephemeral Iron II-III occupations, the Mannaean period (Sharifi 2021c), totally lacking in architecture. Directly below these later contexts emerged the cultural material characteristic of the Late Chalcolithic, thus marking the presence of a protracted hiatus of several millennia. The Late Chalcolithic is represented by a thick deposit comprised of 24 layers and 4 architectural phases. A contemporary deposit of such depth, 8 meters, is as yet unreported from northwestern Iran.

Gird-i Ashoan and the significant of Late Chalcolithic period in northwestern Iran

Since Gird-i Ashoan is a key site in the Zab Basin and the chaff-faced pottery occurs throughout the site's sequence, a major question addressed here is the reasons behind its spread over such a vast range extending from Caucasia to Mesopotamia, northern Syria and northwest Iran. The pottery analysis sheds light on Gird-i Ashoan's interactions with neighboring regions through relative chronology. The culture seems to have extended up to the slopes of the East Taurus and the Zagros. The second question considered is whether the Zab Basin was involved in any contacts and trade.

A major objective is to study cultural transformations of the Hasanlu VIII Period in the Lower Zab Basin drawing on the most recent archaeological findings and cultural interactions of the local inhabitants with nearby regions based on the finds from Gird-i Ashoan. The paper offers a detailed description of the regional material culture of the Late Chalcolithic, the advent of which was associated with tremendous cultural transformations. Our data comes from both fieldwork and comparative studies. Thus, the information obtained from excavations are juxtaposed with those gathered from all pertinent publications on northwest Iran, Caucasia, Anatolia and Mesopotamia in the fourth and fifth millennia BC to set up a relative chronology. The merit of the study lies in the fact that the region in question formed a part of the chaff-faced pottery horizon.

History of Research

In the archaeological literature, northwestern Iran is primarily famed for the plains of the Lake Urmia Basin. The sphere of influence of the region's culture, however, spreads over a much vaster zone. In regards to the history of scholarship, the basin was among the regions of the most interest for domestic and foreign scholars at the dawn of professional archaeology in Iran. In the northern

basin, excavations at the Neolithic site of Tepe Hajji Firuz have yielded ceramics paralleling the material from the Early Hassuna sites (Voigt 1983: 101). Dalma-type pottery has occurred at Tepe Sivan (Solecki 1973), Hajji Firuz (Voigt 1983: 80) and Pisdeli (Dyson 1960). The University of Pennsylvania Museum's long-lasting Hasanlu Project, started in 1956 under the general direction of Robert H. Dyson, is the most significant work in this basin (Dyson 1968).

Very little is known about the region in the Chalcolithic period notwithstanding extensive scholarship, notable among them being the excavations of Dalma, Pisdeli , Lavin and Dava Göz (Hamlin 1975; Dyson 1960; Nobari & Binandeh 2012; Abedi etal.2018). As the Late Chalcolithic presently remains unattested at any other site in the Zab basin, Gird-i Ashoan with its thick deposits can be regarded as the key site of this basin. The period is separated by a long hiatus from the immensely different Early Bronze traditions that supplanted the Chaff-Faced horizon. Later excavations by Sharifi at Barveh and Bard-e Zard Tepe brought to light further aspects of the Bronze Age cultures (Sharifi 2021b).

Geographic Location of Gird-i Ashoan

Gird-i Ashoan is a mound in the western side of a namesake village, 10 km away from Piranshahr city of West Azerbaijan province (Figure 1). With its 60 m diameter, the mound reaches a maximal height of 10 m from the surrounding lands. Its location amid the village houses has brought about partial disturbance of both its core and buffer zones (Figure 2). Excavations were completed in two seasons. The single 5 × 10 m trench opened in the first season would be taken down to the sterile soil in the subsequent season (Figure 3).

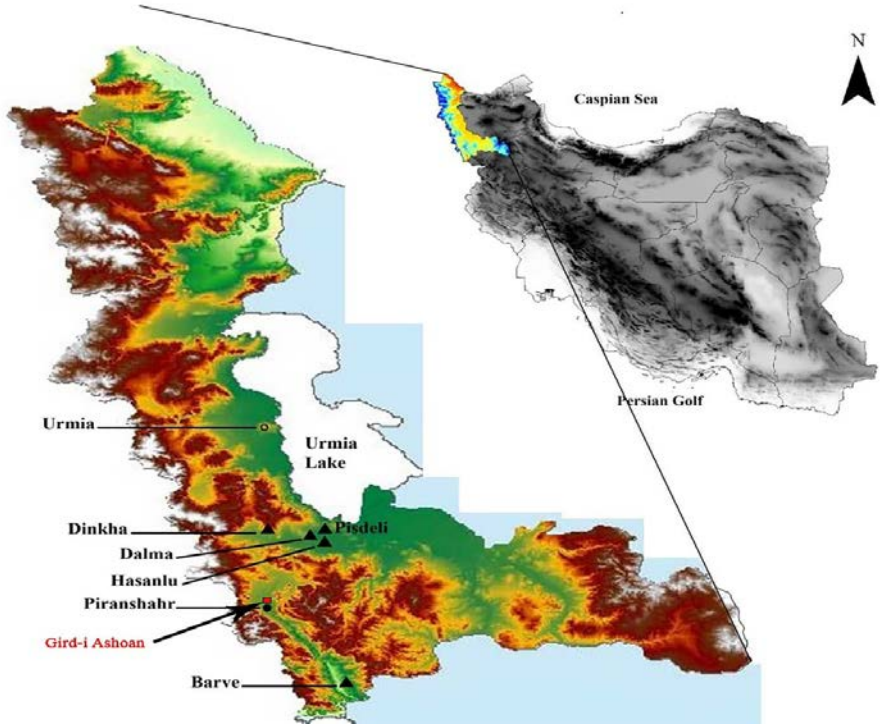


Fig 1: the position of Tepe Gird-i Ashoan in the map.

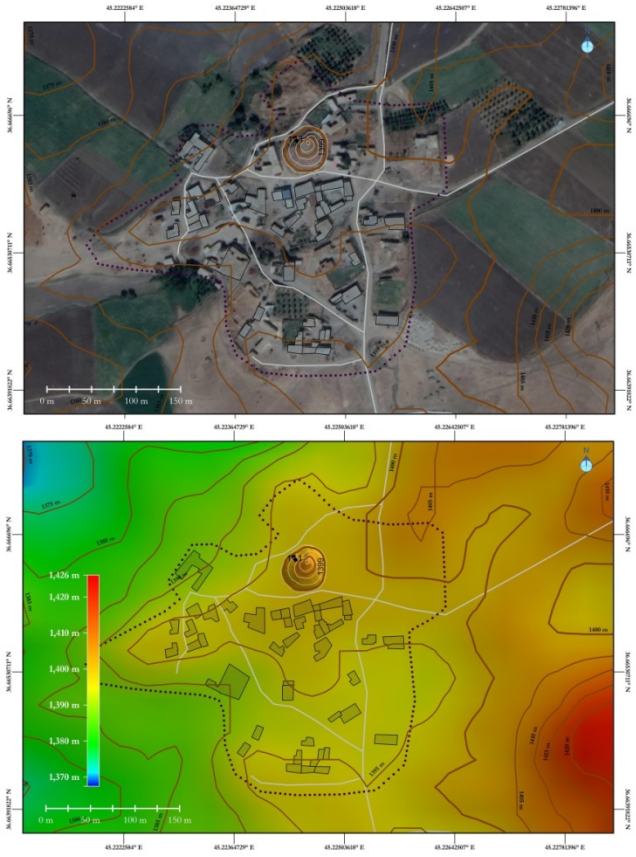


Fig 2: Profile and Satellite image of Gird-i Ashoan Tepe..

Fig 3: General view of Gird-i Ashoan

An Outline of the Fieldwork

The mound lies at UTM 520062E 4057880N at an altitude of 1415 m, at the eastern fringes of the Piranshahr plain, on the east bank of the Lavin River. The northern and western flanks of the mound are about 330m and 450m off the riverbed, respectively. The site is situated within the boundaries of the modern village, flanked by its buildings. It is a mound with a circular base of about 55 m in diameter. Measuring about 55m north-south and 50m east-west, it occupies a total area of *ca.*

2750 sq. m. The east and south slopes gently descend against the walls of the villagers' houses.

In the first season of excavation at the site, Trench T.G.A was opened in the western side of the mound, as the cut already made in this vertical slope had exposed the cultural layers and related materials, thus excluding the need for much excavation. The surface layers in this 5 x 10 m trench belonged to an Islamic cemetery, and Iron Age II-III potter was attested in the first layer (Sharifi 2011). Chalcolithic material was reached at the depth of 1.70 m and continued down the depth of -9.65m**.** Of the total of four architectural phases presently known from the Chalcolithic deposits of Gird-i Ashoan, the two upper phases were recorded in the first season (Sharifi 2022). Phase 1 consisted of dry-laid stone walls in the northern quadrant of the trench, extending from -2.31m down to -2.65m, while Phase 2 was represented by perpendicular mudbrick walls beginning from -3.43m and ending at -3.62m. The recovered mudbricks measured 40 × 60 cm (Figure 4).

The meaning two phases would be recorded in the second season that resumed the work from the lowest level reached in the previous season, which had recorded eleven locus and reached a depth of 6.4 m below datum that marked Locus 113. Digging in the second season continued until encountering the virgin soil at the depth of 9.65m, designated as Layer 125. As with the previous season, architectural structures and material culture connected with the everyday life of the Late Chalcolithic inhabitants were encountered.

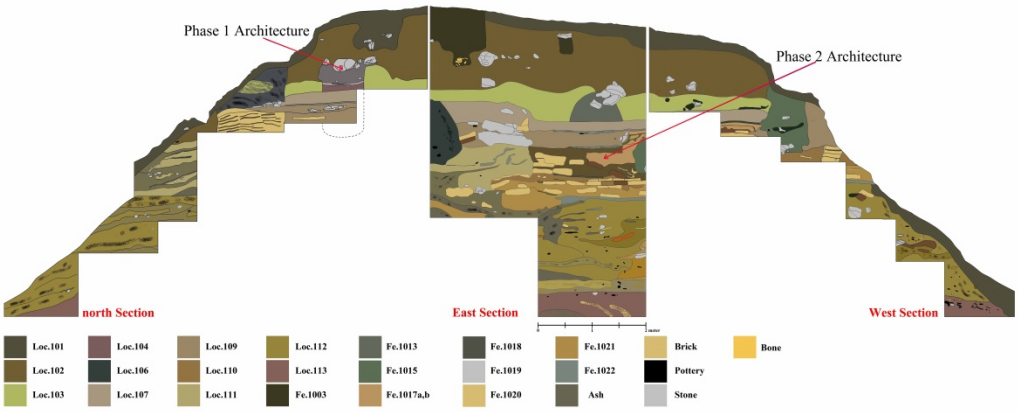


Fig 4: Sections of the trench, Loci 101-113 (Sharifi, 2022:63)

A profusion of ash and charcoal fragments was attested in Locus 116 at the depth of 6.55 m, which continued to -7.55 m. A point of interest about this deposit is the high frequency of burned animal bones, mainly of ovid and caprine species, and canine jaws and skulls. Also recovered were coarse sherds in chaff-faced ware, sometimes with smoke-blackened surfaces evincing exposure to fire. Designated as Locus 118, the deposit is 40 cm thick, extending from 7.5 m to 8.3 m below the datum. This black deposit comes from fires that presumably served cooking and heating purposes as evidenced by the presence of burnt faunal remains (Figure 5). Lithic and obsidian tools and a bone nail also occurred not to mention pottery. As already stated, the second season of fieldwork added two further levels to those already identified in the first season. An outline of these new levels designated as

Phases 3 and 4 at Gird-i Ashoan, which was a permanent settlement, follows.

Phase 3

A partially missing north-south oriented mudbrick wall (see Figure 5) appeared in the northern half of Trench T.G.A (Feature 1023), from -6.6 m to -6.8 cm. Built from two rows of mudbricks measuring 9 × 40 × 60 cm, the wall was 0.6 m long and 0.4 m wide, with the greatest extant height of 20 cm. Occupying the northeast quadrant, the next layer (Locus 117) extended from -7.15 m to -7.7 m, and was a light brown deposit containing very fine clay, sand, and silt.

Fig 5: The mudbrick wall (Phase 3) in T.G.A.

Phase 4

A north to south oriented structure of mudbrick (Feature 1024) emerged. Measuring 2.9 m long, 1 m thick, and 1 m high in the highest part, it exhibited mudbricks of similar size as the aforementioned structure (Feature 1023). Yet, to achieve the highest possible strength and a harmonious arrangement, mudbricks of smaller dimensions were also used in this latter wall. The extant wall consists of eleven superimposed courses. Several parts of its eastern face were distributed, presumably to create fire pits. Another point of interest is the use of mudbricks of different colors in alternative courses, creating a color contrast. This could hardly be inadvertent or accidental. Two plausible stimuli present themselves. The first is to achieve a certain aesthetic, i.e., a spectacular façade. The second is of practical character, i.e., a moisture controlling measure, whereby the ultimate improved structural strength was intended. It is noteworthy that the discovery of thick

substantial wall, which extended from -7.5 m to - 8.6 m and occupied above two thirds of the whole trench, somehow impeded further work in the trench, which had to be continued down as a small sounding to sterile soil (Figure 6).

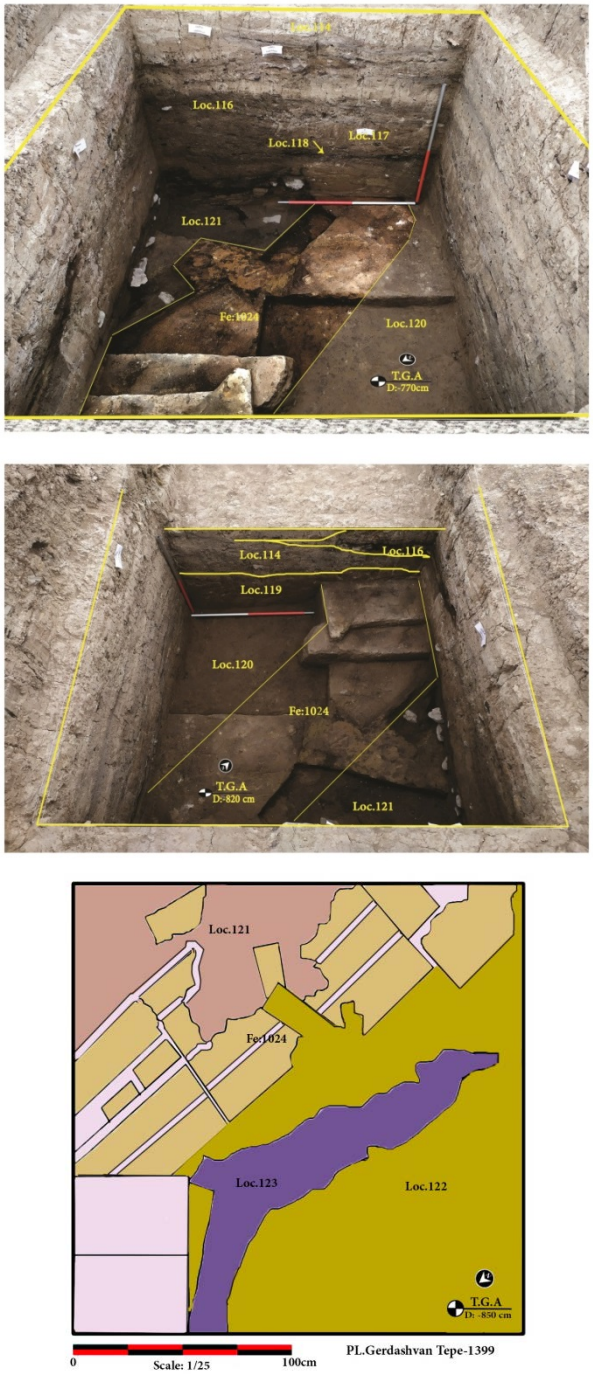


Fig 6: Thick mudbrick wall (F.1024) in T.G.A . Fig 7 Plan of the remains architecture.

Lower Strata

The first attestations of Pisdeli Ware occurred in Locus 122, a deposit containing silt, lime and occasionally gravel. It was characterized by fragments of chaff-faced ware and painted red-slipped pottery, associated with lithic and obsidian blades as

well as two pieces of river shells. With a maximal thickness of 60 cm, it began from 8.2 m below datum. Locus 123 was a dark brown deposit with heavy contents of ash and charcoal (Figure 8−9).

As a gray and brown accumulation, Locus 124 similarly contained large amounts of ash and charcoal along with fine clay and sand particles. An intriguing point is the presence of veins of ash, charcoal as well as chaff-faced ware. At the base of this deposit appeared the first indications of virgin soil. Locus 125, marking the lowest layer probed at the site, was a highly compacted, moist layer containing white particles of lime. Its character coupled with the total absence of finds of cultural nature and evidence of human activities leaves no doubt that it represented virgin soil.

The deposit was tested down to the depth of 9.65 m below datum to verify virgin soil was not far deeper, before the excavation was closed. The lower levels of Gird-i Ashoan are typified by the association of painted ceramics with the chaff-faced material. Thus, the Pisdeli type painted pottery prevailed at the site at the same time with the chaff-faced tradition.

Fig 8: Position of Layers 121-123 and F.1024 (architectural Phase 4)

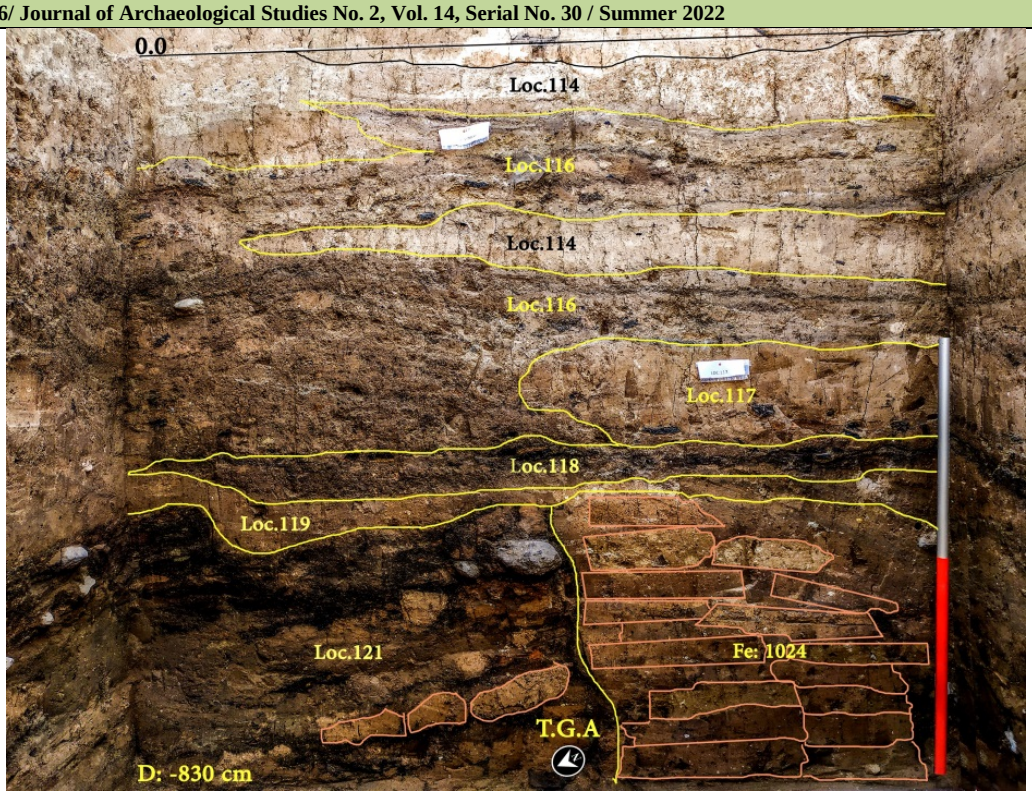


Fig 9: Stratigraphy picture of the part of the south east wall, Tranche T.G.A.

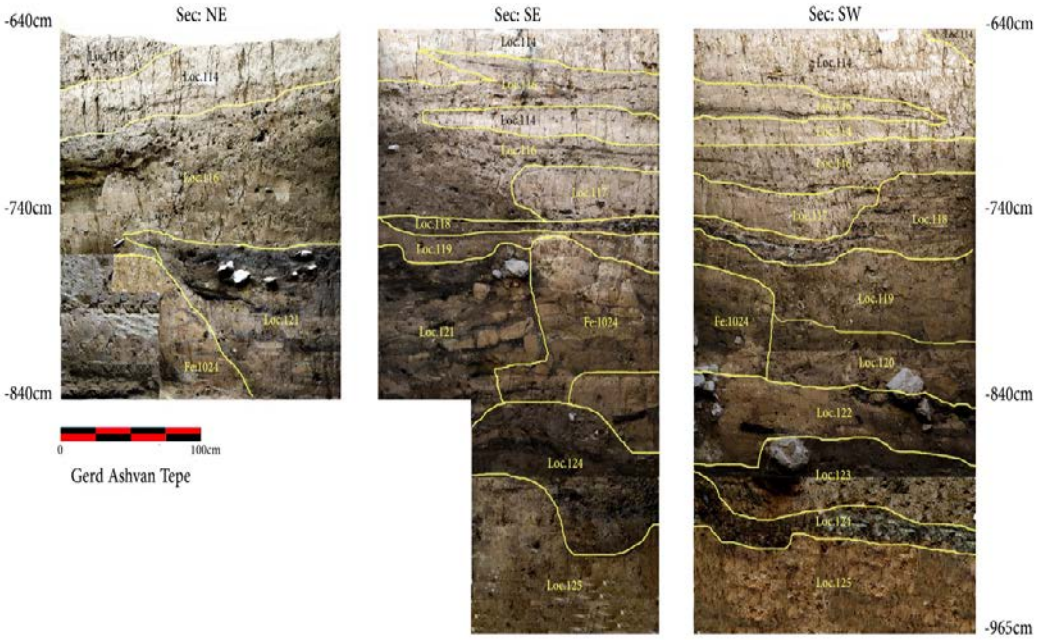


Fig 10: Stratigraphy picture of the South west, south east and north east walls

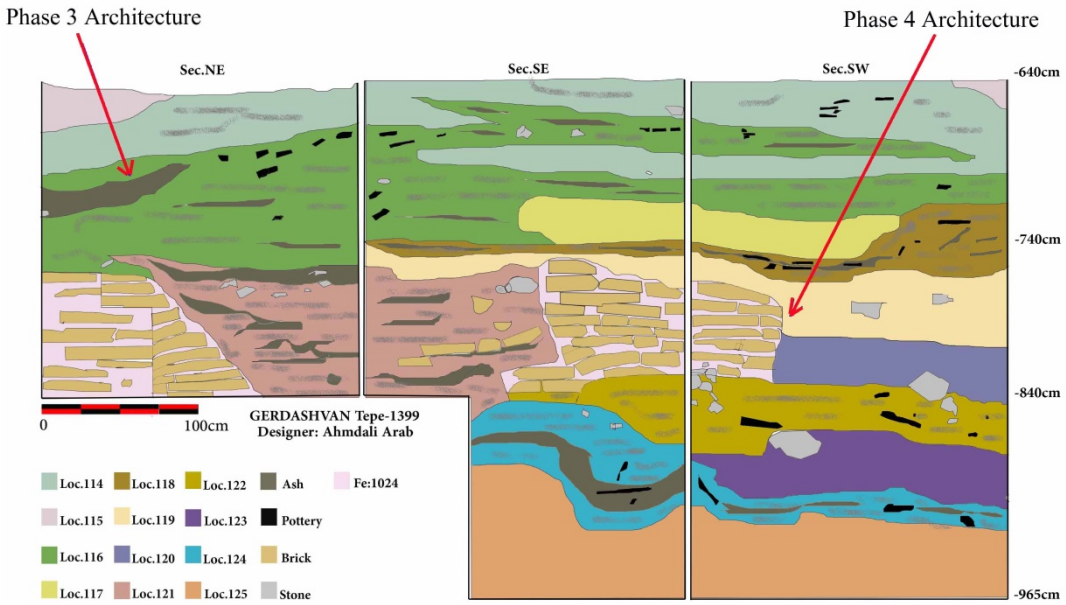


Fig 11: Section drawing of South west, south east and north east walls.

Pottery and relative Chronology

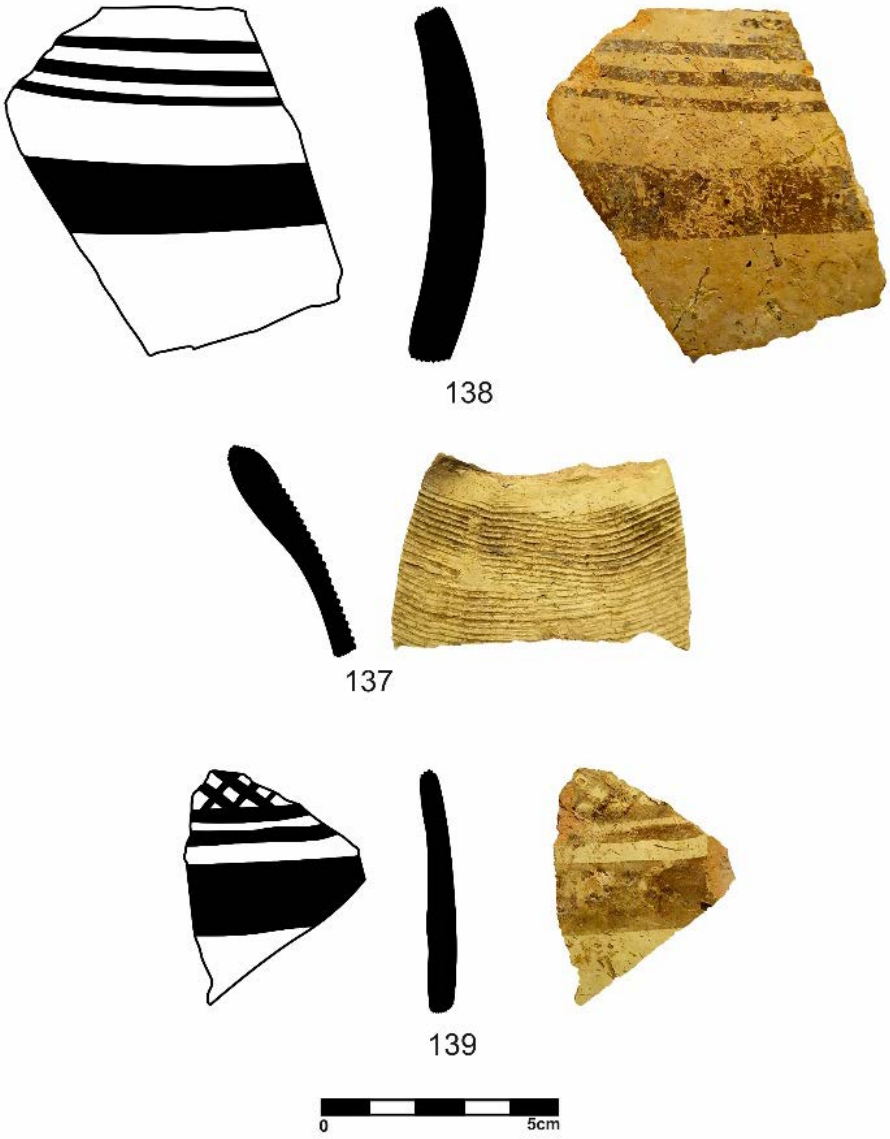
The ceramic material from Gird-i Ashoan belong to the Late Chalcolithic and consists of the Pisdeli (LC1) and the CFW pottery types. The assemblage falls under two plain and painted categories. The original handmade vessels were fired in a range of colors: orange, red, brown, and grey. The pieces in chaff-faced ware are coated in a thick slip. The painted pieces split into two grooved and bichrome subcategories. Painted pottery (of Pisdeli type) occurred in the lower levels characterized by painted motifs in black on buff or brown ground (Figure 12). Documented patterns include horizontal bands, parallel lines, triangles, and small squares. The painted material contains find grit and chaff inclusions in its fabric, bears a thin slip, and is adequately fired, with a brown exterior color.

A striking point about the pottery production at Gird-i Ashoan is the broad popularity of grooved pottery, to the extent that the related pieces occur across the documented sequence. Decorations come in the form of deeply incised horizontal patterns. As regards morphology, several forms are distinguishable: 1) wide-mouthed jars with everted rims and with the highest frequency; 2) open bowls; 3) pedestal bowls with elongated bodies; 4) jars with narrow openings; and 5) shallow trays (Figure 13-14).

The pottery from the site shares broad similarities with the neighboring regions. In terms of shapes, wide-mouthed jars and open bowls are almost identical with those from Mesopotamia (Stein 2012: 134, fig. 5), and Tell Zeidan in northern (Fisher 2017: 474) and Mozan/Urkesh in northeastern Syria (Buccellati 2019). These forms were also particularly prevalent at Ovçular Tepesi in western Nakhchivan (Marro et al. 2011: 93), Uçan Ağıl in the South Caucasus (Marro 2020, fig. 4) and are found at several sites in Anatolia, including Kenan Tepe (Parker 2006: 127; 2008: 165–167), Hirbemerdon Tepe (Nannucci 2016: pl. III), Arsalan Tepe VII (Balossi-Restelli 2012: fig 5.7), the Leylan region (Rova 2006; Brustolon 2007), and Barcın Höyük (Gerristen 2016: 223). Gird-i Ashoan's

shallow trays occur at the Caucasian site of Mentesh Tepe (Lyonnet et al. 2012: 148, nos. 1–2). And, narrow-mouthed spherical jars were in use in the Helawa region of Iraqi Kurdistan (Peyronel and Vacca 2015: 110, fig. 12,).

The painted pottery from the lower levels (Late Chalcolithic I) were quite popular in northern Mesopotamia (Fisher 2017: 478). In the mid-Chalcolithic period of western Turkmenistan related painted material prevailed (Bonora and Vidale 2013). The painted assemblage (from Locus 24) finds strong parallels in Helawa (Peyronel and Vacca 2015: 110, fig. 11). Grooved pottery is common at Tel Zeidan and Nuzi (Fisher 2017: 479), Çadır Höyük (Steadman et al. 2007: 398, fig. 8), Başur Höyük (Saglamtimur and Kalkan 2015: 81), Leylan (Brustolon and Rova 2007: 19, fig. 5, no. 6), Ovçular Tepesi (Kuliyeva and Baxşeliyev 2018: 44; Marro et al. 2011: 93), Beyuk Kesik, Poylu II, and Galayeri (Museyibli 2016), and Ovçular Tepesi (Marro 2010).



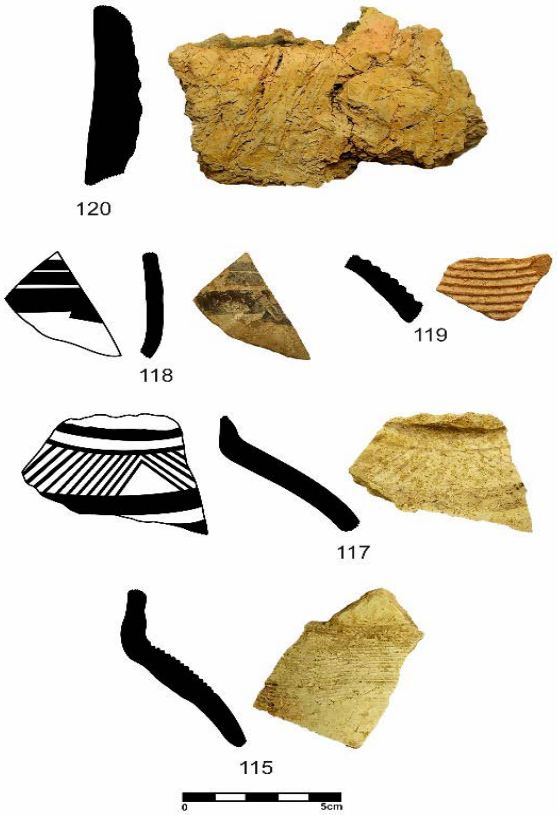
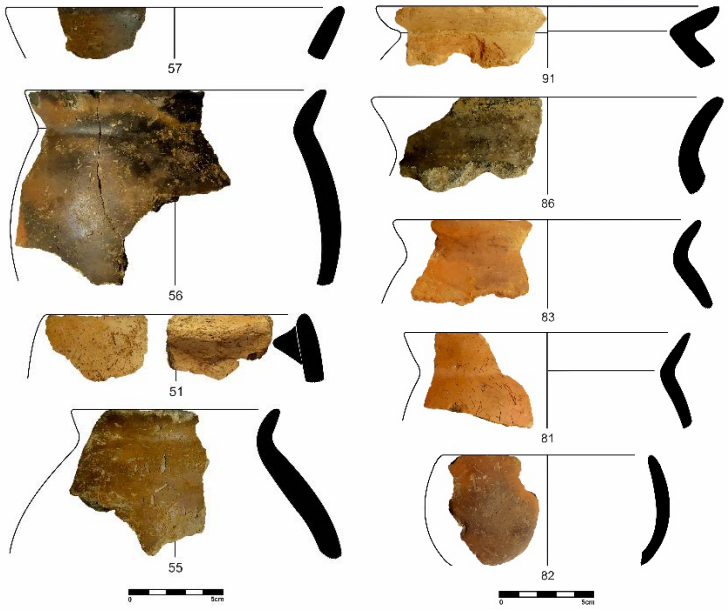


Fig 12: Painted-ware, Pisdeli sherds ;LC1, The Lower layers in Gird-i Ashoan



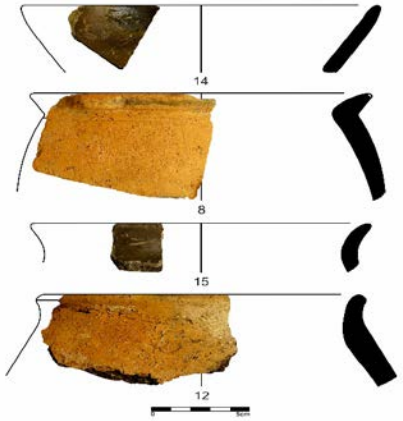


Fig 13: Late Chalcolithic CFW Piieces (LC2-3)

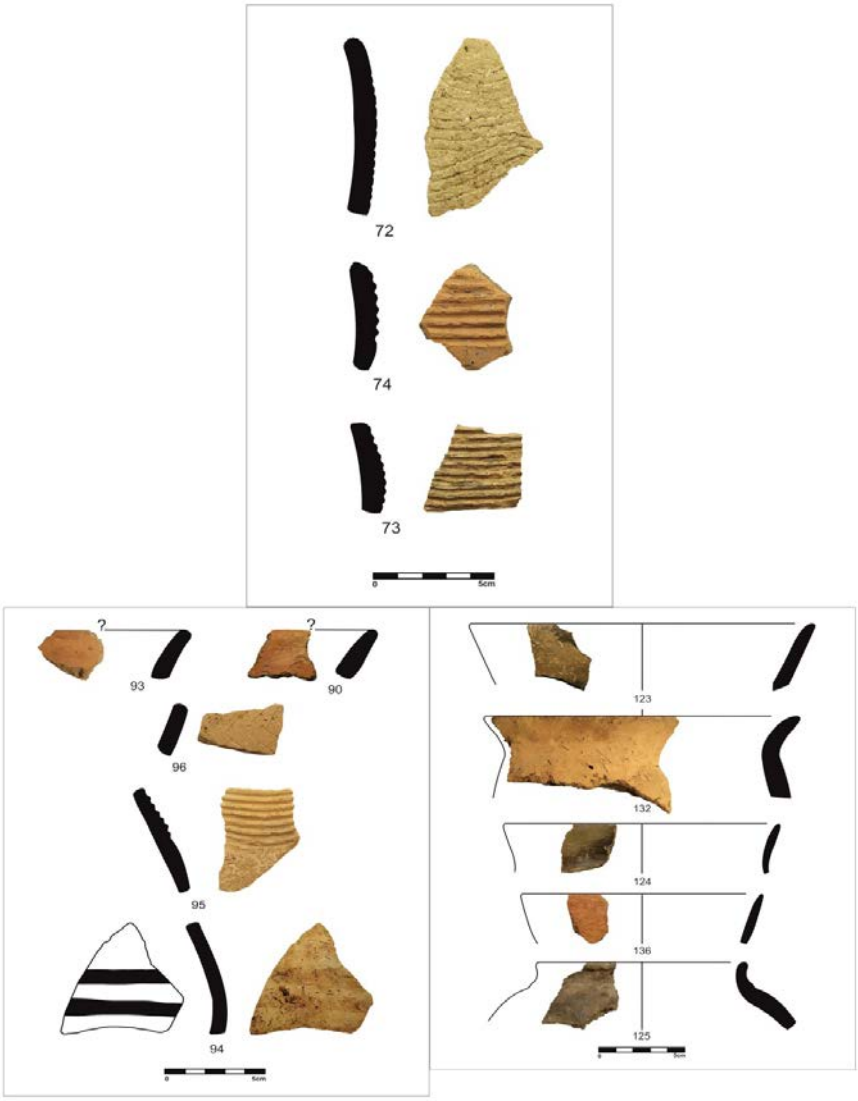


Fig 14: Late Chalcolithic simple, Painted and Streaky pieces.

Small Finds

Trench T.G.A produced a small assemblage of small finds including spindle whorls, tokens, obsidian, a bone awl, and a handful of lithic tools.

Spindle Whorl

Representing indirect evidence of textile production at Gird-i Ashoan, the recorded spindle whorls are simple and plain, and served practical, spinning, purposes (Figure 15). They were made of terracotta in a conical shape. The rather higher relative frequency of spindle whorls in the artifactual assemblage from such a limited excavated area, and the abundance of faunal skeletal remains of goats and sheep might point to a popular practice of spinning and textile production from wool and goat's hair fabrics at the site.

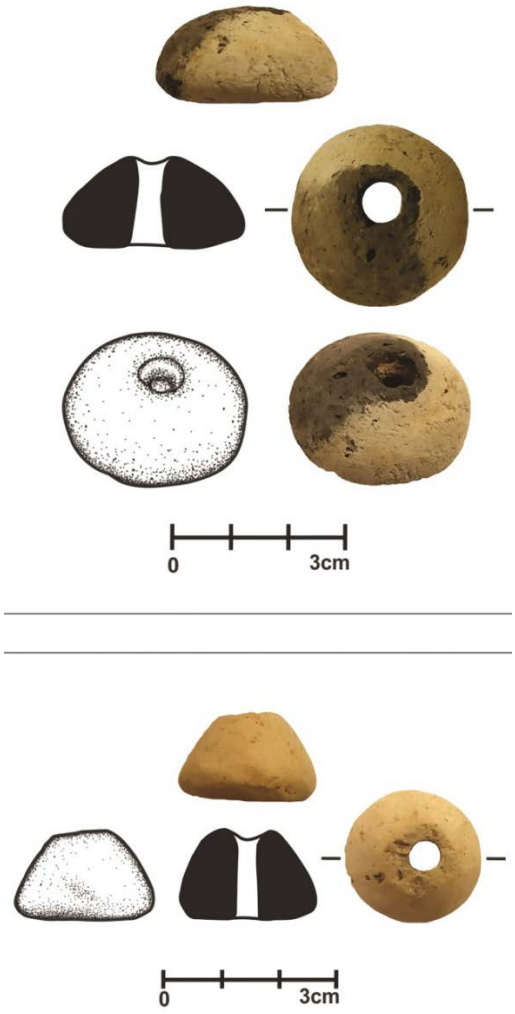


Fig. 15: Terracotta spindle whorls. L:118/121

Tokens

A single piece of conical token was excavated (Figure 16). The use of clay tokens for accounting and storing purposes is known from Qeshlaq in Chalcolithic period (Sharifi 2015:27) and outside the borders of Iran in the Balkans, which mainly lay within the Anatolian sphere of influence (Mihal Budja 2003).

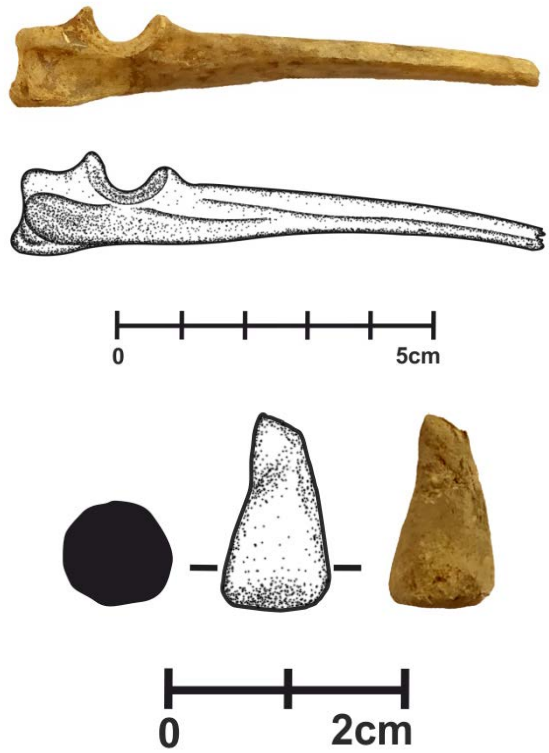


Fig 16: bone tool and token

Obsidian

A total of 13 obsidian pieces are divided between 7 flakes and 6 blades (Figure 17). The latest example was found in Locus 121 at the depth of 8 m below datum, while the earliest occurred in Locus 112 at -5.87m. The demonstrated provenance for the obsidians coming from such localities as Dava Göz and the Bostan Abad region (Abedi et al. 2018) bears testimony to the spread of Syunik obsidian to the southern Lake Urmia basin. Thus, the related material at Gird-i Ashoan may also have their origin in Caucasia (Orange et al. 2021).

Stone Tools

The stone tools (Figure 18-19) exhibit a limited variety. Noteworthy points include: 1) the blades were formed with an uncommon percussion and the known pressure technique; 2) the tools are made of flint or chert, thus the low potential for the production of longer blades with parallel edges; 3) some fragmentary blades were once longer, but were broken off during application or replacement; 4) the pieces tend to show indications that evince their use in composite sickles; this production technique and the use of sickle blades continued into the Bronze Age; and 5) apart from the blades, the rest are simply chips reduced from cores. Generally speaking, Gird-i Ashoan's stone tool assemblage reflects very rudimentary and localized production techniques. Cores were presumably river stones collected from different terraces.

Fig 17: Stone Scraper, L:119; Sample of Obsidians: L:118

Fig 18. Image and sketch of stone tools.

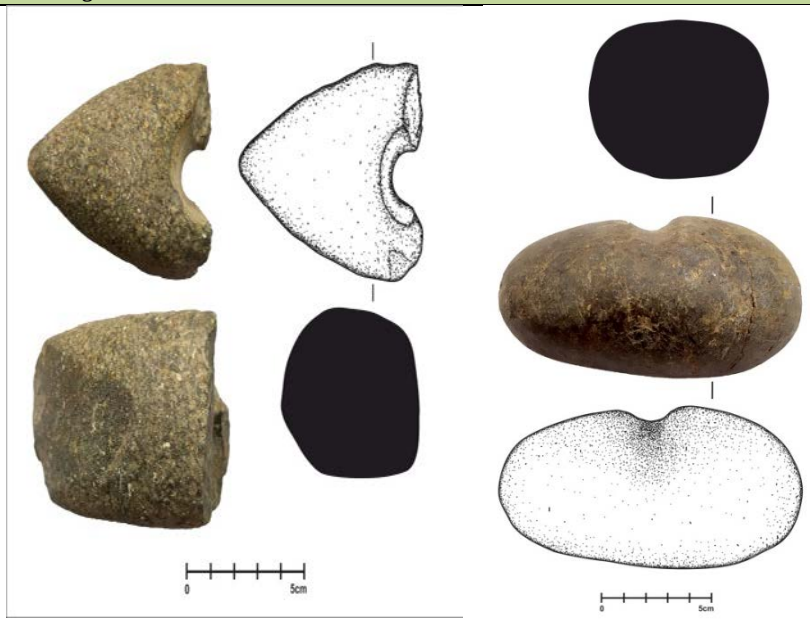


Fig 19: Image and sketch of stone tools.

Radiocarbon Absolute Dating of Gird-i Ashoan

Excavations were followed up by radiocarbon determination of a charcoal sample from Layer 112, carried out at the University of Copenhagen, Denmark (see Table 1). The calibrated date of about 4449 to 4361 BCE indicates that Chalcolithic levels of Gird-i Ashoan dating to the Pisdeli period (LC1) tallies with the corresponding deposits at Kul Tepe (Hadishahr), Arsalan Tepe, and Hasanlu (see Table 2).

Table. 1. Calibrated radiocarbon dates for Gird-i Ashoan.

AAR	SID	Name	Material	Description	Yield	14C Age-14C yr. BP	Calibration Program	Calibration Options	Calibrated Age (1 σ)	Calibrated Age (2 σ)
33861	41557	Gerdi Ashoan Tepe	Charcoal	Sampl 6 (Locus 112)	48.60842422	5584 - 46	OxCal v4.4.2 Bronk Ramsey (2020) ; r:5	IntCal20	4449BC (68.3%) 4361BC	4531BC (0.6%) 4526BC 4501BC (94.8%) 4342BC

Tab 2: Chronology of Late Chalcolithic sites in Caucasia, Anatolia and Iran. Marro et al., 2011, Marro 2022, Balossi-Restelli 2012:250, Abedi et al. ,2014: 37

Sites	Period	Dating
Ovçular Tepesi (Caucase)	Late Chalcolithic	4340/4255 -4230/4140
Arslan Tepe VIII (Anatolia)	Late Chalcolithic	4464/4339- 4542/4247 4451/4010- 4334/3961
Ucan Agil(Caucase)	Late Chalcolithic	4831/4587-4783/4540 4600/4350- 4687/4484
Kul Tepe VII(North West Iran	LC1: Pisdeli/Hasanlu VIII, Ubaid Period	4500/4400-4300/4200
Hasanlu VIII(North West Iran)	Pisdeli	4688/4337
Kul Tepe VIB(North West Iran	LC2,Chaff ,faced /chaff tempered	4300/4200-4000/3900
Kul Tepe VIA(North West Iran	LC3,Chaff tempered	4000/3900-3700/3600
Gird-i Ashoan(North West Iran	Late Chalcolithic LC1: Pisdeli	4531 BC / 4526 BC

The lower layers of the Late Chalcolithic period (LCI) include black-on-buff so-called Pisdeli type painted pottery. According to ^{14}C dating, a date around 4531 BC / 4526 BCE for Gird-i Ashoan is suggested. The upper and middle layers at the site appear to belong to the CFW horizon (LC2/LC3), dating around 4200-4000 BCE.

Discussion

Over the course of the Late Chalcolithic, a multitude of socio-economic transformations and cultural adaptations to the environment introduced variations into a number of cultural domains. Notable among these are the similarities shared among the material cultures of the Southern Lake Urmia Basin, the Caucasus and eastern Anatolia. Such ecological factors as the relative rise in annual precipitation and a shortened dry cycle effectively contributed to this situation.

Archeologically, the Chaff-Faced Ware culture characterizes eastern and northern Mesopotamia, eastern Anatolia, southern Caucasia, and northwestern Iran, including the Zab Basin. In each of these individual regions, the culture displays evident local idiosyncrasies in conjunction with its universal characteristics. The Late Chalcolithic Period is divided into three sub-periods, and in this tripartite system where the Pisdeli phase (LCh I) antedates (Helwing 2012: 204) the ensuing LCh III–II dominated by Chaff-Faced Ware (Helwing 2005; Marro 2022; Abedi 2014:39). The distinguishing attribute of this latter ware, *viz.* coarse chaff fragments on the surfaces, is related to firing process. The pottery tradition has a tremendously wide geographic distribution, though the process may be well related to a higher standardization of vessel functions (Palumbi 2011:

214). The culture is attested at Kul Tepe (Abedi 2014) and Baneh (Saed-Moucheshi 2017) in Iran, and farther afield in Anatolia (at Çadır Höyük, Kenan Tepe, Arsalan Tepe, Barcın Höyük), and Caucasia (at Leyla Tepe, Beyuk Kesik, Mentesh Tepe; Baxşeliyev 2010).

In northwestern Iran, the Late Chalcolithic sites cluster along riversides, as is the case with Tepe Lavin and Gird-i Ashoan. Human occupation of the Zab Basin had to wait until the Late Chalcolithic period to truly take root, when the first settlements emerged thanks to its natural features coupled with permanent water sources—the Lavin River running next to the mound and other tributaries of the Zab nearby. This very late occupation, a pattern also typical of the high plains of the eastern Zagros slopes, may be related to a rather cold and dry climate that hindered farming, and which, according to McDonald, was the main reason for the absence of earlier settlements in these regions (Levine and Young 1984: 17). The so-called 8.2k event was presumably the main factor behind this pattern (Croucher 2012: 19)

The precise dynamics responsible for the spread of the Chaff-faced Ware over this vast geographic remains as an unresolved question to be addressed in future research. Was this prompted by migration and population movement? Indeed, the bearers of the chaff-faced ware culture often selected fertile regions for settlement. Advancing several hypotheses in this regard, C. Marro (2010) suggests widespread migrations as the foremost dynamic. At any rate, these third millennium BCE migrations might have had their roots in the preceding millennium, prior to the Early Bronze Age, and are likely due to the interaction of several different forces, among them being climatic change and the search for better pastures.

Conclusions

Excavations at Gird-i Ashoan, a representative Middle and Late Chalcolithic site, have shed remarkable light on the Zab Basin's cultures. The earliest settlement at the site is marked by the LC1 painted pottery that preceded the Chaff-faced and Pisdeli wares of the LC2/3. Remarkably, the site contains four phases of mudbrick architecture. It reveals close affinities with the Late Chalcolithic Anatolian cultures, alongside strong influences from the Caucasus and Mesopotamia. Based on archaeological finds, one can then speak of regional and interregional contacts of the site's inhabitants. Since its natural geography made the region a route and a crossroads between northwestern Iran and the Caucasian and Anatolian highlands, ascertaining the site's potential significance for inquiries into the extent of transformations and reciprocal influences of the coeval cultures was a main objective of the paper. In terms of landscape and terrain, the Zab Basin is one of the natural corridors that links parts of northwestern Iran to regions in the Tigris Basin and northeastern Mesopotamia more generally.

Gird-i Ashoan is an extensive and high mound in the Zab basin, with a thick Chalcolithic deposit. Consequently, it is a key site in the northwest of Iran. Its material culture reflects a close link to other contemporaneous sites in the Lake Urmia region, on the one hand, and cultural ties with the Caucasus and Anatolia, on the other, as well as with centers in Syria and Mesopotamia. While the Lake Urmia region has provided a line of communication throughout history, as is suggested *inter alia* by the discovery of obsidian, the particular merit of Gird-i

Ashoan lies in its eight meter thick deposit dating to the Middle and Late Chalcolithic, which is as yet unmatched by any other regional center.

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گردآشوان در عصر مس و سنگ جدید،براساس فصل دوم کاوش‌های باستان شناسی شمال غرب ایران

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تپه گردآشوان در حوزه رودخانه زاب کوچک شهرستان پیرانشهر قرار گرفته که انجام کاوش‌های باستان-شناسی آن طی دو فصل انجام یافت. نتایج کاوش اطلاعات درخور توجه‌ای در خصوص سنت‌های فرهنگی دوران مس وسنگ جدید بدست داد. این مقاله، با مطالعه مواد فرهنگی محوطه به این پرسش می‌پردازد که علت پراکنش سفال‌های کاهرو از قفقاز تا بین‌النهرین، شمال سوریه و شمال غرب ایران چیست؟ مطالعه مواد فرهنگی، در مقایسه با سنت‌های مشابه دیگر در حوزه فرهنگی شمال غرب، قفقاز و آناتولی، نوعی تاثیرات بومی محلی را نشان می‌دهد. نتایج کاوش‌های باستان‌شناسی منجر به شناسایی استقراری طولانی مدت از عصر مس و سنگ جدید بود، بطوریکه شامل انباشت ضخیم (حدود ۸ متر) را شامل می‌شد و شامل بیست وچ لایه فرهنگی و چهار فاز معماری است که در محوطه‌های همزمان دیگر چنین استقرار طولانی مدتی گزارش نشده است. نتایج مطالعه مواد فرهنگی گردآشوان نشانگر حضور سنت سفالین کاهرو و سنت پیزدلی بوده و نشانگر این امر است که بیشترین مناسبات فرهنگی و برهمکنش‌ها با مناطق قفقاز ،آناتولی و بین‌النهرین بوده است. مقاله حاضر با تکیه بر یافته‌های گردآشوان به دلایل گسترش سفال‌های سفالی در گستره جغرافیایی وسیعی از قفقاز تا بین‌النهرین، شمال سوریه و شمال غربی ایران می‌پردازد. لازم به ذکر است در عصر مس و سنگ شاهد تحولاتی هستیم که مهمترین آنها افزایش نسبی محوطه‌های استقراری نسبت به دوره نوسنگی است و عمدتا الگوی خاصی به تبعیت از شرایط و پتانسیل‌های زیست محیطی شکل گرفته است. بررسی‌های باستان‌شناسی نشان می‌دهد که تعدد و وسعت استقرارهای این دوره در اغلب مناطق ایران خصوصا شمال غرب و دامنه‌های غرب ایران افزایش یافته است.شکل‌گیری پهن‌های فرهنگی مانند دالما و پیزدلی در شمال غرب ایران عملا در نواحی بیشتری رواج یافته که مبتنی بر کشاورزی و دامداری بوده و در این دوره اتکا معیشتی به شکار و گردآوری از منابع بومی به کمترین حد خود رسید. به نظر می‌رسد مواد فرهنگی گردآشوان به گسترش فرهنگ‌های دوره مس وسنگ جدید و خصوصا مرحله II و III در مناطق وسیعی از قفقاز تا شمال بین‌النهرین می‌پردازد که می‌توانسته نشان از نوعی حرکت جمعیتی یا رواج شیوه‌ای خاص از یک سیستم معیشتی متکی بر دامداری باشد. البته مساعد شدن شرایط اقلیمی به صورت کاهش محسوس سرما و پدیدار شدن شرایط اقلیمی مشابه امروز در شکل‌گیری این پدیده موثر بوده است. این فرهنگ تا مدتی با اقوام کوراارس همزیسیتی داشته‌اند سپس پدیده کوراارس در مناطق مرتفع جایگزین فرهنگ سفال کاهروشده است.

واژه‌های کلیدی: شمال غرب، مس و سنگ میانی/جدید،سفال پیزدلی،سفال کاهرو.

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Analysis of Neolithic Chipped Stones of South Lut and their Comparative Study with Southern Zagros Industries

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(111-132)

Abstract

Artifacts recovered from the Bam surface survey and Tal Atashi excavations, as well as Kerman's discoveries, have sometimes been compared to the Neolithic industries of Balochistan, Pakistan, and have sometimes been described as having local characteristics. In this article, we analyze the artifacts mentioned with the samples found in the South Zagros according to the three variables of raw material, technology and typology. The ancient sites of the South Lut and the South Zagros have followed the same pattern in choosing the type of raw material and how to access it, from the beginning of the Neolithic (aceramic) to the pottery Neolithic. The raw materials were generally local. According to studies, chert and flint were the most important and andesite, sandstone and limestone were the least used raw materials. Bullet cores have been documented in most areas. These cores are few at Tal Atashi, Darestan and Ashkaft Haji Bahrami (Aceramic Neolithic), but at Rahmatabad, Mushki and Hormangan they are relatively numerous. Bullet cores became insignificant from the middle of the Mushki Period, and their numbers declined during the Jari Period. The frequency of geometrics in the Fars region, from the beginning of the Neolithic to the Jari period, has fluctuations in shapes such as backed crescent and trapezoid. Crescent geometrics were one of the most important tools at Tepe Yahya and Tal Atashi across all phases of Neolithic in Fars province. The production process of sickle blades in Yahya was increasing whereas at Tal Atashi, it decreased over the same interval. The frequency of these tools was high at Rahmatabad, and low during the Mushki and Jari periods. This trend may be related to the technological developments of stone artifacts and changes in the type of economy during the Neolithic.

Keywords: Stone Artifacts, Neolithic, South Lut, South Zagros, Tal Atashi, Darestan.

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Introduction and research background

The importance of stone artefacts in archaeological studies is found both in terms of their durability and in terms of providing extensive information about their methods of production, distribution, use, and disposal. The study and analysis of these collections also provides information on the search for and selection of raw materials. On this basis we can discern the level of complexity of the production technique, typological diversity, and regional and trans-regional similarities. Neolithic stone tools are more important than the older and younger periods because of the changes in the livelihoods and social structure of Neolithic communities.

We have Neolithic chipped stone evidence from most parts of Iran (Bigleri, 2002; Fazeli Nashli et al., 2002; Masuda et al., 2013). But we should admit that in western Iran and the Zagros, which has been introduced as the eastern flank of the Fertile Crescent (Kozlowski, 1999), studies in the field of Neolithic stone artefacts have a long history and there are many reports in this field (Neely, 1969; Zeidi & Conard, 2013; Hole, 1994; Nishiaki, 2016; Nishiaki & Darabi, 2018; Hildebrand, 1996). However, the number of Neolithic archaeological studies in the eastern parts of Iran is small (Map 1). We have an incomplete picture of such research in the mentioned areas. The geographical area of Kerman, which is located between the last eastern stretches of the Zagros and Baluchistan of Pakistan, is naturally described as such, and therefore any new information obtained about its Neolithic will be important. Recently, Kerman Neolithic stone industries have been compared with similar industries in Baluchistan, Pakistan, and it has been concluded that Neolithic tools of these two regions, while having general similarities, have local characteristics and traditions (Jayez, 1394, Jayez and Garazhian, 1397). Our aim in this study is to evaluate and compare the findings of the South Lut and Kerman researches with the Neolithic data of the southern parts of the Zagros and the Fars plains (Map 2). In fact, in order to complete the previous studies, we look to the South Zagros, where a large number of Neolithic sites with a set of stone artefacts have been introduced.

Until about a decade ago, the southern Lut region had never been considered because of its remoteness from major Neolithic centre. The area has also been only sparsely visited by archaeologists (Hanslen, 1974; Caldwell, 1967; Adle, 2005). Also, no site was excavated. However, in the last one or two decades, it has a special place in the field of Neolithic studies. Archaeological research in the Darestan began in 2007 under the supervision of Omran Garazhian. Then, Tal Atashi and a number of other sites were excavated (Garazhian and Rahmati, 2012; Garazhian, 2008; Garazhian, 2009). Kerman, which is located in the western part of southern Lut, has a more well-known archaeological background. There, during the last 60 years, several researches have been done (for more information, see: Shakuie, 1389; Pricket, 1986). Of course, the contribution of Neolithic archaeology to these studies has been small. In the lower layers of Tepe Yahya (Lamberg-Karlovsky et al., 1986), Tel Iblis (Caldwell, 1967), Gas Tavileh Tepe (Pricket, 1986) and Gavokshi (Soleimani Alidadi and Fazeli Nashli, 1397), evidence from the Neolithic period has been obtained. If we want to number the study of Neolithic stone artifacts from the total of the aforementioned research, the number of projects will not exceed the fingers

of one hand. The only descriptive and analytical report obtained from the excavation is the studies of Marcello Piperno on the stone artifacts of Tepe Yahya (Piperno, 1973). Although Neolithic sites have been mentioned in a number of archaeological reports (Khosrozadeh, 2004; 2005; Sajjadi, 1987; Sajjadi & Wright, 1990), stone artifacts are only well-documented at Kuhbanan (Hukcriede, 1962) and Fahraj (Henzlen, 1974). Meanwhile, the South Zagros is in a much better position than the South Lut and Kerman in terms of the number of Neolithic sites, survey reports, and analysis of the stone industry. The first steps to study Neolithic sites in the South Zagros was by Louis Vandenberg in the Kur River Basin in 1950 (Vanden Berghe, 1952, 1954). His studies were then followed by William Sumner (Sumner, 1977). Important sites such as Haji Bahrami rock shelter and Hormangan (Khanipour and Niknami, 1397) were explored. In addition, review excavations have been carried out in some areas, such as at Mushki (Alizadeh, 2004, 2006).

Materials and research methods

Stone artifacts discovered from the sites selected for comparative study include Haji Bahrami Caves 1 and 2 in Tang-e Bolaghi, Rahmatabad, Mushki, Hormangan, and Jari, i.e., the most significant excavated sites in the South Zagros. In Southern Lut and Kerman, Tal Atashi and Tepe Yahya have a similar situation. In what follows, the data obtained from the studies of Darestan [Southern Lut] and Kuhbanan [Kerman] will be used for analysis. The chronological relations and technological characteristics of Fars Neolithic stone industries with the traditions of the Middle and Western Zagros will also be evaluated. Therefore, the Fars Neolithic has been considered in the Zagros tradition. Although comparisons of archaeological data between Kerman and Fars have been made by archaeologists (Weeks, 2010; Caldwell, 1968; Mutin, 2012; Petrie, 2012), these comparisons are often made on topics such as pottery and related traditions, and have not been made on Neolithic chipped stone.

In the rest of this research, while presenting a picture of the formation of Neolithic stone industries in the southern Lut, with emphasis on the findings of the Tall Atashi, we perform a comparative study of stone artifacts from Fars and Kerman. This study is based on alignment with the theory of Neolithic delay in the eastern and south-eastern regions of Iran. We will analyse the relevant stone tools based on characteristics such as raw material, technology and typology of formal tools. Of course, in order to perform this comparative analysis, it is necessary to pay attention to the following facts: first, the Neolithic data of Kerman are limited to the findings of excavation of Tal Atashi and Tepe Yahya and the data of comprehensive surveys of Darestan, Kuhbanan and Fahraj. Although these data are suitable for drawing a picture of the Neolithic situation in this area and to understand the technologies of stone tools, but they will not be enough for comprehensive studies. Second, chronological sequences from the Pre-Pottery to Pottery Neolithic have not been reported in either of the two excavated sites. Therefore, a detailed study of the transition period of the two mentioned cultures is not possible at present. Third, although there is a relative correlation between the beginning of the Neolithic period of Tepe Yahya and the Neolithic of Fars (Beale & Lamberg-Karlovsky, 1986), the chronology of Tall Atashi shows that Neolithic in this region began about two millennia later than in Fars. Of

course, this issue has similarities, for example, in the record from Tapeh Sang-e Chakhmaq [Shahroud] in north-eastern Iran, where a slight delay has been reported compared to the Zagros (Roustaei et al., 2015).

Most studies in the eastern and south-eastern regions of Iran have studied the issue of delay through the Pottery Neolithic period and less attention has been paid to this issue through Aceramic Neolithic (Mutin, 2012; Weeks, 2010). Again, for example, the comparison of the Neolithic layers of Tepe Yahya and Iblis to Mehrgarh is an example of such a study (Petrie, 2011; Petrie & Weeks, 2019; Weeks, 2013). Archaeologists have always spoken about this delay. Some archaeologists in Pakistan's Baluchistan Basin have ignored Carbon-14 chronologies to justify the time difference (Jarrige, 1984). Joseph Caldwell, while accepting the precedence and delay of cultural progress in the Iranian plateau, divided it into the western plateau (i.e., the western lands of the Zagros Mountains) and the eastern plateau (i.e., the southern part of the Alborz Mountains, the southern and south-eastern lands of the Zagros Mountains, and the margins of the Lut plain and salt desert). Caldwell said that early sedentary agriculture and animal husbandry on the Western Plateau began more than a thousand years later than in Mesopotamia, Anatolia, the Levant, and Turkmenistan. The Eastern Plateau of Iran also achieved these cultural developments about a thousand years later than the Western Plateau of Iran. He called a large part of the eastern plateau of Iran Kerman province (Caldwell, 1967: 25). The latest study (Petrie & Weeks, 2018), which also refers to the Tall Atashi and the Kerman region, attributes the reason for this delay to geographical factors. The authors of this article, despite the aforementioned research issues, which is due to lack of information in the field of the Southern Lut Neolithic, have shown that the possibility of comparative study of Southern Lut Neolithic findings with Kerman and Fars data will be a major step forward in the analysis of the Neolithic stone industries of the eastern Iranian Plateau.

Analytical description of the findings

The first findings of Kerman region are Kuhbanan assemblage, which was first introduced as an industry based on microlith production and was attributed to the Middle Stone Age. The assemblage was also associated with the Natufian industry (Huckriede, 1962). Then, Lamberg-Karlovsky evaluated them as similar to Yahya Neolithic industry (Lamberg-Karlovsky, 1970). Backed blades, geometric microliths, scrapers, perforators and drills are reported in the formal tools group of this collection. In recent years, Mozhgan Jayez has acknowledged that Huckriede may have made a mistake in attributing the Kuhbanan industry to the Middle Stone Age. She referred to the core from which small blades had been removed by the pressure technique. The parallel ridges on the blades and the presence of polished traces on many of them indicate standardization in production, which emphasizes the Neolithic character of the Kuhbanan assemblage (Jayez, 2017).

The main feature of the Yahya Neolithic stone industries is blade production. Due to the presence of almost regular bladelet cores as well as blades/bladelets with parallel edges in Yahya VC, the use of pressure technique in the production of fine blades can be cautiously considered for Tepe Yahya. Formal tools include sickle blades, notched-denticulated blade and a small number of burin and end-scrapers. Geometrics are also present in the Yahya

Neolithic layers but gradually disappear in the higher layers. These artifacts are made of flint stone and a small number of obsidian. Obsidian instruments were imported as manufactured goods in older periods, but were produced in site in more recent periods (Piperno, 1973).

Systematic study of the B1 area in Darestan, has led to the identification and documentation of tools related to pottery Neolithic in this area (Garazhian, 2008). Finds show that the stone industry of this area was based on the production of bladelets. Flakes and chips that were made in the process of producing bladelets are very common. Bladelet cores, which are probably the product of the pressure technique, is also significantly present in the collection. Of course, it seems that the indirect percussion technique was still used in producing the blades. The blades were also removed in this method by an indirect blow in the early phases and when the cores had larger dimensions. It seems that in the continuation of the process, as the dimensions of the core became smaller, bladelets were removed using the pressure technique. As a result, the formal tools of this area include a large number of geometric microliths that were made not by retouching but by fracture (Jayez and Garazhian, 1397)

Chipped stone from systematic sampling (Shakuie, 2010; Shakuie & Garazhian, 2013) and excavations at Tall Atashi (Jayez, 1394; Jayez and Garazhian, 1392; Jayez & Garazhian, 2013) indicate the industrial prevalence based on the production of bladelets in this area. In addition, blades, crescent-shaped microliths, and notched-denticulated flakes are very common. The shine on some of these specimens confirms their use as sickle blades. Scrapers, burin and drills are also available in small numbers in the collection. As a result, the familiarity of instrument makers with the pressure technique is confirmed by studying a number of cores from which bladelets has been extracted. Of course, most bladelet core does not have a parallel and regular shape due to the use of indirect impact. This issue shows that the pressure technique was not widespread in the Tall Atashi (Jayez and Garazhian, 1397). In the collection of Tall Atashi, despite the existence of a few tools whose raw material is andesite and sandstone, the raw material of most tools is local material.

The oldest Neolithic chipped stone of the South Zagros region has been collected from the excavations of Ashkaft Haji Bahrami 1 and 2. At Ashkaft Haji Bahrami five settlement phases have been identified: Epipaleolithic (phases one and two), beginning of the Neolithic (phases three and four) and the final phase of the proto-Neolithic or Aceramic Neolithic (phase five). The raw material of the artifacts is a variety of flint. The first signs of using the pressure technique are seen in phase three, but at this time the cores did not yet have a standard shape. Backed bladelets, thumbnail, side and round scrapers as well as a small number of trapezoidal geometric microliths are present in the Neolithic assemblage. The use of the pressure technique became more advanced and pervasive during the fourth phase, and gradually, bullet-like cores emerged, albeit in less abundance. The technique of pressure and production of crescent and trapezoidal microlith was still the same as in the previous phase during phase five. Also in this phase, as in phase four, the blades and chips were produced by indirect impact, but the micro-blades were produced using the pressure technique. The presence of scrapers and a small number of arrowheads is also recorded in the collection (Tsuneki, 2013).

The Aceramic Neolithic at Tepe Rahmatabad dates from the late eighth millennium BCE to the middle of the seventh millennium BCE (Azizi Kharanaghi et al., 2013). This phase is the continuation of the final phase of the beginning of the Neolithic period of Haji Bahrami 1 and 2 in Tang-e Bolaghi. The chipped stone found in Rahmatabad is mostly made of local chert and a small amount of obsidian and limestone. Cores show the removal of regular blade/lets with the pressure technique. The presence of very small bullet cores in this collection shows the development of pressure technique and its standardization. Scrapers that were abundant in Eshkafte Haji Bahrami are rare here, but sickle blades are an important part of the collection. The existence of these blades in the Neolithic sequence of Fars has been confirmed in the pre pottery phase of Rahmatabad. Also, micro burin technique has been used in making backed blade/lets (Nishiaki et al., 2013). The pattern of raw material use in the first layer of Rahmatabad is basalt-based, which is also called the Mushki formative period, is quite similar to the previous period. The presence of standard bullet cores, the prevalence of the pressure technique, and the reproduction of crescents, trapezoids, and scrapers have been reported during this period. At the same time, sickle blades were still an important part of formal tools (Abe & Azizi Kharanaghi, 2014).

During the Mushki period, the raw materials are flint and a limited number are obsidian. No obsidian cores were excavated from the site, but the site yielded obsidian blades, flakes and retouched tools. Sickle blades and scrapers are moderately present and no burins have been reported in the collection (Furuyama, 1983). It seems that the importance of bullet cores has diminished and they constitute only 30% of the total cores (Nishiaki et al., 2013). Also, a large number of geometric microliths have been recorded in the collection, and it has been suggested that their application must be analyzed along with zoological data (Abe, 2011).

With the exception of a single thin blade of obsidian, the rest of the raw material in Hormangan is from a local chert. The stone industry of this site is based on the production of blades made using the pressure technique. In the production process, this pressure technique continues so long that only a very small bullet core remains. This maximum usage can be considered as a sign of the advancement in pressure technique. From this area, a large number of backed and geometric microliths have been discovered which have been attributed to being hunting tools. Of course, the large number of hunting tools, along with the medium number of sickle blades, is considered as a sign of the importance of hunting over agricultural activity (Abe & Khanipour, 2019). Unlike Hormangan, the raw materials of the Jari period (late seventh millennium BCE) were of chert, tuff, and rarely, limestone. The number of bladelet cores is greater and generally after producing pressure blades, the flakes were produced in the next phase using a hard hammer (Nishiaki et. al, 2013). The stone industry of this period was based on the production of blades. The use of bullet cores and the production of backed bladelets were significantly reduced. The frequency of sickle blades increased and geometrics decreased (Hori, 1989).

In what follows we will analyze the common features and differences of the South Lut, Kerman and South Zagros assemblages based on the three variables of raw material, technology and typology. The type of raw material and

the methods of access show almost the same pattern in all the studied areas. The raw material was generally local. Obsidian was the only raw material that probably came from distant lands. The first presence of obsidian in the southern Zagros has been reported in the pre-pottery layer of Rahmatabad in the form of small blades and through the Pottery Neolithic in the form of cores (Abe & Azizi Kharanaghi, 2014). In the southern Lut and Kerman, notwithstanding the surface assemblage of Kuhbanan, obsidian has been reported only at Tepe Yahya, albeit in very small quantities. Also, an obsidian backed bladelet was reported in Yahya VII (in the form of finished tools), though no obsidian core has been discovered at Yahya and out of the ten obsidian specimens discovered, seven belong to Yahya V. The discovery of evidence of obsidian retouching in Yahya V is perhaps a sign of the introduction of unworked obsidian which were worked on site (Lamberg-Karlovsky et al., 1986). Local chert and flint are abundant and andesite, sandstone and limestone were rarely used. Limestone that has been discovered from the Pre-Pottery and Pottery Neolithic layers of Rahmatabad are all unretouched flakes. The absence of limestone cores suggests that those flakes were produced in the process of the manufacture or maintenance of limestone ground-stone tools which often involved flaking prior to grinding (Nishiaki et al., 2013). Limestone at Jari B was also used to make ground-stone and unretouched flakes (Nishiaki, 2013). From Tal Atashi, only andesite and sandstone tools have been recovered, but no core of this type of rock has been obtained (Jayez, 1394). In all of the areas described, a better raw material was used to produce the blade/lets and formal tools, and a lower substandard material was used to make unretouched flakes. As a result, the technique of making tools for substandard raw materials has been impact, not pressure.

What brings the Neolithic sites of the Southern Lut, Kerman and the South Zagros closer together are the characteristics and variables of the second (technology of production of fine blades and stone artifacts) and third domains (typology of formal tools). The use of pressure flaking, which is one of the most important factors in differentiating the Neolithic from the Epipalolithic era can be seen in these areas (Olszewski, 1996). Chronological factors are found among the formal tools of the South Zagros; for example, the microliths, backed, scrapers, and notched-denticulated. these are among the formal tools of the Epipalelitic (Zarzi) Zagros, which have continued until the Neolithic period. Stefan Kozlowski introduces the microlith in early Neolithic sites as a sign of the continuation of the Zarzi tradition (Kozlowski, 1994), but the most important sign of the distinction between Zarzi and the Neolithic is the use of a pressure technique (regular, thin blade/let from bullet core).

One of reflection of the technology of Zarzi are single platform cores and pyramidal forms and they are not necessarily highly standardized or regular in appearance. In their exhausted state although there are some examples of well fashioned pyramidal bladelet cores, the pressure technique is absent (Kozlowski, 1996). But through the Neolithic period, cores were multidirectional, regular and reflect the emphasis on balde/let production. They show some standardization and yielding bullet cores. Of course, recognizing the prevalence of pressure technique requires recognizing other factors such as crested blades and core tablet (Pelegrin, 2012). The prevalence of this technique in the Southern Lut has been studied and

has been identified based on the similarity of tools related to the samples found in Balochistan, Pakistan (Jayez and Garazhian, 1397). Therefore, it seems that the pressure technique at Tal Atashi was used in the early phases because bullet cores in this site are less common than unidirectional pyramidal and conical cores. Discovery of a bullet core in the highest layer in the first season of excavation of Tal Atashi and a number of others in a pottery Neolithic site adjacent to the Tal Atashi (Jayez and Shakuie, 1396; Jayez and Garazhian, 1397), indicate the evolution of pressure technique from pre-pottery neolithic to pottery neolithic in south Lut. This technique has been common in all Neolithic areas of the South Zagros. In phases four (onset of Neolithic) and five (Pre-Pottery Neolithic) at Eshkafat Haji Bahrami, the initial process of using this technique is documented in some finds (Tsuneki et al., 2007). Although bullet cores discovered from Rahmatabad, Hormangan, and Mushki are very small exhausted cores, the evolution of the pressure technique has not been a very complex situation in these areas. It is likely that the decline of this technique began during the Neolithic period, when only 30% of the bladelet cores in this area were bullet-shaped (Nishiaki et al., 2013). This trend declined in the Neolithic layers of Jari B (during the first half of the sixth millennium BCE) and the number of bullet cores (Figure 1) decreased significantly (Nishiaki, 2013). Formal tools discovered from most of these sites can be divided to eight main groups: 1) Geometric microliths, 2) sickle blades, 3) scrapers, 4) perforators, 5) notched-denticulated flakes, 6) backed flakes, 7) arrowheads, and 8) burins and truncated blades. In the continuation of this analytical description of the findings, we will make a comparative analysis of some of these tools (Table 1).

Discussion

Although geometric microliths were obtained in small numbers from phase three in Eshkaft Haji Bahrami (Proto-Neolithic), but from phase five, we see their significant presence in the form of crescents and trapezoids (Tsuneki et al., 2007). The abundance of microliths in varied across sites in Fars, but their production continued until Jari B. Microliths have not been reported from the Pre-Pottery layer of Rahmatabad, however, they do comprise a small percentage of the chipped stone assemblage during the Pottery Neolithic (Nishiaki et al., 2013; Abe & Azizi Kharanaghi, 2014). Significant increases in the number of microliths have been reported in Mushki and Hormangan (Abe, 2011; Abe & Khanipour, 2019). In Tal Jari B, however, we encounter only a few of them in the form of simple trapezoids.

Geometrics from Tal Atashi are an important group of formal tools. Of course, their production method was different from the geometrics discovered from Fars during the Neolithic such as at Rahmatabad, which were often made using the micro-burin technique (Abe & Azizi Kharanaghi, 2014). Microliths at Tal Atashi were obtained by fracturing regular bladelets (Jayez, 2015). Also, four crescent, two triangular, and one trapezoidal microliths were obtained from Yahya VI and VC and completely disappeared in the higher layers, especially Yahya IV. Yahya crescents are classified into two groups including simple crescents (microlith subset) and Backed crescents (sickle subset). The crescent-shaped backed flakes discovered from the lowest layers of Yahya gradually lost their crescent shape over the Post-Neolithic periods (Piperno, 1973). Crescents, which

are considered to be one of the most important tools at Tal Atashi and Yahya, had a high frequency in the Neolithic areas of Fars. Also, these tools have been reported from the second phase in Eshkaft Haji Bahrami (Late Zarzian) and their production has continued in the next phases, although with less frequency (Ohnuma, 2008). In Rahmatabad, in addition to the widespread use of the pressure technique, the backed microliths also comprise a large component of formal tools (Nishiaki et al., 2013). Accordingly, technological similarities between South Zagros and South Lut can be examined. In addition, we know that the production of backed (Figure 2) was a continuous process in the Mushki and Hormangan, but their importance was greatly reduced in the Jari B (Abe, 2011; Abe & Khanipour, 2019; Nishiaki, 2013).

Although many microliths and backed were used as sickles, longer blades (with luster) were also made, which were usually truncated blade or notched-denticulated and we should therefore place them in a separate group of sickles (Figure 3). Thus, sickle blades are another important type of formal tool for Neolithic analysis in southern and southeastern Iran. These blades are few in the lower layers Tal Atashi and have not been seen at all in the upper layers (Jayez, 2015). They appeared in more recent periods in Yahya (e.g., layers of the V period) not in a crescent-shaped and backed form but in a notched-denticulated form. luster is reported to be one of the oldest periods of Yahya, but its number gradually increased so that their number doubled in John IV; This seems to be a sign of the importance of agriculture or population growth (Piperno, 1973). Luster is not recorded at the beginning of the Fars Neolithic sequence (in Ashkaft Haji Bahrami) (Tsuneki et al., 2007), but this is an important part of the chipped stones assemblage in Tepe Rahmatabad, and from the pre-pottery to pottery layer. Their number increased (Abe & Azizi Kharanaghi, 2014). Although the production of sickle blades was still important in the Mushki and Hormangan assemblages, we encounter a decrease in their number relative to microliths (Abe & Khanipour, 2019). In Jari B, however, the number of sickle blades has increased dramatically (Nishiaki, 2013). It can now be concluded that in both the southern Lut and Kerman, as well as in Fars, during the Rahmatabad period, the frequency of agricultural tools such as sickles was higher, but during the Mushki period (probably simultaneously with the drought and the climatic event of 8200 years ago) has been less and hunting tools have increased. The production of such tools increased from the Jari period, which was the transition period from 8.2 ka event[5] and the beginning of irrigation agriculture. Their deficiency in Tall Atashi and Darestan can also be analyzed and evaluated with the environmental perspective of this region.

In the early phases of Neolithic in the Fars area, we see the increasing presence of scrapers, especially in small sizes that are indicative of the Zarzi period (Tsuneki et al., 2007), but their overall number declined in later Neolithic periods. This change can also be seen in the typology of the tools, so that the thumbnail scrapers disappeared and the production of side and end scraper continued until the end of the period. The number of scrapers at Tal Atashi (Jayez,

[5] The 8.2 ka event is a pan-global abrupt cooling and drying event, which occurred between ca. 6200 BCE and ca. 6000 BCE. Recent paleo-environmental studies reveal that the cold and dry climate had already started around ca. 6600 BCE (8.6 ka event) (Abe & Khanipour, 2019).

1394), the Pre-Pottery layer of Rahmatabad (Nishiaki et al., 2013) and Hormangan (Abe & Khanipour, 2019) constitute about 5% of the total formal tools, however, their number reached 13% of all tools during the Pottery Neolithic layer at Rahmatabad (Abe & Azizi Kharanaghi, 2014). The number of scrapers in Tepe Yahya (Piperno, 1973), Mushki (Fukai et al., 1973) and Jari (Nishiaki, 2013) has been decreasing from older to newer layers. Therefore, the frequency of scrapers in most areas of the southern Lut and South Zagros regions (Kerman and Fars), with the exception of Rahmatabad, has been declining. This is an important indicator of technological developments during cultural processes, of course with different chronologies and similar sequences in the two regions of the South Zagros and southern Lut.

Conclusion

Based on what has been presented and discussed, there are many similarities between the collections of Neolithic stone artifacts in the southern Lut, Kerman and Fars regions. It seems that the Neolithic cannot be called a period for such studies because this term has a time burden in archaeology and chronological differences between the two regions will prevent the use of comparative methods. However, this comparative study has helped to provide a descriptive and analytical, albeit preliminary, examination of a collection of Neolithic chipped stone artifacts from the southern Lut. Investigation of raw materials in the study areas indicates that they are local and were collected from the surrounding areas. In the lower and upper layers of the Neolithic at most prehistoric sites, evidence of obsidian and obsidian artifacts has been obtained, albeit in small quantities. Access to obsidian in Kerman (Kuhbanan and Tepe Yahya) came a little later than in Fars and no examples of it have been discovered at Tal Atashi. This is exactly what indicates local raw materials and the exploitation of ecological resources. The use of pressure technique in the production of blade/lets, which is the distinguishing indicator of the Epipaleolithic from the Neolithic, has been observed in most areas. This technique appeared later in the Lut basin and Kerman than in Fars. The very small amount of bullet cores at Tal Atashi and the not-so-complex evolution of the pressure technique at Tepe B1 in Darestan are evidence of this claim.

Significant types such as microliths, backed flakes, sickle blades, and scrapers were produced in all areas with only slight technological differences. An important result obtained from the evaluation of microliths, backed and sickle blades is the analysis of the economic livelihood of the study areas in different phases of the Neolithic. Their application in simultaneous periods with Rahmatabad, Mushki and Jari can be considered in the form of primary agricultural tools, hunting-gathering, and re-irrigation-based agriculture, respectively. In this article, we habe used the term southern Lut to refer to the eastern part of Kerman, which until a decade or two ago had no information about its Neolithic phase. The current data have been used to draw a basic image of the Neolithic cultures in this region and a comparative study with Neolithic data of Kerman and Fars. Thus, this article represents the first time that the similarities and differences between the technologies and typologies of the chipped stone assemblages of the mentioned areas have been studied and analysed.

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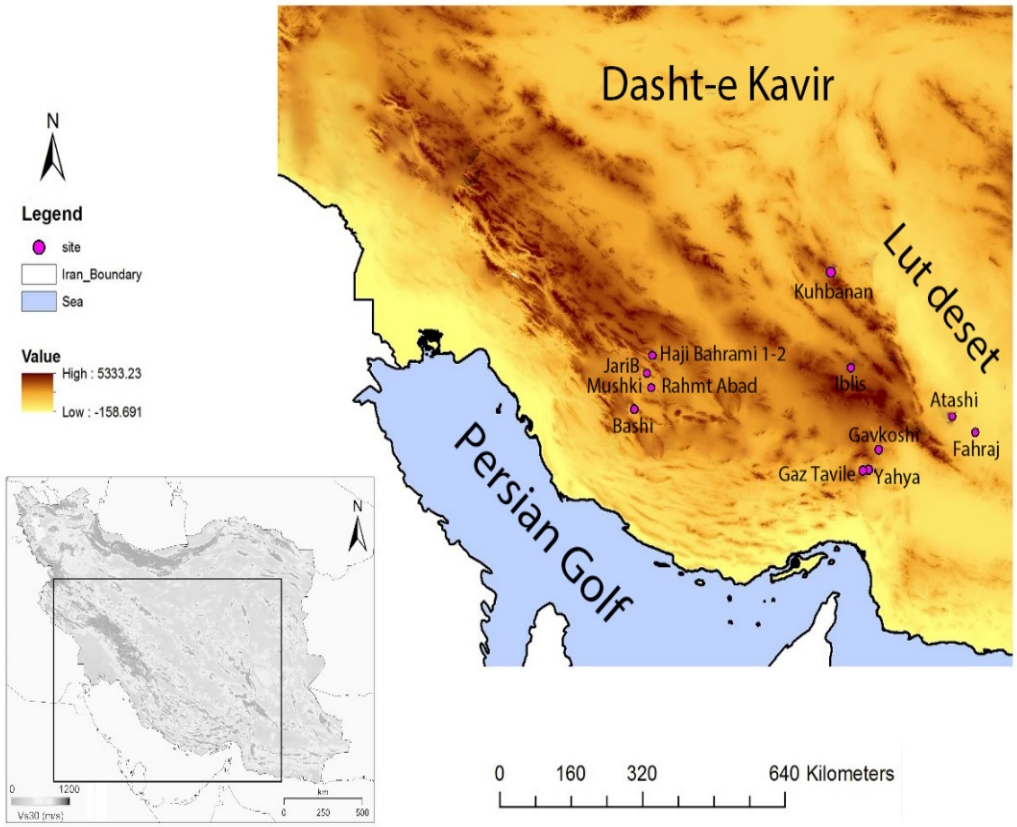

Map 1: Neolithic sites of South Lut, Kerman, South Zagros

Map 2: Neolithic sites of South Lut, Kerman and Pakistan

Table 1: Formal tools discovered from South Lut, Kerman and South Zagros

منبع	Attributed period	Chronology	Abundance of formal tools	Area	Altitude (meters)	Site
Garazhian and Rahmati, (2012):144	Aceramic Neolithic	5200-4600 BC	Backed, Geometric, Scraper (high),Notched/ Denticulated(medium),Sickle, Burin, Drill, Truncated(low)	South Lut	700	**Atashi**
Lamberg-Karlovski and Beale, 1986: 11	Neolithic-Yahya	3700-3900 BC (not calibrated)	Notched/ Denticulated(high), sickle (medium), Scraper, Burin, Backed, Geometric, Truncated(low), drill (disappear)	Kerman	1200	**Yahya VI**
			Notched/ Denticulated, sickle (high), Backed, Burin(medium), Scraper, Drill, geometric, Truncated(disappear)			**Yahya VC**
Tsuneki, 2013: 74	Proto-Neolithic	10000-8300 BC	Scrapers, Notched/ Denticulated (High) geometric (Low), sickle (Disappear)	South Zagros	1875 and 1848	**Haji Bahrami,3**
	Proto-Neolithic	7600-7400 BC	Scrapers (high), Notched/ Denticulated and non-geometric microlites such as backed and side Scrapers (medium), drill (low), sickle (disappear)			**Haji Bahrami,4**
	Proto-Neolithic/ Aceramic Neolithic	?	scrapers (high), geometric microliths (medium), sickle (disappear)			**Haji Bahrami,5**
Azizi Kharanaghi *et al.*, 2012	Pre-pottery Neolithic Rahmat Abad phase	7047-6744 BC	Sickle, Notched/ Denticulated(high), Scrapers, Burins and backed (Medium), Blade and drill (low), Geometries (disappear)		1774	**Rahmat Abad-Pre-Pottery Neolithic**
	Pottery Neolithic Befor Mushki phase	6218-6028 BC	Sickle, Notched/ Denticulated(high), Scrapers(medium), Drill, Burin, Backed and geometric (low), Truncated (disappear)			**Rahmat Abad-Pottery Neolithic**
Nishiaki, 2010	Pottery Neolithic Mushki phase	6400-5981 BC	Geometries (high), scrapers (medium), sickle and drill (low), Burins (disappear)		1800	**Mushki**
Khanipou and Niknami (2019)	Pottery Neolithic	6373-6000 BC	Geometric, Sickle, Notched/ Denticulated (high), Backed (Medium), Scraper, Perforator (low), truncated, Burin (Disappeared)		2364	**Hormangan**
Nishiaki, 2010	Neolithic	6177-5730 BC	Sickle (high), Notched/ Denticulated(medium), Scraper, Geometric (low), Drill, backed, Burin, truncated (Disappear)		1800	**JariB**

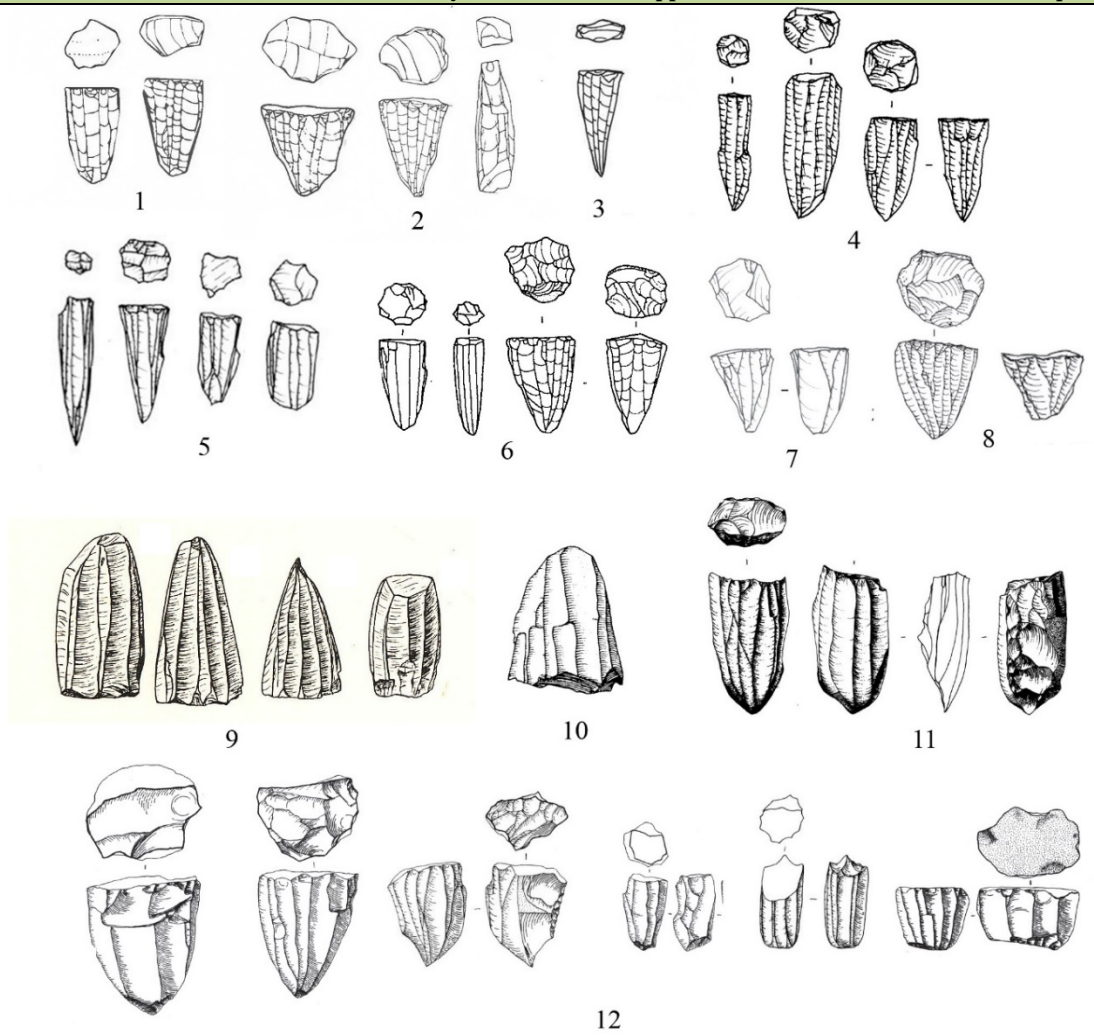

Figure 1: unidirectional bladelet core no.1: Haji Bahrami3, no. 2: Haji Bahrami 4, no.3: Haji Bahrami5, no.4: Pre pottery Rahmatabad, no.5: Pottery Neolithic Rahmatabad, no. 6: Mushki, no.7: Hermangan, no. 8: Jerr B, no. 9: Kuhbanan, no.10Yahya, Ash. No.11: B 1 Derstan, no. 12: Atashi. The scales are different

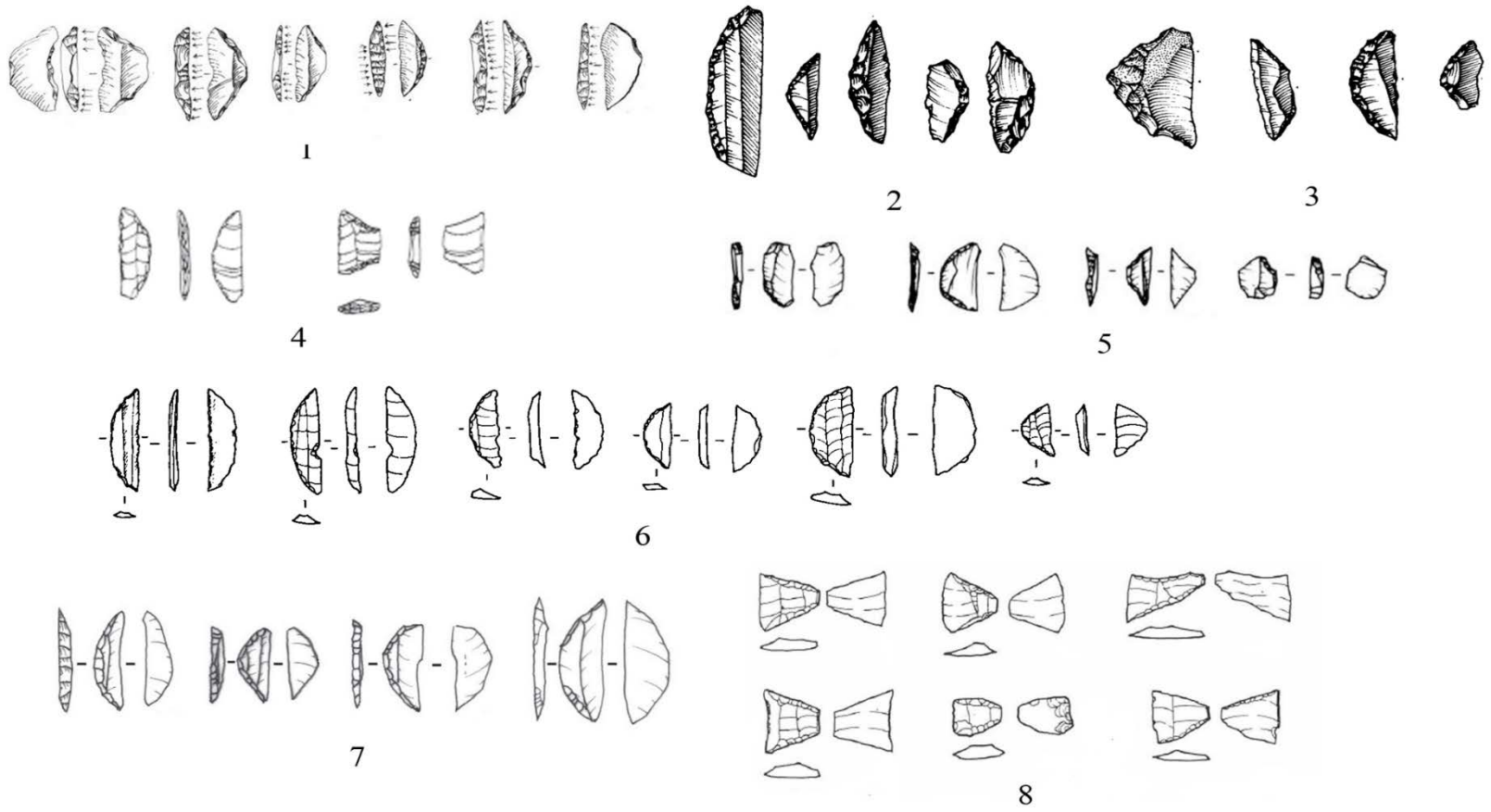

Figure 2: Backed, Crescent and Geometric tools: no. 1: Atashi, no.. 2: Yahya VI, no. 3: Yahya VC, no. 4: Haji Bahrami, no. 5: Pottery Neolithic Rahmatabad, no. 6: Mushki, no. 7: Hormangan, no. 8: Jerry B (scales are different)

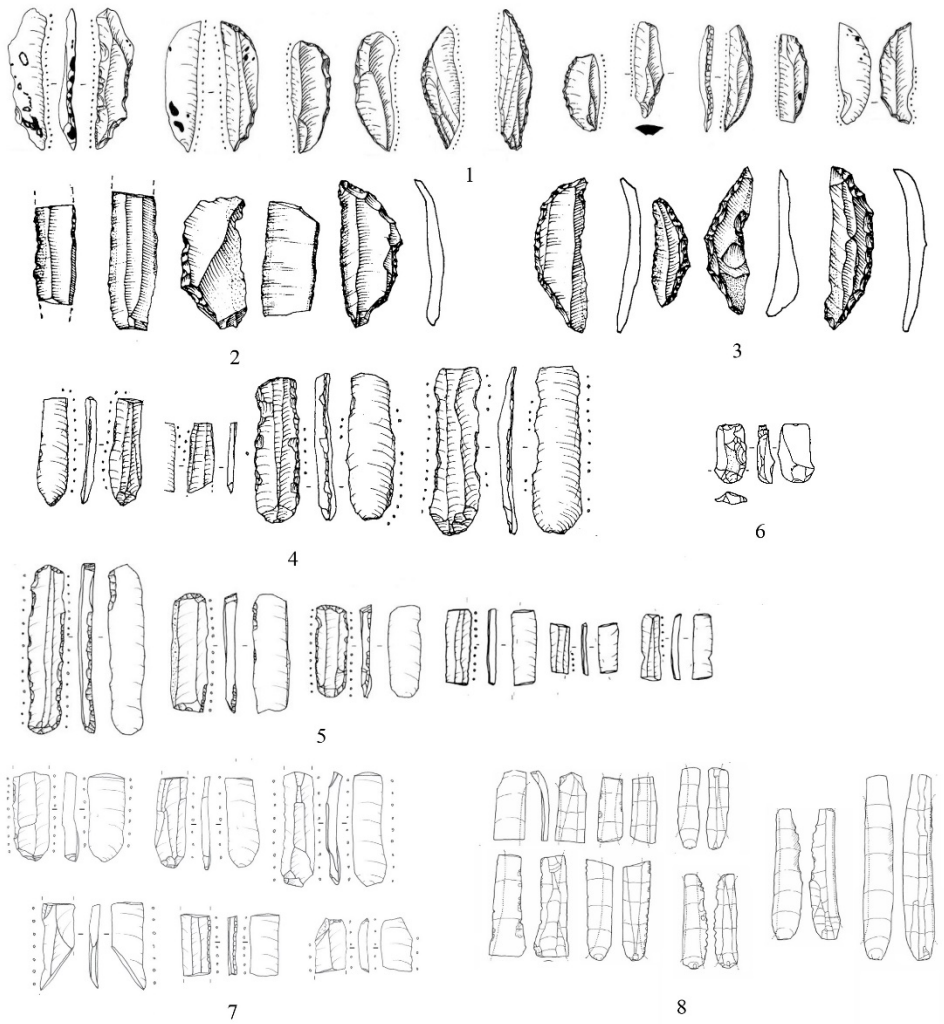

Figure 3: chipped stones with sickle elements: no. 1: Atashi, no. 2: Yahya VI, no. 3: Yahya VC, no. 4: Pre pottery Neolithic Rahmatabad, no. 5: Pottery Neolithic Rahmatabad, no. 6: Mushki, no. 7: Hormangan, no. 8: Jerry B

تحلیل صنایع سنگی نوسنگی لوت جنوبی و مطالعهٔ تطبیقی آنها با صنایع زاگرس جنوبی

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چکیده

مصنوعات مکشوفه از بررسی‌های دارستان بم و کاوش تل آتشی، به‌همراه یافته‌های کرمان، گاهی با صنایع نوسنگی بلوچستان پاکستان هم‌سنجی شده و زمانی هم، واجد ویژگی‌های محلی، توصیف گردیده‌اند. در این مقاله، مصنوعات مذکور را با نمونه-های مکشوفه از زاگرس جنوبی طبق متغیرهای سه‌گانه‌ی ماده‌ی خام، فناوری و گونه‌شناسی مورد تحلیل و مطالعه‌ی تطبیقی قرار داده‌ایم.محوطه‌های باستانی لوت جنوبی و زاگرس جنوبی از الگوی یکسانی در انتخاب نوع ماده‌ی خام و چگونگی دسترسی به آن، از آغاز نوسنگی تا نوسنگی باسفال پیروی می‌کرده‌اند. مواد خام، عموما بومی، بودند. براساس مطالعات انجام-شده چرت و فلینت، مهم‌ترین و آندزیت، ماسه‌سنگ و سنگ آهک، کم‌اهمیت‌ترین مواد خام بودند. سنگ‌مادرهای فشنگی که محصول فن فشاری هستند در اغلب محوطه‌ها به‌دست آمده‌اند. این سنگ‌مادرها در تل آتشی، محوطه‌های دارستان و اشکفت حاجی بهرامی (نوسنگی بی‌سفال)، کم‌تعداد ولی در رحمت‌آباد، موشکی و هرمنگان، نسبتا پرتعداد هستند. سنگ‌مادرهای فشنگی از اواسط دوره‌ی موشکی، کم‌اهمیت شدند و شمار آنها در دوره‌ی جری، کاهش یافت. فراوانی هندسی‌ها در منطقه فارس اگرچه از آغاز نوسنگی تا دوره‌ی جری، دارای نوساناتی بوده است ولی در اشکالی نظیر هلالی، کول‌دار و ذوذنقه‌ای تولید شدند. هندسی‌های هلالی از مهم‌ترین ابزارهای رسمی در تپه یحیی، تل آتشی و نیز تمامیِ مراحل نوسنگی فارس بودند. روند تولید تیغه‌های داس در تپه یحیی، افزایشی ولی در تل آتشی، کاهشی بوده است. فراوانی این ابزارها در دوره‌های رحمت‌آباد، کم، موشکی و جری، زیاد بوده است. این روند فراوانی را می‌توان با تحولات فنآوری مصنوعات سنگی و تحولات در نوع اقتصاد معیشتی در نوسنگی مرتبط دانست.

واژه‌های کلیدی: مصنوعات سنگی، نوسنگی، لوت جنوبی، زاگرس جنوبی، تل آتشی، دارستان.

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The Eastern Iran Prehistoric Archaeological Project: The Second Season of Archaeological Excavation at Kale Kub, Southern Khorasan Province (2019)

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(133-152)

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Abstract

After more than one hundred years from the beginning of archaeological studies in Iran, the eastern regions of the country have received scarce or no attention from archaeologists, and there are very limited publications resulting from archaeological activities in this part of Iran. The prehistoric site of Kale Kub Ayask is one of the few prehistoric sites of South Khorasan province, and indeed in the whole eastern Iran, containing sufficient cultural deposits to provide a reliable chronology of the prehistoric cultural sequence of this region. Excavations at the site have led to the identification of the unknown prehistoric cultures in the area. The most significant achievement of the excavation is the identification of cultural materials dating to the fourth millennium BCE with southwestern and Mesopotamian origins. This cultural evidence, which can be considered as horizons of the culture of Susa II or the Late Uruk period, includes the typical pottery types of this period, such as beveled rim bowls, coarse Banesh trays, tubular vessels, nose-handled jars, patterned, and fine wheel pottery. This evidence has been long known in the southwestern, western, northwestern, southeastern, and central plateaus of Iran, but this is the first time they have been identified in eastern Iran. Based on geophysical studies, pristine places were selected to survey during the second season of excavation at the Kale Kub site, and the excavation of trenches with wider dimensions has lead to the identification of the prehistoric architecture of the site.

Keywords: Kale Kub, Architecture, Trade, Raw Materials, Susa II

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Introduction:

The Kale Kub Ayask is located in the Sarayan district of South Khorasan province (Figures 1 and 2). Prehistoric studies in the eastern regions of Iran have up to now been severely limited overall and the studies that have been accomplished are almost entirely concentrated in the southeast and northeast of Iran whereas the central eastern regions have received scant attention due to the harsh climatic conditions of the vast deserts of the region, the Dasht-e Lut and Dasht-e Kavir. However, in recent years, almost the entirety of the province of South Khorasan has been surveyed by the province's General Directorate of Cultural Heritage, Handicrafts and Tourism. The number of identified prehistoric sites is extremely limited, however, and another problem with these sites is they have generally been damaged by human and geological factors. Kale Kub is perhaps one of the few prehistoric sites in the province with substantial intact deposits.

Kale Kub is located on the edge of three active alluvial fans where the sedimentation rate is very high, in an area where between one and one-and-a-half meters of fine-grained alluvial sediment layers have covered the whole plain. This is the reason why farmers have been interested in this area. High-quality agricultural lands and gardens are located in the western and southwestern parts of the Ayask town. Agriculture is the main occupation of the people of this region today, and in recent years, due to the digging of numerous deep wells, almost all areas that had arable land, have cultivated crops such as wheat, cumin, and especially saffron and pistachios. The site of Kale Kub is also located between these farms and therefore, had been almost destroyed by the landowner to create arable agricultural fields.

Kale Kub was initially excavated over two seasons between 2008 and 2011 (Anani, 1391: 1); in 2008, the site was inscribed on the list of national monuments of Iran, number 23005. Based on these two seasons, the total area of the site is estimated to be approximately seven hectares. In 2018, Kale Kub was excavated for stratigraphic studies. The particular purpose of this season was to provide both a relative and absolute chronology for the site and to identify the cultural sequence of its prehistoric settlements (Azizi Kharanaghi et al., 2021). For this purpose, two small 2m×2m trenches were excavated in the central part of the site, next to the previously excavated areas (Azizi Kharanaghi et al., 2018). In 2019, the second season of excavation of the present project was carried out in the same vicinity (Azizi Kharanaghi et al. 2019), as well as at several new loci determined by geophysical survey to be of interest.

Figure 1: Geographical Location of Kale Kub

As mentioned above, during the fourth millennium BCE—i.e., simultaneous with the formation of complex societies and the beginning of urbanization in Mesopotamia—we see the emergence of regional and trans-regional trade relations and consequently some degree of cultural homogeneity indicated by the presence and distribution of, for example, beveled rim bowls. Eastern Iran has always been considered to be part of these networks because of its location along the trade routes of mineral resources such as lapis lazuli and metals. The excavations at Kale Kub have revealed evidence of the presence of a beveled rim bowl and other diagnostic pottery from the fourth millennium BEC cultures of Mesopotamia and southwestern Iran. Analysis of the findings from this area can explain the position of eastern Iran in the broader cultural interactions of the fourth millennium BC cultures on the Iranian plateau. The results obtained from the first season of the current campaign led to the expansion of excavation in the second season. In this season, after conducting extensive geophysical studies, various trenches have been excavated which led us to identify prehistoric architectural remains, which may be industrial installations.

Research questions and hypotheses

The key questions of this research are as follows. What are the characteristics of the fourth millennium architecture at Kale Kub? What is the reason for the formation of this site, especially during the fourth millennium BCE in this region, especially in light of its special climatic conditions? What role did the region play in the supply of raw materials and craft products for exchange, compared with similar centers located in the Central Plateau and Kerman?

Geographical location of South Khorasan

South Khorasan is located in eastern Iran and has an area of ca. 90000 square kilometers. This province covers about 5.4% of the total area of Iran, which is bordered on the east by Afghanistan, to the north by Khorasan-e Razavi, to the northwest and west by Yazd, to the southwest by Kerman, and to the south by Sistan and Baluchestan. In 2004, the province of Khorasan was divided into three new provinces: North Khorasan with the center of Bojnord, Khorasan Razavi province with the center of Mashhad, and South Khorasan province with the center of Birjand. The most important cities of this province are Birjand, Ghaenat, Nehbandan, Sarbisheh, Darmian, Ferdows, Sarayan, and Boshravieh (Deputy of Culture and Communication, 2005: 15-14).

The Sarayan district is located in the northwest of South Khorasan province and in terms of geographical location is located around the intersection of 33° 52' north latitude and 58° 30' 40" east longitude. Sarayan is bounded to the north by Gonabad, to the south by Birjand, to the east by Ghaen and to the west by Tabas; its distance to Birjand (the center of the province) is 156 km. The climate of the region is divided into two dry types: cold and hot. This climate is largely due to the mountain ranges in the north of the district and the presence of desert plains in the south. The northern reaches of the area are cold in winters and mild in summers due to the numerous mountain ranges and valleys; most of the region is, however, covered by dry plains and deserts (Annani, 1391: 13-12).

In the south of Sarayan, there is a vast plain whose soil is very fertile for agriculture. Sarayan is further divided into two small townships, Seh Qale (which occupies most of the plains and deserts) and Ayask, which has a relatively milder climate. In these areas, most people today are engaged in agriculture due to the existence of motorized wells. In the past, the village of Seh Qale had used the many qanats that provided drinking and agricultural water; after the advent of deep mechanical wells, however, most of these qanats dried up and this issue caused the migration of most people in this village. The general slope-aspect of this region, especially around Sarayan, grades from northeast to southwest. Due to the town's location in a relatively flat area, there is no special natural feature around the city and only a few natural issues can be mentioned around it (Sarayan City Master Plan, 2009, vol. 2: 8).

Research background

With its rich culture and brilliant civilization, Iran has always been the center of scientific, archaeological, and cultural research. Khorasan has been the wellspring of numerous fundamental movements and events in Iranian history. In short, the region has always played a crucial role in Iranian culture. Unfortunately, due to the lack of sources and reasoned historical and archaeological sources in southern Khorasan, as well as due to the dearth of fieldwork, there are still many ambiguities in the field of archaeology in this region to be resolved (Soroush, 2012). From 1900 to 1978, among 727 archaeological projects conducted in Iran, only eighteen cases, less than 2.5%, were allocated in Khorasan. After the Islamic Revolution, the process of archaeological research in Khorasan has accelerated, and that research has helped us to better understand the historical ambiguities of Khorasan (Labaf Khaniki, 2012: 28). In this section, greater emphasis is placed on

archaeological research in the province of South Khorasan, and an attempt is made to introduce a part of archaeological activities in this area. For the first time in 1941, Jamal Rezaei and Sadegh Kia took steps to study archaeology and read the Parthian inscriptions of Kal Jangal (Behnia, 2002: 371). In 1949, Carlton Coon from the University of Pennsylvania excavated Khoeinik Cave, a site located 18 km away from Qaen, an inhabitation dating back to 35,000 BCE (Coon, 1951).

A systematic archaeological survey of Khorasan from north to south was carried out in 1977 and 1978 under the supervision of Faeq Tawhidi, and relative knowledge of the cultural and historical capabilities of each of the cities of Khorasan was thereby obtained (Tawhidi, 1977, 1978). The study of Qasbeh Gonabad qanat was carried out in 1990 by Labaf Khaniki during a one-month research program. The length of the qanat is about 33,113 meters and 472 wells have been drilled along its gallery. The depth of the mother-well is about 300 meters. Next to one of the wells of the main branch, ceramics similar to Dahan-e Golaman have been found, which are approximately two thousand years old (Labaf Khaniki, 1997: 298-271). During the archaeological survey of Birjand, in the village of Lakhmzar, a wide collection of petroglyphs was discovered, expressing the beliefs and art of the ancient past and also the presence of people and tribes such as Hepthalites (Labaf Khaniki and Bashash, 1994: 76-74). The following areas have been surveyed: Ferdows in 1996 by Mahmoud Bakhtiari; Ghaen in two seasons in 1997 and 1998 by Ali Hassanabadi; Bardaskan in 1998 by Mahmoud Bakhtiari, and Sarayan in 2004 by Alireza Nasrabadi; Takhcharabad site in 1999 by Ali Hasnabadi (Labaf Khaniki, 2012: 152-142); Kale Kub in 2008 and 2009 (Yousefi, 2009); Kundari Tapeh, a settlement of the prehistoric and historical periods in Ghainat, surveyed in 2008 (Yousefi, 2008); the Palaeolithic cave of Chehel Dokhtaran in Sarbisheh (Behnia, 2002: 383); the prehistoric site of Sar Takht Baghistan in 2004 (Zafranloo, 2004). Takhcharabad is possibly the only site dating to the late prehistoric period that has been excavated in South Khorasan province, investigated for four seasons (Dana, 2019: 406). This site is located near Birjand and archaeological studies are ongoing there. The excavator of this site proposed its chronology as spanning the Late Iron Age III and pre-Achaemenid periods (Dana, 2019). Furthermore, Kale Kub was intensively excavated in 2018, which led to the discernment of the relative chronology of the site and the identification of its cultural materials from the fifth to the second millennium BCE (Azizi Kharanaghi et al., 2021).

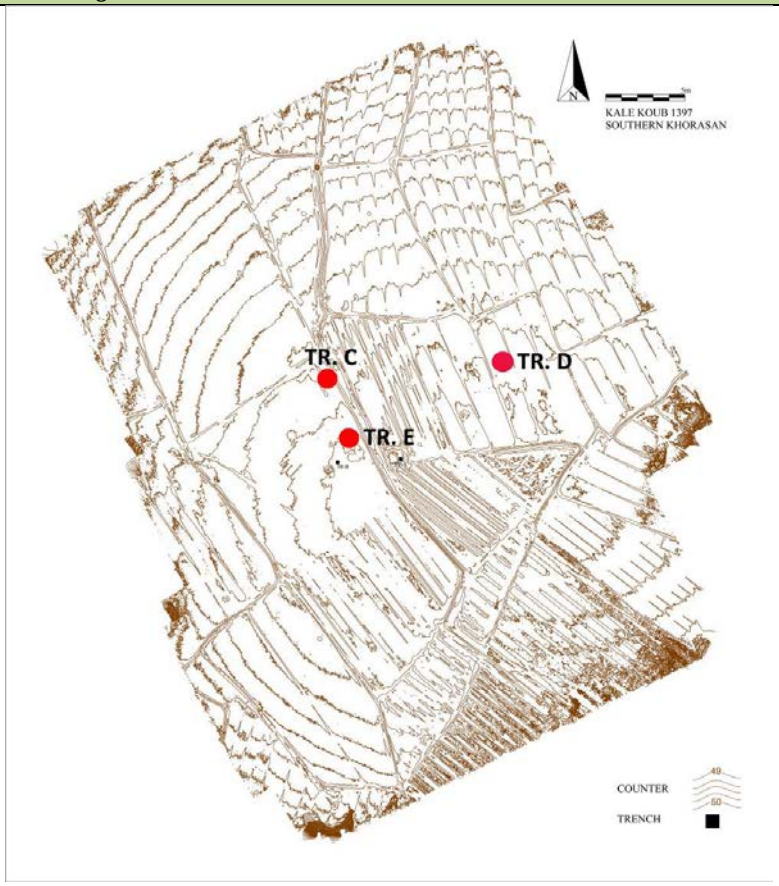

Figure 2: Kale Kub topographic map, showing the locations of Trenches C, D and E

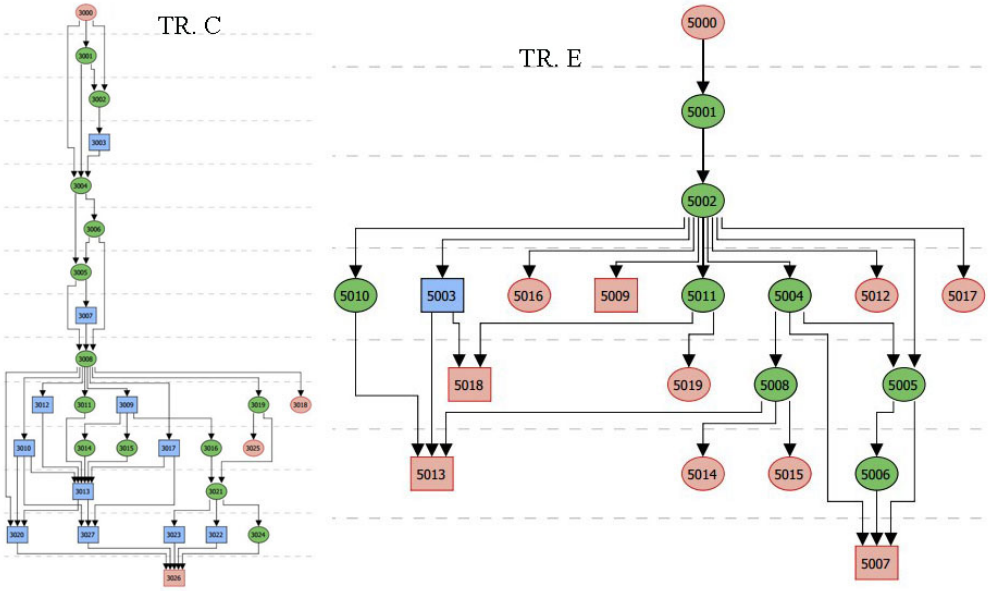

Figure 3: Harris matrix charts of Trenches C and E of Kale Kub 2019

Description of excavation, Trench C:

Trench C (5m×5m) was excavated to identify the architectural structures and cultural layers of the site according to anomalies identified during the geophysical survey of the central part of the site. The elevation of the area of the site where

this trench was dug, which also has a gentle slope from east to west, is 1359 meters above sea level. During the excavation in this trench, 28 separate contexts, with depths below the datum of up to 210 cm were recorded, along with their various cultural materials. Finally, the excavation of this trench at an altitude of 1356.90 meters above sea level was completed in context 3026 with the identification of two architectural phases which were filled with windblown sand (Figure 5). Due to the richness of the architectural remains found in this trench, and because of their extension into the space beyond the opened trench, the expansion and continuation of excavation around this area must be one of the goals of excavation in future seasons.

Figure 4: Architectural remains found in Trench C, Kale Kub 2019

With a general and initial look at the condition and nature of the architectural and cultural remains found from the excavation in this trench, which resulted in the discovery of 28 distinct contexts, the architectural remains found can be summarized in two different and superimposed architectural phases. The earlier phase of architecture in this trench includes Contexts 3020, 3022, 3023, 3027, and 3026, all of which, form a single architectural complex of related structures in the form of a thermal structure or kiln (Figure 4). This thermal structure consists of 4 interconnected walls in the area exposed inside the trench; Wall 3020 divides this structure into two parts, i.e., the eastern and western space. The floor of this structure is was observed to have a heavily burnt texture with colors ranging between black and grey; it was registered as Context 3026. During the excavation of the interior of this context, the remains of heavy mud-brick debris were found along with pieces of mud with the negative imprints of organic matter (plant stems), which could be a sign of the existence of a roof made of plant materials such as tree stems and wood. The later phase of architecture in this trench is based

on the elements of the kiln structure. The architectural remains belonging to this phase include three walls, Contexts 3010, 3012, and 3017, which form an adjoining right-angled architectural space. The floor of this space was registered as Context 3013. A little distance away, in the northern part of this architectural structure, there are traces of a heated floor in the shape of a concave circle and burnt soil around it (Context 3009), which is probably part of a small thermal structure of the same period and belongs to the new phase of architecture in this trench.

This space's function and its architectural structure are not clearly known, but due to the finds of different types of stone tools and a large amount of debris within it, is possible to hypothesize that the use of this space was not unrelated to the production of stone tools. However, firm conclusions about the architecture and its dating require further study and excavation.

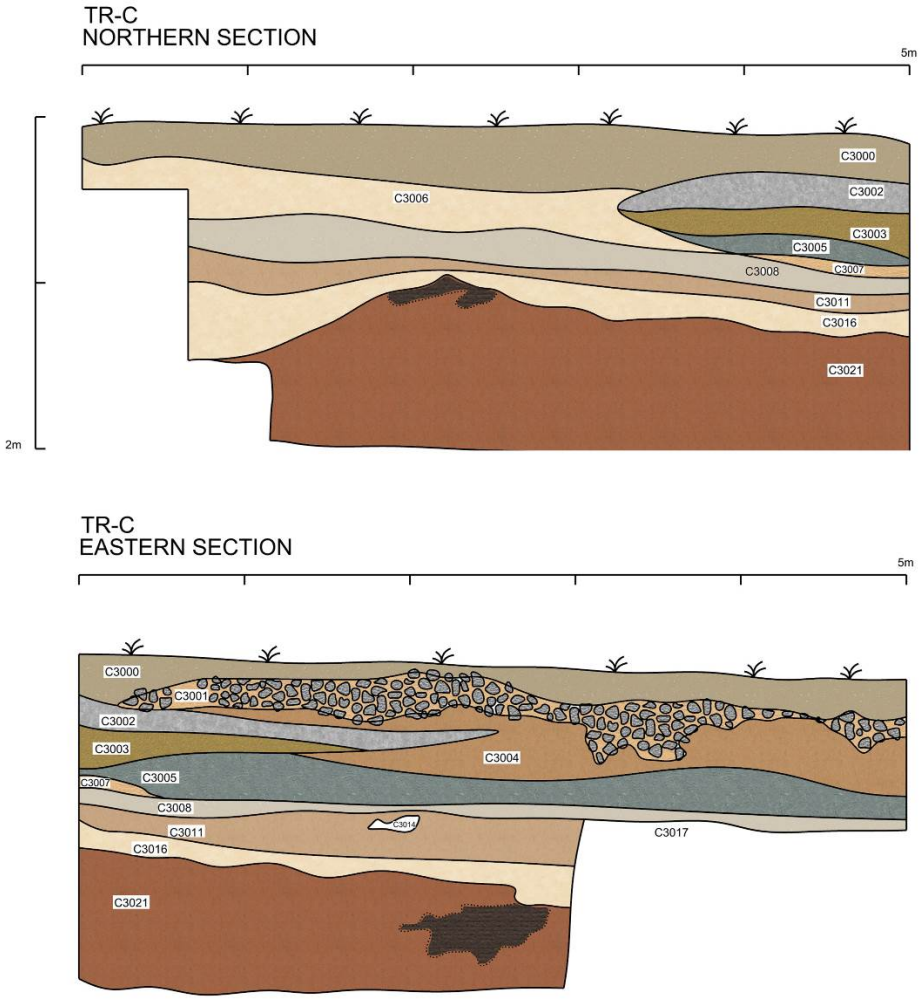

Figure 5: Northern and Northeastern sections of Trench C, Kale Kub 2019

Test Trench D

Test Trench D (2m×2m) was dug in the northern part of the site at an altitude of 1360 meters above sea level in areas covered by pebbles which were excavated to identify the spatial extent of cultural layers of this part of the site. After 136 cm digging in this trench, five separate contexts were identified along

with several different phases of cultural materials. Finally, at an altitude of 1358.64 m above sea level, excavation of this test trench was halted due to the lack of cultural materials. In total, from the five contexts identified in this trench, several ceramics, stone tools, and grindstones were found (Figure 6). Context 4002 can be considered as the only in situ deposit of the trench, which was probably part of a thermal feature. Geophysical studies in this sector of the site had suggested the possibility of burials or heated structures, which were identified through excavation; the heated surface (Context 4002) correlated to one such anomaly. The other loci and contexts in Trench D are very similar to each other and contain a large amount of fine-grained sand along with clay, which seems to be the result of long-term sedimentation of surface water or the accumulation of large volumes of water in this part of the site (Figure 7).

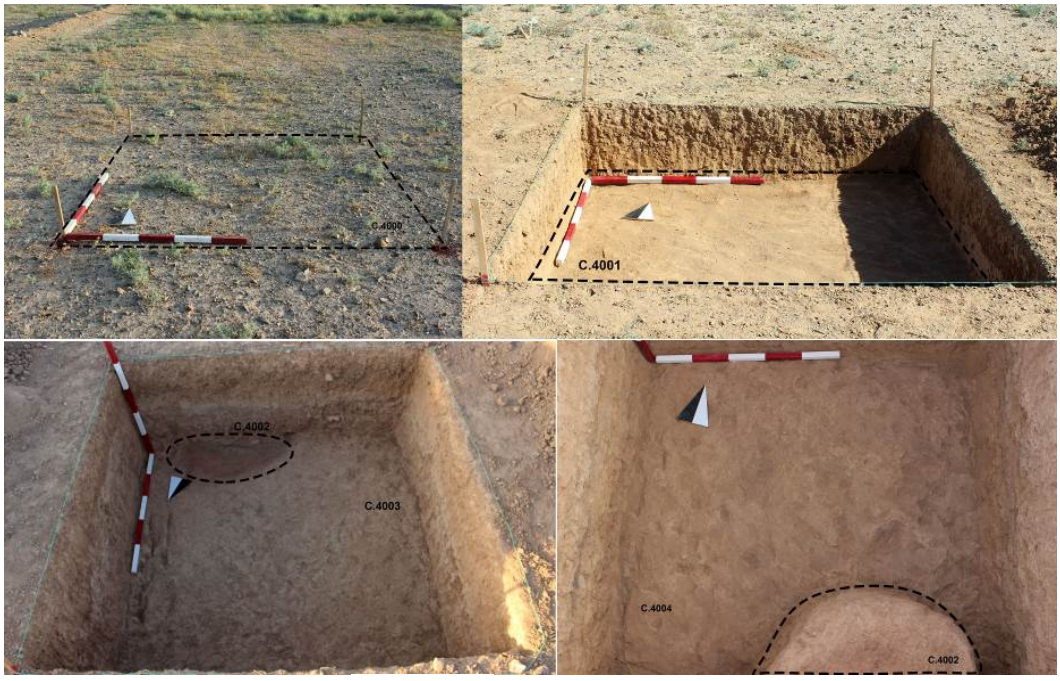

Figure 6: excavation steps of test Trench D, Kale Kub 2019

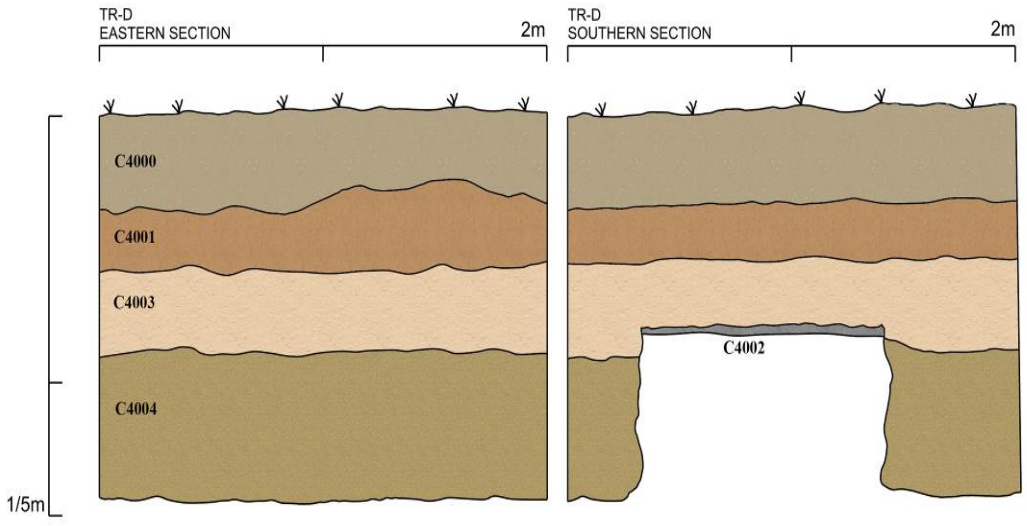

Figure 7: Eastern and Southern sections of Test Trench D, Kale Kub 2019

Trench E

Trench E (2m×2m)was opened near the illegal excavation area and to the north of Trench B from the first season of this campaign. Trench E was opened to identify cultural and architectural layers in this part of the site.

The excavation was expanded in two stages, ultimately reaching 3m×4m. The altitude of the basal level of this trench was recorded at 1358.50 meters above sea level and at a depth of 130 cm from the datum of the trench. Excavation only stopped due to the end of this season and also because the extensive architectural remains that were uncovered needed much more time to excavate. In total, twenty separate contexts, along with two architectural phases were identified in this season (Figure 8). Finally, this trench was backfilled after the completion of documentation and excavation steps.

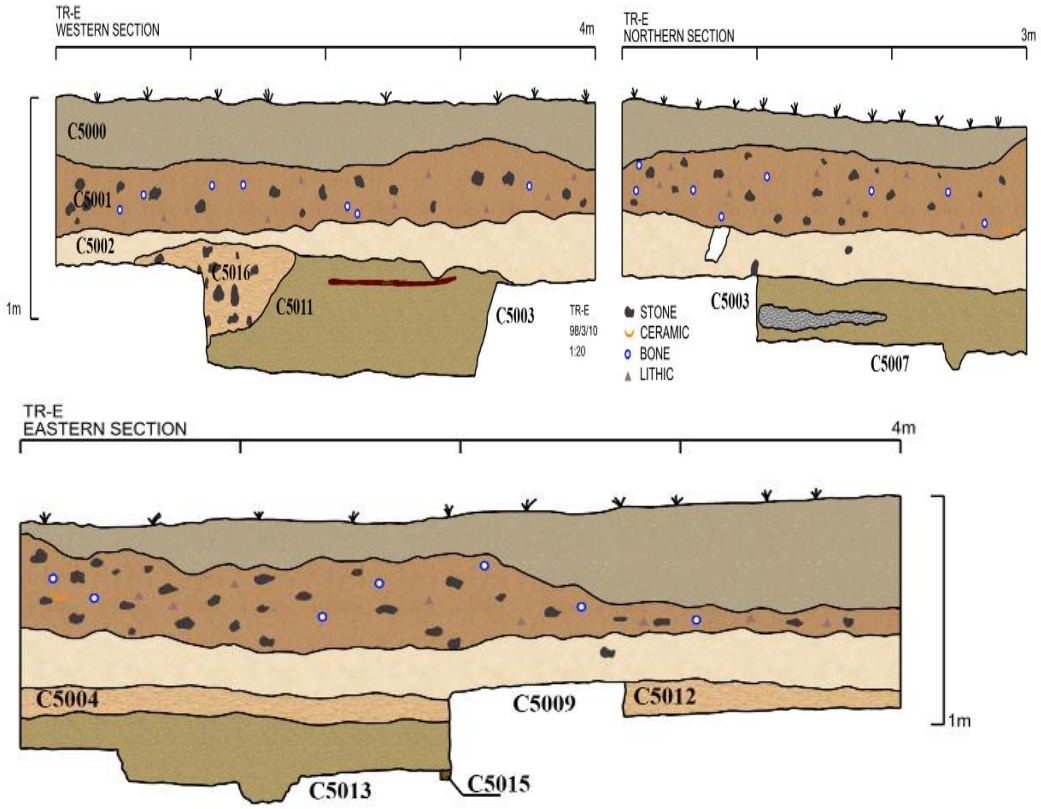

Figure 8: Western, Northern, and Eastern sections of Trench E, Kale Kub 2019

The twenty different contexts found in this trench can be divided into two architectural phases. The earlier phase, which lies beneath the remnants of the new period and consists of two walls (5013 and 5018), was not fully excavated because of the trench's dimensions and because time constraints did not allow further excavation. However, it appears that during the construction phase of Wall 5003 during the later phase, parts of the older architectural structure just below this wall were likely damaged. Remains of the later phase architecture, which includes two walls (5003 and 5009) and a circular mud-brick structure (5007) were built directly atop the remnants of earlier phases and probably involving the

partial destruction of the earlier features (Figure 9). The remnants of the later phase indicate the complex and rich structures of this phase, which with the further expansion of excavation in the area around the trench in the coming seasons can lead to accessing useful information about the culture and living conditions of the inhabitants of this area.

Figure 9: Orthophoto plan view of Trench E, Kale Kub 2019

Pottery

From the excavations of Trenches C, D, and E during the second season of the Kale Kub excavation in 2019, eight different pottery types were identified. The variety and sequence of pottery types form the basis of the relative chronology of the site. The study of pottery was done in two stages. First, the initial classification, in which all pottery pieces were counted, weighed, and classified according to different types, and then the second stage, which was done by selecting diagnostic shreds and measuring and accurately describing each piece of pottery. In general, 2512 pieces (Trench C: 1328, Trench D: 10, trenches E: 522, and Trench F: 650) have been identified from the mentioned trenches and among those 587 pieces were selected and studied as diagnostic pottery (Figure 10).

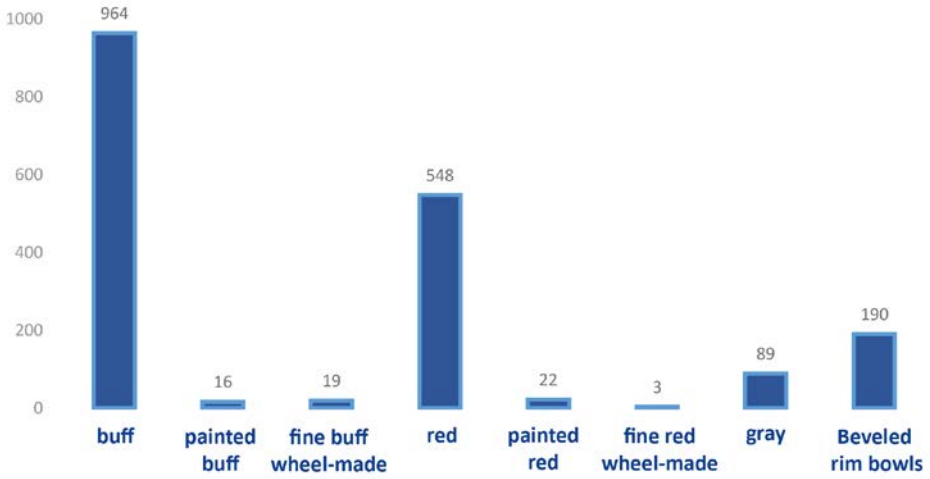

Figure 10: Ware-type distribution from the second season of Kale Kub excavation, 2019

Simple buff and reddish wares

This type of pottery is found across almost the entire stratigraphic sequence of the excavated trenches. In the lower layers, it is coarse with a temper of coarse sand, and in the upper layers it is a finer ware and tempered with finer sand. This ware is handmade and its color ranges are from buff to reddish or orange. The pottery pieces are usually covered with a thin clay slip and are sufficiently fired. Forms are generally simple and include open-mouthed bowls with simple rims. However, relatively deep bowls with vertical edges and small pots can also be seen (Figure 7 and Figure 14, Nos. 1 to 10). Unfortunately, due to its simple form and presence in all layers with only slight changes, this type of pottery cannot yet be dated.

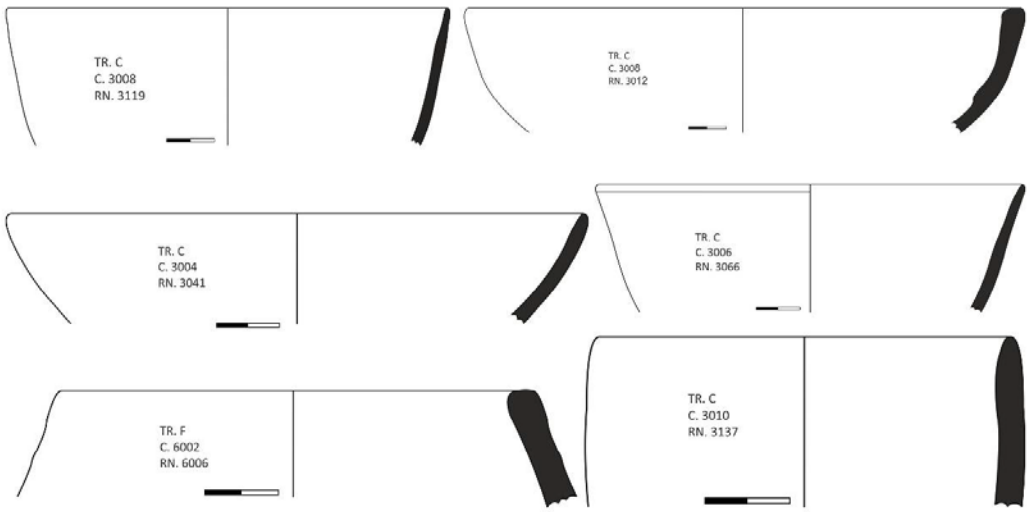

Figure 11: Samples of simple buff/reddish/orange ware from Kale Kub, 2019

Gray ware

This type of pottery has been obtained from only a very small number of the upper layers of Trenches C, D, E, and F, from insecure contexts located in the chronological sequence of the site in the period of the third and second millennia BCE, belonging to the Bronze Age (Azizi Kharanaghi et al., 2021). These ware

types are handmade and have a mixture of sand, thin clay slip, and improper firing. Forms include simple bowls with simple edges and uneven outer surfaces (Figure 12 and Figure 14, numbers 11 to 17).

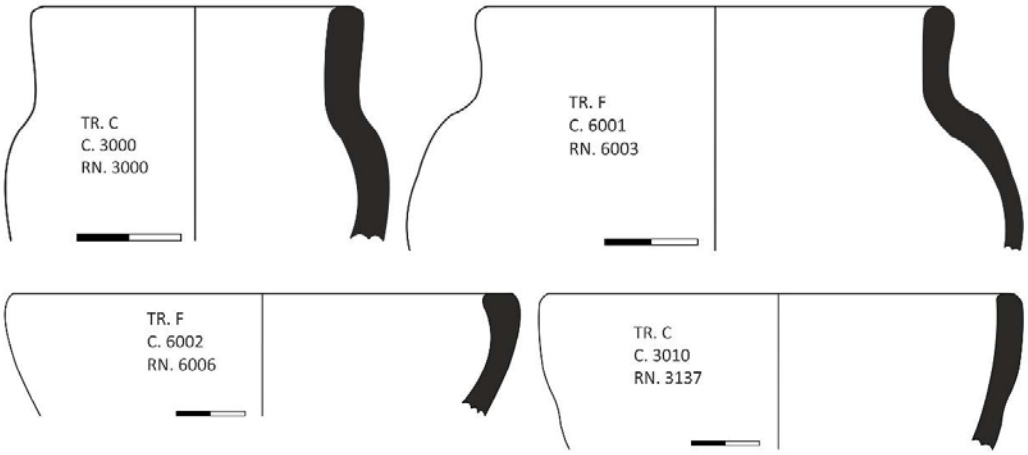

Figure 12: Samples of gray ware pottery from Kale Kub, 2019

String Cut Base

This type has been identified along with other types of diagnostic pottery of the fourth millennium BCE from the Kale Kub II period. This pottery consists of simple, open-mouthed, possibly slow-wheel thrown, rough bowls with a mixture of sand, a thin clay slip, and decent firing. The color of the pottery core ranges from buff to orange and the separation of the pottery from the pottery wheel was done by thread, which is marked on the bottom of the pottery as concentric parallel lines, and because these lines are not smooth or completely parallel. Thus, we infer that the slow pottery wheel was probably used to produce such pottery (Figure 10, No. 24). Similar samples have been identified from Tappeh Qabrestan in the Qazvin Plain (Fazeli Nashli, 2006: 147: Figure 21-4).

Beveled rim bowls

This type is a handmade, rough container with outer edges that often have a porous outer surface and an inner surface slightly smoothed with a wet hand (Fig. 13 and Fig. 14, Nos. 18 to 23). Beveled rim bowls have been identified from several areas in Mesopotamia, Syria, Turkey, Iran, and a few sites in Pakistan. This type of pottery has been obtained from several areas of Iran, particularly from the southwest to the southeast, center, and west of the Iranian plateau. The geographical area of the distribution of the Beveled rim bowls indicates the wide spread of this pottery culture across Mesopotamia and the Iranian plateau. Beveled rim bowls have been obtained from southern Turkey to southwestern Pakistan, but samples of these vessels had up until now not been found in Khorasan or Sistan, as well as in northwestern Iran (Mutin, 2013: 61-62). The use of Beveled rim bowls is considered have primarily been during the period of about 3500-2700 BCE, which is about 800 years for the use of a type (Abdi 1378, 66). In both Trenches A and B of Kale Kub, there is a layer of accumulation of pottery, including a Beveled rim bowl and a Banesh tray (Azizi Kharanaghi et al., 1399), among which are pottery that has turned green-gray due to overfiring,

which indicates the possibility of local production of Beveled rim bowls at this site. These types have been identified along with other types of diagnostic pottery of the fourth millennium BCE of the Kale Kub II period.

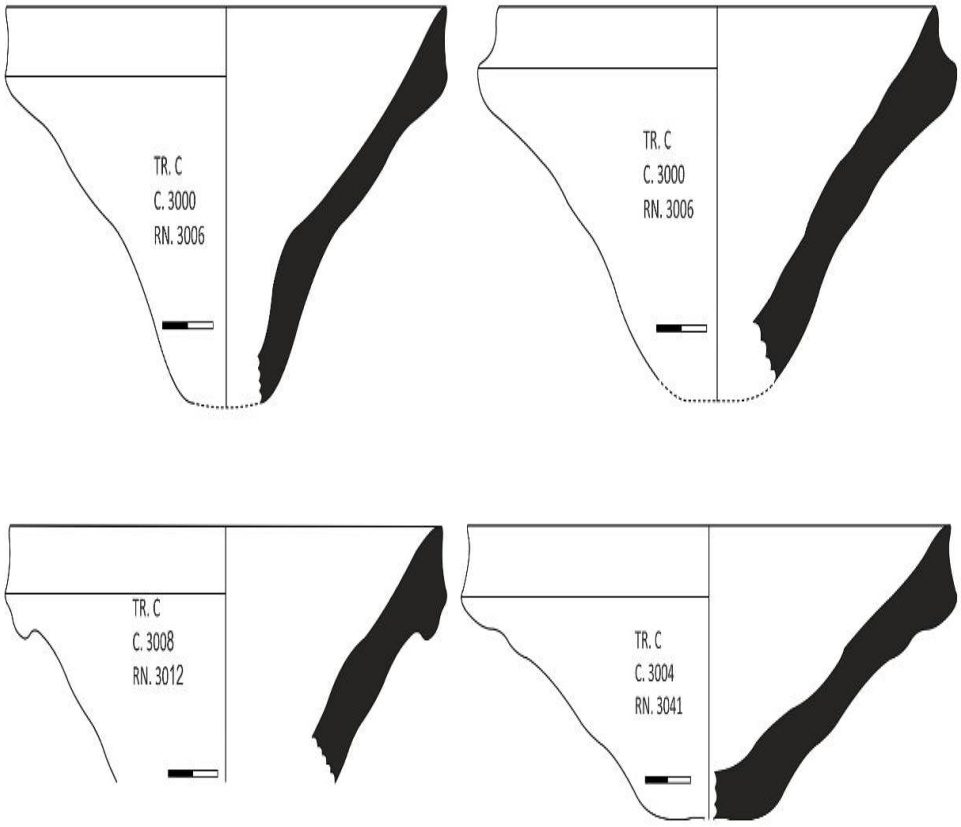

Figure 13: samples of Beveled rim bowls from Kale Kub, 2019

Painted buff ware

These types have also been identified along with other types of pottery of the fourth millennium BCE from period II of Kale Kub. The pottery is wheel-made, delicate, with a thin slip of buff clay, an orange-green buff core, and sufficiently fired, decorated with black or brown geometric patterns on the outside surface of the vessels. The painted designs are generally relatively wide parallel or diagonal lines, and the predominant form is a bowl with simple open-edged rims; However, cup-shaped forms and relatively high-walled bowls are also seen (Fig. 10, Nos. 25 and 26).

Painted red ware

This type comprises only a small percentage of the pottery assemblage and belongs in the stratigraphic sequence of the site to the Kale Kub I period, proposed to date to the fifth millennium BCE. These ceramics are delicate, handmade, are sufficiently fired, and have a very soft mixture of sand, with a red coating, the core is generally gray, and these wares are decorated with simple or intricate geometric lines in black. The predominant form of such simple bowls is an open mouth with a simple rim (Figure 10: Nos. 27 to 35).

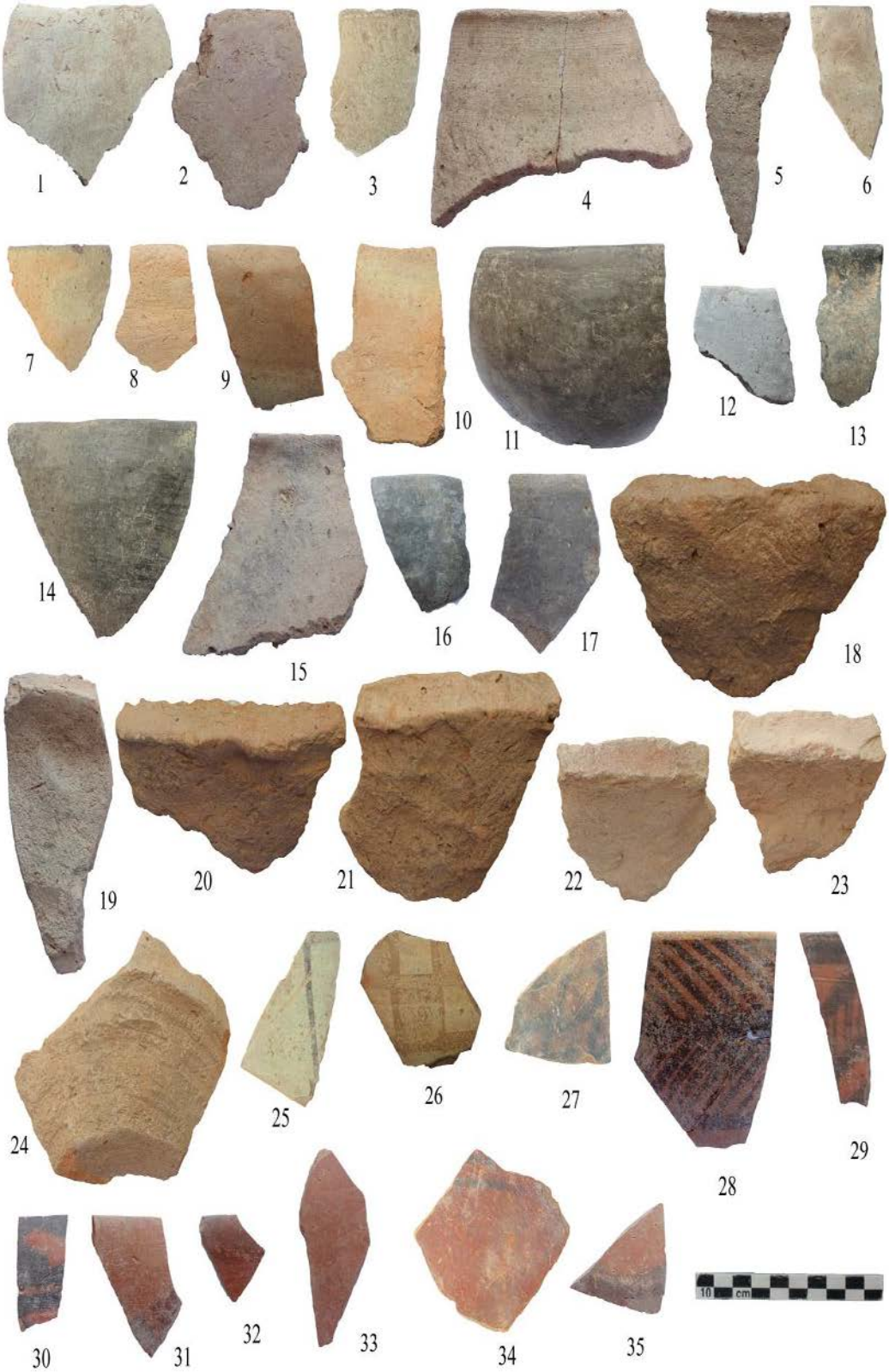

Figure 14: Kale Kub ceramic wares, 2019

Chart 1: information of Figure 14 pottery types

No.	Description
1	Tr. E, context 5001, rim (diameter: 40 cm, height: 60, thickness: 10 millimeters), handmade, outside, core and inside colors are buff, vegetive temper, enough heat, thin clay covered.
2	Tr. C, context 3001, rim (diameter: 30 cm, height: 77, thickness: 14 millimeters), handmade, outside and inside colors are reddish and the core color is gray, vegetive temper, less heat, thin clay covered.
3	Tr. C, context 3008, rim (diameter: 18 cm, height: 58, thickness: 3 millimeters), wheel-made, outside, core, and inside colors are buff, mineral temper, enough heat, thin clay covered.
4	Tr. E, context 5001, rim (diameter: 18 cm, height: 70, thickness: 16 millimeters), handmade, outside, core and inside colors are reddish, vegetive/mineral temper, enough heat.
5	Tr. E, context 5001, rim (diameter: 10 cm, height: 100, thickness: 15 millimeters), handmade, outside, core and inside colors are buff, mineral temper, less heat.
6	Tr. C, context 3008, rim (diameter: 18 cm, height: 57, thickness: 5 millimeters), wheel-made, outside, core, and inside colors are buff, vegetive temper, enough heat, thin clay covered.
7	Tr. C, context 3008, rim (diameter: 14 cm, height: 50, thickness: 8 millimeters), handmade, outside, core and inside colors are buff, mineral temper, enough heat, thin clay covered.
8	Tr. C, context 3008, rim (height: 50, thickness: 6 millimeters), handmade, outside, core and inside colors are buff, vegetive/ mineral temper, enough heat, thin clay covered.
9	Tr. F, context 6001, rim (diameter: 26 cm, height: 55, thickness: 14 millimeters), wheel-made, outside, core, and inside colors are reddish, mineral temper, enough heat, thin clay covered.
10	Tr. C, context 3008, rim (height: 65, thickness: 6 millimeters), handmade, outside, core and inside colors are buff, vegetive/ mineral temper, less heat.
11	Tr. F, context 6001, rim (diameter: 14 cm, height: 70, thickness: 8 millimeters), hand-made, outside, core, and inside colors are gray, mineral temper, enough heat, thin clay covered.
12	Tr. D, context 4001, rim (diameter: 10 cm, height: 30, thickness: 4 millimeters), hand-made, outside, core, and inside colors are reddish, mineral temper, enough heat, thin clay covered.
13	Tr. F, context 6001, rim (diameter: 14 cm, height: 38, thickness: 8 millimeters), hand-made, outside, core, and inside colors are gray, mineral temper, enough heat, thin clay covered.
14	Tr. F, context 6001, rim (diameter: 32 cm, height: 95, thickness: 11 millimeters), hand-made, outside, core, and inside colors are gray, mineral temper, enough heat, thin clay covered.
15	Tr. C, context 3001, rim (diameter: 22 cm, height: 74, thickness: 8 millimeters), hand-made, outside, core, and inside colors are reddish, mineral temper, enough heat.
16	Tr. D, context 4000, body (length: 54, width: 38, thickness: 7 millimeters), hand-made, outside color buff, core and inside colors are reddish, mineral temper, enough heat, thin clay covered.
17	Tr. E, context 5001, rim (diameter: 16 cm, height: 72, thickness: 6 millimeters), hand-made, outside, core, and inside colors are gray, mineral temper, enough heat.
18	Tr. C, context 3000, rim (diameter: 20 cm, height: 52, thickness: 15 millimeters), hand-made, outside, core, and inside colors are reddish, mineral temper, enough heat.
19	Tr. E, context 5001, rim (diameter: 19 cm, height: 85, thickness: 13 millimeters), hand-made, outside color is buff, core and inside colors are gray, vegetive/ mineral temper, enough heat.
20	Tr. C, context 3000, rim (diameter: 18 cm, height: 70, thickness: 17 millimeters), hand-made, outside, core and inside colors are reddish, mineral temper, enough heat, outside design by geometric motifs, thick clay covered.
21	Tr. F, context 5000, rim (diameter: 18 cm, height: 60, thickness: 14 millimeters), hand-made, outside, core, and inside colors are reddish, vegetive/ mineral temper, enough heat.
22	Tr. C, context 3000, rim (diameter: 20 cm, height: 84, thickness: 20 millimeters), hand-made, outside, core, and inside colors are reddish, vegetive/ mineral temper, enough heat.
23	Tr. C, context 3000, rim (height: 98, thickness: 12 millimeters), hand-made, outside, core, and inside colors are reddish, vegetive/ mineral temper, enough heat.
24	Tr. C, context 3004, base (diameter: 7 cm, height: 59, thickness: 12 millimeters), wheel-made, outside, core, and inside colors are reddish, vegetive/ mineral temper, enough heat, thin clay covered.
25	Tr. C, context 3006, base (height: 55, thickness: 4 millimeters), wheel-made, outside, core, and inside colors are buff, vegetive/ mineral temper, enough heat, outside design by geometric motifs.
26	Tr. C, context 3019, body (length: 54, width: 44, thickness: 5 millimeters), wheel-made, outside core and inside colors are reddish, mineral temper, enough heat, thin clay covered, outside design by geometric motifs.
27	Tr. C, context 3000, body (length: 65, width: 50, thickness: 6 millimeters), wheel-made, outside core and inside colors are reddish, mineral temper, enough heat, thick clay covered, outside design by geometric motifs.
28	Tr. E, context 5001, rim (diameter: 22 cm, height: 85, thickness: 4 millimeters), wheel-made, outside, core, and inside colors are reddish, vegetive/ mineral temper, enough heat, outside design by geometric motifs.
29	Tr. E, context 5001, rim (diameter: 18 cm, height: 45, thickness: 4 millimeters), hand-made, outside, core, and inside colors are reddish, mineral temper, enough heat.
30	Tr. E, context 5001, body (length: 33, width: 20, thickness: 3 millimeters), hand-made, outside core and inside colors are reddish, mineral temper, enough heat, thick clay covered, outside design by geometric motifs.
31	Tr. E, context 5001, rim (diameter: 12 cm, height: 36, thickness: 4 millimeters), hand-made, outside, core and inside colors are reddish, mineral temper, enough heat, outside design by geometric motifs.
32	Tr. E, context 5001, rim (height: 23, thickness: 4 millimeters), hand-made, outside, core and inside colors are reddish, mineral temper, enough heat, outside design by geometric motifs.
33	Tr. E, context 5001, body (length: 56, width: 28, thickness: 3 millimeters), hand-made, outside core and inside colors are reddish, mineral temper, enough heat, thin clay covered.
34	Tr. C, context 3004, body (length: 79, width: 63, thickness: 6 millimeters), hand-made, outside core and inside colors are reddish, mineral temper, enough heat, thick clay covered.
35	Tr. E, context 5001, body (length: 42, width: 32, thickness: 6 millimeters), hand-made, outside core and inside colors are reddish, vegetive temper, less heat, thin clay covered.

Conclusion

The second season of archaeological excavations at the site of Kale Kub Ayask began in May 2019 with the general aim of identifying the architectural structures of this site dating to the fifth and fourth millennia BC. Unfortunately, this site has been severely leveled by the landowner to create arable land for many years, and the cultural materials and surface layers have therefore been badly disturbed, in such a way that there is no cultural and material evidence on the surface to guide the selection of the location for trenches. For this reason, after the first season of this campaign in 2018 and the completion of stratigraphy for extensive excavations, two stages of geophysical study were conducted by Dr. Kourosh Mohammadkhani, a respected faculty member of the Department of Archeology at Shahid Beheshti University, and with support and funding The General Directorate of Cultural Heritage, Handicrafts and Tourism of South Khorasan Province. Dr. Mohammadkhani's work at this site targeted various places where there was presumably a higher likelihood of recovering in situ deposits. As a result, Trenches C, D, and F were selected for excavation.

Kale Kub site is one of the few prehistoric sites in South Khorasan province that has an intact stratigraphic sequence; given the depth and extent of intact deposits at this site, its partial destruction notwithstanding, it is possible to excavate this site for a long time. One of the most significant cultural finds of this site is the existence of different types of pottery from the Susa II period (also known as the Late Uruk period), which until now had not been reported in eastern Iran. Finding material evidence of this culture in this area is very important from an archeological point of view and shows the wide range of cultures dating to the beginning of urbanization and the Proto-Elamite culture in eastern Iran, which was not conceivable to such an extent before the Kale Kub excavation. Given the importance of the findings of Kale Kub, especially the representative layer of the fourth millennium BCE at this site, and due to the extensive destruction and impossibility of choosing the location to open new trenches, geophysical studies seemed the only logical solution and therefore according to the findings in this study, Trench C (5m×5m) was selected. Geophysics suggested the possibility of a large heated structure (kiln) at this locus and the excavation confirmed this inference. Considering that the depth of this kiln is lower than the architectural evidence of Trench E, and incorporating the stratigraphic evidence of the previous season, this kiln probably belongs to the fifth millennium BCE, but any definite statement is subject to the absolute date of this kiln.

Excavations in Trenches D and F (each measuring 2m×2m) in the eastern part of the site, where geophysical maps suggested the existence of tombs, led to the identification of two burnt floor contexts, which are probably related to the Bronze and Iron Ages. Excavations in the trenches have shown that the eastern part of the site was settled later historically than the western part and it is possible to identify more evidence of the Bronze and Iron Ages by expanding excavations in this area.

Trench E is located between Trench B and Trench C near the illegal excavation pit. Because of the recognition of mud-brick architectural remains in this area, the trench was expanded in three stages and its final size reached 3m×4m. Two architectural phases were identified in this trench, but unfortunately,

the cultural materials related to these architectural spaces are very few and insignificant. Considering the architectural form and also the similarity of the depth of this architecture with the depth of the layers containing the deposited Beveled rim bowls of Trench B, however, it can probably be attributed to the proto Elamite/Susa II horizon. To prove this claim, extensive excavations are needed in this trench to identify the entire architectural plan.

In general, it can be stated that the second season of excavations at Kale Kub provided the conditions for the third season of the excavation in this site. Now, according to the architectural evidence identified in Trenches C and E, with more extensive excavations in these two loci, complete plans of the structure and architectural features of the fifth and fourth millennium BCE can be identified. Considering the lack of knowledge of these periods in eastern Iran, these data can be used to provide a chronology and material basis for comparison with other areas of Iran. It is expected that with the continuation of excavations in this site, it will be possible to better identify the prehistoric cultures of eastern Iran and how this area's inhabitants related to their neighbors both inside and outside the region.

Acknowledgment:

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پروژه باستان‌شناسی پیش‌ازتاریخ شرق ایران؛ کاوش محوطه پیش از تاریخی کله کوب آیسک، استان خراسان جنوبی (دومین فصل، ۱۳۹۸)

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چکیده

با گذشت بیش از صد سال از شروع کاوش‌ها و مطالعات باستان‌شناسی در ایران، به دلایل مختلف مناطق شرقی کمتر یا اصلاً مورد توجه باستان شناسان قرار نگرفته و انتشارات بسیار محدودی از فعالیت‌های باستان‌شناسی در این بخش از ایران وجود دارد. محوطه باستانی کله‌کوب آیسک، یکی از محدود محوطه‌های پیش‌ازتاریخی استان خراسان جنوبی و در کل شرق ایران است که دارای نهشته‌های فرهنگی کافی به منظور ارائه گاهنگاری و شناخت توالی فرهنگی؛ فرهنگ‌های پیش‌ازتاریخ این منطقه است. کاوش‌های صورت گرفته در این محوطه منجر به شناسایی فرهنگ‌های پیش‌ازتاریخی ناشناخته‌ای در منطقه شد. شاخص‌ترین دستاورد کاوش در این محوطه شناسایی فرهنگ‌های هزاره چهارم پیش از میلاد با خاستگاه جنوب غربی و بین‌النهرینی است که شواهد آن بسیار دور از مرکز در این محوطه به دست می‌آیند. این شواهد فرهنگی که می‌توان آن‌ها را هم افق با فرهنگ شوش II یا اوروک جدید دانست، شامل انواع سفال‌های شاخص این دوره از قبیل سفال‌های لبه واریخته، سینی‌های خشن نوع بانشی، ظروف لوله‌دار و خمره‌های دسته دماغی، سفال‌های منقوش و سفال‌های چرخ‌ساز ظریفی هستند که در نواحی جنوب غربی، غربی، شمال غربی، جنوب شرق و فلات مرکزی ایران شناخته شده هستند ولی در شرق ایران برای نخستین بار شناسایی و معرفی می‌گردند. در فصل دوم کاوش محوطه کله کوب بر اساس بررسی‌های ژئوفیزیک انجام شده، محل های جدیدی برا کاوش انتخاب شد و انجام کاوش در ترانشه های با ابعاد بیشتر منجر به شناسایی بخشی از معماری پیش از تاریخ محوطه شد.

واژه‌های کلیدی: کله‌کوب، معماری، ارتباط تجاری، تامین مواد اولیه، افق فرهنگی شوش II

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The North and South Central Plateau of Iran During the Third and Second Millennium BCE (3200-1500 BCE) [*1]

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(153-180)

Abstract

The societies of the northern and southern zones of the "Iranian Central Plateau" flourished during the last quarter of fourth millennium BCE. This floruit was marked by the rise of complex social systems, long distance trade, and new systems for the management of economic activities, such as the "proto-Elamite writing system" (Vidale 2018; Helwing 2019; Fazeli Nashli and Nokandeh 2019). This evidence supports the view that the inhabitants of the Iranian Plateau during this time were connected to each other, represented by a relatively uniform writing system and similar economic organization. However, nowadays we know that the similarity of the "Grey Ware Culture" occurring in Proto-Elamite sites of the north-central Plateau such as Sofalin, Qoli Darvish, Meymanatabad and Sialk also suggests inter-regional contact, beyond the "Proto-Elamite phenomenon" during the last quarter of fourth millennium BCE. The population of the whole of the north Central Plateau appears to have dispersed during the third millennium BCE and current information suggests that most Chalcolithic settlements were gradually abandoned beginning around 3400 BCE, and that the hiatus in settled occupation continued throughout the third millennium BCE. This may be connected with climatic events during the last quarter of the fourth millennium BCE, characterized by aridity and increased aeolian activity, which destabilized the agriculture system. As Vidale postulated (Vidale et al. 2018) the social evolution of the Central Plateau, based on non-centralized networks during the Chalcolithic period and were extinguished shortly after 3000 BC but shaped again shortly which was different from the previous period. This paper will summarize the findings of these excavations and propose a chronological framework for these social and cultural changes from the late fourth to the early 1st millennia BCE. In this paper we document the intra-regional societal developments and inter-regional material culture connections that made the third and second millennia BCE such a dynamic time.

Keywords: North Central Plateau, Bronze Age, Pottery, 4.2ka event. Qoli Darvish, Pardis, Estark-Joshqan.

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Introduction

In two papers co-written with one of the authors of the present investigation (HFN), Armin Schmidt and Massimo Vidale discussed why the proto-urban population of the Central Plateau of Iran never developed a state level society during the late fourth and early third millennia BCE, but significantly mentioned the diversity of complexity of social system during the early third millennium BCE (Schmidt et al. 2011; see also Vidale et al. 2018). Recent archaeological research into Bronze Age sites from both the northern and southern zones of the Central Plateau forces us to revise our earlier conclusions and while the collapse of proto-urban system collapsed during the dawn of third millennium BC but new socio-economic system shaped the societal structures of the central plateau societies. Whereas once it was thought the Central Plateau was largely uninhabited for most of the Bronze Age, new surveys and excavations have instead noted that this region had large, multi-period settlements displaying a material culture influenced by the Proto-Elamite expansion from southwestern Iran, the Transcaucasian expansion from northwestern Iran, and the "Grey Ware Culture" from northeastern Iran.

Recent research has demonstrated that both Transcaucasian and local cultures co-existed in this region from ca. 3000-2400 BCE. Within the Qazvin Plain, for example, we see the existence of the Transcaucasian culture from the beginning of third millennium BCE and also in some areas such as the Qom plain at Yousef Khan Khaveh, where this culture appeared around 2700 BCE (Sarlak 2020). In some other areas, such as the Eastern part of the Zayandeh-Rud River Basin in the southern part of the Central Plateau, we see how the Central Zagros, southwestern Iran, and the eastern parts of Iran were connected during the Early Bronze Age (Ilkhan et al. 2019; Shojaee-Esfahani and Rafi'i-Alavi 2020; Rafi'i-Alavi and Shojaee-Esfahani 2020; Rafi'i-Alavi et al. 2021). The existence of high-status goods such as gold, silver, lapis lazuli, ivory, marble vessels, and ceremonial axes at Central Plateau sites during the third millennium BC signifies how the people of past communities rebuilt new social differentiation and economic specialization after the "Proto-Elamite period." However, while we have some limited information regarding the third millennium BCE settlement density, the nature of the Central Plateau has changed dramatically with the rise of cultural complexity and super-regional contacts, increased complexity in mortuary ritual, craft specialization, the emergence of monumental buildings as well as potential economic specialization during the second millennium BCE. To understand the long-term communication, inter-regional contacts, economic specialization and settlement patterns of the Central Plateau we will review evidence from the plains of Qazvin, Tehran, Qom, Kashan, and Varzaneh throughout the third and second millennia BCE (Table 1, Fig 1).

Figure 1 displays the most important Bronze and Iron Age sites of the Central Plateau (also Table 1), which have been used to establish a chronological framework. The term "Iron Age" addresses social and cultural changes occurring from ca. 1500 BCE onward with the introduction of iron objects in the Central Plateau of Iran. The main problem is that iron was only in widespread use after 1250 BCE (Pigott 1980), and most "Iron Age" social and political changes occurred during the first millennium BCE, leading one of the authors (BR) to argue that the Iron Age started around 1000-900 BCE. Nevertheless, if we focus on the introduction of iron metallurgy, the oldest iron objects found in Iran are from Tepe Sialk Cemetery A with the monochrome gray-to-black burnished ware of the Tepe Giyan I style (Danti 2013). In addition, a number of iron objects and a large volume of slag and iron metal pieces were found across an extensive excavation area, from the surface layers and inside the architectural remains at Qoli Darvish of the IV to VI period (Fig 2). Three iron objects in particular were found from specific cultural layers of Qoli Darvish; the first object is the remains of an iron vessel in the form of a bowl, which was obtained from layer 1 of the VI period. Two ^{14}C dates from this layer indicate an absolute date-range of 1528-1426 BCE and 1531-1429 BCE (Sarlak 2020). Three iron artifacts, the remnants of metallurgical furnaces, and large amounts of slag and iron ore fragments from archaeological layers and substrates have been recorded at Qoli Darvish. All of this evidence supports the conclusion that iron came sporadically into use already from the beginning of the "Final Bronze Age" in the Central Plateau.

On the other hand, the chronology proposed by Michel Danti (2013) is valuable for understanding long term socio-political changes in northwestern Iran. According to Danti, the second millennium of northwestern Iran can be divided into the Middle Bronze Age I (2100-1900 BC), Middle Bronze Age II (1900-1700BC), Terminal Middle Bronze Age II (1700-1600 BC), Middle Bronze Age III (1600-1450 BC), Late Bronze Age (1450-1250), Iron Age I (1250-1050) and Iron Age II (1050-800 BC). Also, Hamid Fahimi (2019) excellently reviewed the beginning of Iron Age in Iran and argued that such socio-political changes and technological innovation appeared in the late second millennium BC rather than middle of second millennium BCE. Thus, although iron objects were used widely in the late second millennium BCE in Iran, current information indicates that iron objects were used earlier in the Central Plateau than in northwestern Iran, by perhaps three hundred years in some cases. Such an argument needs further research but it seems iron objects appear in the Central Plateau of Iran at ca. 1500 BCE, meaning that the end of the Bronze Age falls during the middle of the second millennium BCE. Of course, the "Iron Age" of Iran should be defined by a multitude of factors – socio-political complexity, the resurgence of inter-regional exchange, re-adoption of writing, and complex craft technologies such as iron, mass-produced pottery, etc. – but the latter half of the second millennium BCE is a reasonable period for these changes to begin.

The Northern Central Plateau from 3200 to 1500 BCE:

The Qazvin plain

The Qazvin plain was important during the fourth millennium BCE, but lost its significance during the third millennium BCE. Within the Qazvin plain the decline of sites began from ca. 3400 BCE, with only a few permanent settlement sites known to have been occupied on the plain until the last quarter of the third millennium BCE. After the abandonment of Ghabristan around 3450 BCE (Pollard et al. 2012), there was a considerable gap before the first few sites (e.g., Sagzabad) were reoccupied during the Middle Bronze Age. To the southwest of the Qazvin Plain in the hilly flanks of the Zagros, the site of Shizar exhibits continuous settlement occupation during the fourth and third millennium BC without any gap, continuing even into the second millennium BCE (Pollard et al. 2012).

The Early Bronze Age at Shizar and related sites starts from 3000 BC and continued until 2500 BC and is characterized by the prevalence of Transcaucasian-style ceramics. Shizar and sites such as Doran Abad exhibit clear connections with sites in northwestern Iran such as Yanik, Kul Tepe, Haftavan, and Geoy on the one hand, as well as Godin, Pisa, and Gorab in the Central Zagros on the other (Fazeli Nashli et al. 2013). The two sites of Shiretal (Asgari n.d.) and Shizar are both located along the northern and southern sides of the Qazvin plain, which supported small villages with continuous occupation throughout the third millennium BCE. It is important to note that these sites are quite small ($\leq$ 2 ha). That these are the only two sites in the region dating to this period shows how dramatically population structure shifted from the early proto-urban sites of the fourth millennium to a new lifestyle focused on small-scale village agriculture in the Qazvin plain during the third millennium BCE (Vidale et al. 2018, Fazeli Nashli and Abbasnezhad Sereshti 2005).

During the second millennium BCE, the Qazvin plain regains its importance as a locus of settlement occupation, with sites such as Sagzabad (ca. 12 ha) re-occupied from ca. 2000 BCE (Pollard et al. 2012). These sites feature both polychrome (Fig 3) and monochrome wares, including Grey Wares and painted Buff Wares. The Urmia pottery-style is a painted monochrome or polychrome ware on red or dark orange ground, and is observed to have been widely used during the first half of the second millennium in the north Central Plateau at sites including Sagzabad and Shiretal, and in the southern part of the Central Plateau at sites such as Qoli Darvish (Azizi Kharanaghi and Moradi 2011; Velayati et al. 2017; Sarlak and Hessari 2018). This "Urmia Style" was first identified by Edwards (1981) based on the excavation of Haftavan VIB; Stronach assigned this horizon to the Middle Bronze Age, dating its origins to ca. 2200 BCE and its diffusion in the Central Plateau during the 19th and 18th centuries BCE (Edwardz 1986; Velayati et al. 2017).

The Tehran plain

The Tehran plain has a long history of human occupation beginning from 6000 BCE with the rise of cultural complexity, increasing population, the emergence of craft specialization and long-distance trade during the fifth and fourth millennia BCE (Vidale et al. 2018; Fazeli Nashli et al. 2013; Bernbeck et al. 2002). However, after the Proto Elamite period ca. 2900/2800 BC, there is a long gap of occupation within the plain until the 16th century BCE. The site of Morteza Gerd excavated by Erich Schmidt in the 1930s may be an exception as the materials housed at the Penn Museum suggest a Middle-Late Bronze Age date (personal communication with Christopher Thornton), but the site is lost to urban sprawl and the excavations were never published. More investigation will certainly reveal new insights regarding the post Proto-Elamite collapse within the region. Certainly, the excavations at Tepe Pardis have demonstrated the reoccupation of the plain during the first half of the second millennium BCE. The cemetery site of Tepe Pardis was excavated in two seasons in 2005 and 2006 and provide the basis on which to construct a regional model of the Tehran plain during the middle of the second millennium BCE (Fazeli Nashli et al. 2007). In the space of one hundred square meters of excavated area, the remains of 34 humans and animals, two cattle and one horse, were found dating to mid second millennium BC.

The most common method of burial in the cemetery at Tepe Pardis, like other related cemeteries, is an inhumation in the flexed position, but also occasionally burials with an upright position were uncovered. In addition to the human burials mentioned above, three animal burials were found from the excavation of Tepe Pardis cemetery. The animals include two cattle and one horse that were buried among the human burials. The first cattle burial was placed lying on its back in an east-west direction and facing south. The burial lacked any architectural structure and was surrounded by three human burials. It is noteworthy that a large jar was placed under the neck of the cattle. It is important to note that the cows and horses buried in this cemetery are both animals that have positive associations in ancient Iranian mythology. In both attested and reconstructed Indo-European myths and legends, the horse is mentioned as a special symbol of the god of the sun, the god of the moon and the god of the wind. In the way of some gods, only horses were sacrificed (Christensen 1941). In the Aban Yasht of the Avesta, Houshang, Jamshid, Zahak, Fereydoun, etc., each sacrificed one hundred horses, a thousand cattle and ten thousand sheep for Nahid. In ancient Iranian mythology, cattle were considered the origin of all creatures and the first to be created by Ahuramazda (Pourdavood 1969).

We should consider that cattle would have had high economic and ritual values and so such burials suggest a sacrificial practice during the Bronze Age in the central plateau of Iran. The second animal burial category, i.e., the horse, was found interred with an east-west orientation and the body on its left side. Beneath the horse's skull was a small grey cup. Animal burials, especially of horses, are known in the Iron Age of Iran and have been reported from Marlik, Hasanlu, Babajan and Godin Tepe (Talaei 1995) and in the northern region of Kloraz and Sands region of Gilan (Fahimi 2002). But this burial represents the first instance of such a phenomenon on the Central Plateau, and also predates all of the aforementioned examples.

Most of the burial objects of Tepe Pardis cemetery are ceramics. There are bronze objects as well, but they are very limited in number compared to the pottery. Found only from five graves, these objects included daggers, arrowheads, mace heads, pins, sickles, fork-like objects, rings and wires. In addition to these objects, a pair of gold earrings was found, as well as a necklace’s worth of beads, mostly made of limestone and agates. From the Tepe Pardis cemetery, on average, between two and seven pottery vessels were found in each grave, which were placed above the head and at the end of the grave (underfoot). In particular, except for one case, most of the graves featured a beaker placed under the deceased's head and the rest of the other objects were placed under the feet.

Except for two examples (2.17%) which are hand-made, the rest of the ceramics (97.83%) have been produced by the wheel-making technique. Except for a few examples of buff and brown ware, most of the ceramics are grey ware types. The grey ware group can be divided into three subgroups of ordinary grey pottery with 64.13% (59 pieces), light grey ware with 19.66% (18 pieces) and black-grey ware with 13.40% (12 pieces).

The wares are typically undecorated, but what decorations are found include burnished, engraved, appliqued and combinations of appliqued and engraved motifs.

Of these decorations, the most common technique is burnishing the surface of the vessel. This type of technique, which is executed exclusively on grey ware pottery, includes geometric patterns that, through intersecting and diagonal lines, form successive rhombuses within two horizontal stripes. This type of technique is mostly seen on the shoulders and middle sections of the vessels and is most often observed on the vessel form class that includes beakers with vertical handles, cups, pitchers, and teapots.

The second most commonly used decorative technique at the Tepe Pardis cemetery is engraving. Most of the carved designs are created in a simple and limited way and principally include simple lines arranged in one or two simple bands around the rim or in the middle of the small hemispherical bowls and cups. In a unique example, the entire exterior surface of a cup was decorated in this way. The motifs include oblique and vertical lines as well as carved patterns in the form of wheat clusters that are created around the cup. Finally, the applique technique, which was observed on only one example from Tepe Pardis. This motif features very small button-like protrusions under the edge of the rim of a storage jar. In a few examples, the applique and engraved techniques are used in combination, with the resulting motif resembling a nipple. The most important vessel forms of the Tepe Pardis cemetery include beakers, cups with flared or simple rims, sometimes with a vertical handle, pitchers, tripods, spouted jars, conical bowls with flat bases, small hemispherical bowls and cups, strainer vessels, ledge-rim jars and handled pitchers with open spouts (Figs 4-5). Typologically, within the Central Plateau of Iran, the ceramics of Tepe Pardis are most comparable with those found at Sagzabad, Khorvin, Qeytariyeh, Sarm and Qoli Darvish periods V and VI in which the most common types are button-like base beakers (Fig 6). Outside of the Central Iranian plateau, these beakers have been found at Hasanlu V, Godin (Young, 196۹), Giyan I, Dinkha III, and Geoy Tepe (Medvedskaya 1982, Danti 2013), which are quite comparable with Tepe Pardis. Another important vessel category of this period is spouted jar vessels which are sometimes referred to as teapots. In general, spouted jars are divided into two groups: unbridged pouring spouts and bridged pouring spouts. Among the ceramic forms, beakers and teapots have been reported from almost all excavated sites in the region dating to this period. Vessels with button like base were not observed at Sialk B, however, but were more common in other areas. Similar cups were used extensively in Sialk A, Qeytariyeh, Khorvin and Pardis. The tripod vessels were common in Sialk A and B, Khorvin, Qeytariyeh, Saram and Sagzabad. Tripod-type vessels are observed at Sialk A and B, Qeytariyeh, Saram and Sagzabad. Khorvin-style ceramic forms are much more similar to those Tepe Pardis than those of other sites. The data from Tepe Pardis are furthermore comparable with assemblages known from more distant sites such as Archaic Dehistan pottery from Bidak, Tepe Rezvan (Sharifi and Motarjem 2014), Besh-Dareh, Ashkhaneh Hospital (Hejabri Nobari and Dana 2018) and; Dasht Kalpoush Valley (Vahdati 2018, 2020) and Jayran Tepe (Vahdati 2016).

The central and southern Central Plateau

Human occupation of the southern Central Plateau from 2700 BCE onward is evidenced by the sites of Qoli Darvish and Yousef Khan Khaveh in the vicinity of Qom, and several sites in the Varzaneh region west of the Gavkhuni Wetlands (Esfahan region). The Zayandeh-Rud River, which feeds the Gavkhuni Wetland, has provided very fertile soil for agricultural activities and grazing of animals from prehistoric times until the recent past. The areal extent of the Gavkhuni Wetlands is estimated at 47,000 hectares, but it varies annually based on the amount of water entering the lagoon. The wetland is located 130 km southeast of Esfahan, 30 km east of Varzaneh (the closest city to the wetland), and Its average altitude is 1470 meters above sea level. The area of sand dunes adjacent to the western part of the wetland measures approximately 20,000 hectares, stretching 50 km from near the city of Varzaneh to a few kilometers southeast of the village of Hasanabad. Many archaeological sites have been recorded along the western edge of the wetland, dating principally from Chalcolithic to the Islamic Period (Esmaili Jelodar 2012; Shojaee-Esfahani and Rafi'i-Alavi 2020). Esmaili Jelodar's survey revealed a population increase in this region during the third millennium BCE, with nineteen sites related to the

Bronze Age attesting to the significant increase in population and settlement size during this period. The largest site of this period in terms of size is Saba 22, ca. 50 ha, and the smallest sites are Saba 38 and 72, ca. 1 hectare (Esmaili Jelodar 2012). We assume site sizes such as Saba 22 should be at least 10 ha. Although nowadays the region is a desert land (named the Rigsara, or Sand Hills), during the Bronze Age, the Zayandeh-Rud River passed through the area of Bronze Age settlement concentration, in which both the lake and also the river provided a suitable environment for human occupation. The presence of third millennium settlements, some of which are partially buried under the dunes at the west of Gavkhuni, indicates that these dunes post-date the Bronze age.

The earliest Bronze Age site in the region is site Saba 9, dating provisionally to 2700-2500 BCE. Shahr e-Saba/Saba 9, near the Gavkhuni wetland, is similar to several sites surrounded by sand dunes and its geographical position is 52° 40’ 8.44” E and 32° 18’ 3.43” N at an altitude of 1470 meters above sea level. Three types of pottery were found on the surface, including Buff Ware, Brown, and Grey pottery similar to that found at Qoli Darvish and Tappeh Sofalin. During the survey at Saba 9, two pendants and a large number of beads made of bone, limestone and perhaps ivory were found in the northern part of the area, all of which support the inference of regional and long-distance trade during the third millennium BCE. The finished and semi-finished beads scattered on the site is a further confirmation of the site’s chronology dating to the third quarter of third millennium BCE (Esmaili Jelodar 2015). Tepe Kopandeh is situated in the Dasht e-Ben Rud district of southeastern Esfahan province, in the eastern part of the Zayandeh-Rud river basin. Fariba Saeidi directed one season of excavation at the site in 2006 for her Ph.D. thesis (Saedi Anaraki 2009) with a short report published in 2013 (Pollard et al. 2013).

We summarize here the cultural sequence of the site based on the ceramic typology indicating the following periods: 1) Kopandeh I: Early Bronze Age I-II (2600-2500 BCE), with ceramic types comparable to Godin III:6 and Susa IV; 2). Kopandeh II: Middle Bronze Age (2200–1800 BCE), with ceramics comparable to Godin III:4–2, Tall-e Teimuran in Fars and Koh-Garin in Lorestan; 3) Kopandeh III: Late Bronze Age (1800–1600 BCE), with mixed deposits related to those of the previous phase. The material culture of Tepe Kopandeh indicates cultural connections with the Zagros, Khuzestan, and Fars during the mid-third millennium BCE (EBA II). After that there is a gap on the site in Kopandeh; Kopandeh II includes Middle Bronze Age materials that reveal contacts with the southern part of Iran, especially Susa in Khuzestan and Kaftari and early Shogha-Teimuran periods in Fars (Saeidi Anaraki 2009: 133) like Tall-e Teımuran (Pollard et al. 2013: 40). At Kopandeh III, the settlement experienced its final phase which, compared to the other periods, is relatively unknown. The ^{14}C dates available relate to the beginning of the EBA II phase and the end of the LBA at Tepe Kopandeh. The dates given are 2977-2054 cal. BCE at 95% for the start of the Bronze Age (2387-2086 cal. BCE at 68%, median 2269 cal. BCE) and 1857-986 cal. BCE at 95% for the end (1742-1489 cal. BCE at 68%, median 1609 cal. BCE). Survey and excavation within the Kafarved-Varzaneh plains between 2018-2019 and in 2020 conducted by Babak Rafi’i-Alavi and Ali Shojaee-Esfahani in the Gavkhuni Wetlands discovered many Early Bronze Age sites, dating from 2700 to 2200 BCE (Shojaee-Esfahani and Rafi’i-Alavi 2020). Two Early Bronze Age sites (Sites 013 and 051) were excavated in 2018 and 2019 (Rafi’i-Alavi and Shojaee-Esfahani 2020; Rafi´i-Alavi et al. 2021). At Site 051, Trench 2, Feature 4, the excavators have found an important grave. The body was placed in a flexed position and the material goods included parts of a sheep, silver, gold, pottery, marble vessels, a ceremonial axe, carnelian beads and a gold abr. An interesting point is that above this male, around 25-26 years of age, the remains of an infant were found above the skull (Ilkhan et al. 2019). Two pieces of broken painted pottery from Site 051 help secure the site within a comparative chronology. The depiction of an animal and eagle painted on the jar date the site to the first half and middle of the third millennium BCE, similar to Godin III:6-5 of the Posht-e Kuh and Pish-e Kuh, Susa IV, the Jalyan cemetery in Fasa plain, as well as some designs found on chlorite stone vessels in southeastern Iran and Mesopotamian seals from the Early Dynastic period. The ceremonial axe is also comparable to Susa and the city of Ur in Mesopotamia and can be dated to the second half of the third millennium BC (Rafi’i-Alavi et al. 2021) (Figs 7-8).

In general, it seems that there was a period of flourishing in the eastern part of the Zayandeh-Rud river basin from 2700 to 2200 BCE, when the rest of the Central Iranian Plateau experienced a sharp decrease in settlement sites. The settlement sites along the western part of the Gavkhuni playa could change our understanding about the Early Bronze Age in the interior of the Iranian Plateau and help us to establish a more accurate picture of the period's settlement system.

Qom plain

Within the Qom plain, Qoli Darvish is one of the largest Bronze Age sites located in the middle part of the Central Plateau, some 6 km northeast of the provincial city of Qom. The site rises 5.20m above the plain level and extends 4.47m below the surface (Alizadeh et al. 2013; Sarlak 2020). The total area of the mounded site appears to have extended about 30 ha during the second millennium BCE, but during the early Iron Age (from the middle of second millennium BCE onward) it was much larger (ca. 100 ha). Today, farming and construction activities have severely damaged the site and the remaining mounded area has decreased to fifteen hectares. The site was excavated over 14 seasons under the direction of Siamak Sarlak from 2002 to the present by the Iranian Center for Archaeological Research (ICAR).

The site has six main strata, beginning from ca. 3120 BCE and ending ca. 1500-1400 BCE (Strata II to VI with some subdivision, see Table 1). The chronological model boundaries proposed by Pollard (Pollard et al. 2013) reveal the start of occupation during the Early Bronze Age I, 3408–3026 cal. BCE (3182–3035 cal. BCE at 68%; median 3121 cal. BCE) and ending 3258–2684 cal. BCE (3071–2926 cal. BCE at 68%; median 3002 cal. BCE). Therefore, the site occupation begins during the Proto-Elamite period and after a short hiatus, was again re-occupied ca. 2700 BC. **(**Table 2) The main categories of Proto-Elamite ceramics consists of Beveled Rim Bowls, Buff Pottery, Four Lugged Jars, Uruk Trays, Mono- and Polychrome Ware (typical Proto-Elamite Ware), Burnished Dark Gray Ware and Simple Grey Ware (wheel made and ça. 30% of the whole ceramics assemblage) and Brown Ware (50%). The Painted and Plain Buff Wares demonstrate the connections between Qoli Darvish and southwestern Iran and Mesopotamia, while the grey wares suggest connections with northeastern Iran. Alizadeh assumed that some of this pottery had local characteristics which is not a Proto-Elamite ceramic type (Alizadeh et al. 2013: 157). The Proto-Elamite/Early Bronze Age ceramics of Qoli Darvish were produced by both cottage industries and specialized craft industry, indicating the complexity of the organization of production (ibid. 161).

The administrative technology of the site during the Early Bronze Age consisted of clay balls, along with simple clay tokens, numerical tablet fragments, one numero-ideographic tablet fragment, and door-, bale-, basket- and box-sealings. Other craft activities are attested at Qoli Darvish by metallurgical finds such as clay crucibles, copper ingots, the remains of a metallurgical furnace and copper pins, all of which support specialization and task management during the Early Bronze Age. After the collapse of the "Proto-Elamite" phenomenon and the subsequent ca. 300-year gap in occupation, inhabitation of Qoli Darvish resumed during period IIIA, from ca. 2700-2500 BCE. Along with Yousef Khan Khaveh, it is thus the oldest Early Bronze Age II site in the center of Central Plateau of Iran. According to Sarlak (2020) the ceramics of this period consist of two types. These are a local Godin IV variant and an assemblage of wares most similar to Transcaucasian phase II, which indicates the mixture of these two cultures in this region during the second quarter of the third millennium BCE. Black burnished grey wares comprise 70% of the Qoli Darvish IIIA ceramic assemblage, burnished brown 25%, and plain buff ware 5%. The black-grey wares were burnished on both the exterior and interior surfaces of the vessels, which typically exhibit a sufficiently fired core and are handmade with inorganic temper. The brown wares can be categorized into two groups, handmade and wheel made, in which both surfaces were burnished. Some of this pottery type includes light brown, dark brown and brown to reddish color and three rows of engraved lines on the surface under the burnished slip. This type of engraving continued throughout the whole sequence of the Bronze Age at Tepe Qoli Darvish from period II, IIIA, III-1-3, IV, V and VI. Most of the vessel forms of the Grey and Brown Wares consist of open bowls with simple rim and flat bases. In some cases, there are two

bores beneath the edges of the rim with a triangular shape below the rim probably used as small decorative handle. Some groups of ceramics include open bowls that are not exactly similar with the Transcaucasian types, but seemingly imitate them. Some vessels have a convex body with relatively long cylindrical necks and everted rims without any handle, decorated with wavy geometric incised patterns located under the rim or else carved on the surface. Jars with vertical handles and cylindrical beakers are another widespread ceramic category related to the Early Bronze Age II of sites such as Tepe Yousef Khan Khaveh and Qoli Darvish. These two sites do not have the incised and excised decorations filled with white paste such as those recorded in phase IIA at Yanik Tepe, however; such decorated ceramics appeared only in northwestern Iran from the very beginning of the third millennium BCE and disappeared around ca. 2750 BC (Palumbi 2019). In any event, the Transcaucasian ware, or at least Transcaucasian imitation ware, developed in the Qom plain after 2700 BCE, but local ceramic types numerically dominated the Early Bronze Age II assemblages in the Qom plain (Fig 9). The Qom plain becomes very important during the Middle Bronze Age, ca. 2300-1900 BCE, witnessing an increase in site numbers and overall population (Sarlak 2020; Sarlak and Hessari 2018). The ceramic traditions of the previous period continue with the production of Grey Ware (40%), Buff Ware (40%) and burnished Brown Ware (20%). Toward the end of this period, one subgroup of the Grey Ware pottery spectrum is wheel made, and features burnished interior and exterior surfaces, alternating between black-grey and light grey. At the end of period III_{3-1}, plain Grey Ware began to be decorated with three parallel grooves on the surface. The most common forms of grey pottery are bowls with open mouths and flat bases and large cylindrical storage jars with flat bases. In fact, during this period we face the change of handmade to wheel made wares more generally and the variation of color is much more visible during the period III_{3-1}. Some other common vessel forms consist of flared rim bowls with convex bodies, sometimes with carination, and flat bases. The decoration of burnished brown ware with three horizontal grooves is one of the new innovations of this period (Fig 10).

According to Sarlak (2020), the late Bronze Age of Qoli Darvish (period IV_{6-1}) begins around ca. 1900 BCE and ends ca. 1600 BCE and is characterized by inter-regional communications with the northwestern and central Zagros as well as northeastern Iran. Settlement patterns reveal a further increase in population and the flourishing of sites in the Qom plain. During this phase, site sizes vary from eight hectares (such as the site of Shalamout B, 8.5 hectares) to less than one hectare (Sarlak and Hessari 2018; Sarlak 2020). It is also important to mention that Qoli Darvish played an important role as the main Bronze Age center of the region. According to Sarlak and Hessari (2018) the Late Bronze Age ceramics of Qoli Darvish can be categorized into the following types: Burnished Grey Ware, Painted Buff Ware, Polychrome (Bichrome) Ware, Brown Ware and Red Ware. A few examples are combinations of Grey and Brown Ware. According to Sarlak (2002) during Qoli Darvish IV_{6-1} the ceramic assemblage is approximately 50% brownish/Plum Ware, 40% Buff Ware (whether plain and painted), and 10% Grey Ware, with variation from light grey plain burnished to burnished pattern grey ware with geometric designs. The percentages of the above groups continued throughout the IV_{6-1} period with only some variation and no sharp modifications. The variation found within the Grey Ware category is interesting, with some subdivisions observed between Burnished Light Grey Ware which features geometric designs and Plain Burnished Grey Ware where the entire surface is covered in burnishing without any design. Buff Wares are wheel made and their motifs, which reminds those of Bronze Age samples form Qoli Darvish, are painted in black and include: parallel oblique and vertical hatches, wavy horizontal parallel lines and bands, and oblique intersecting lines which resemble V-shaped designs, all enclosed in horizontal frames. The use of the engraved groove design under the slip includes three horizontal rows below the rim and on the neck and continues to appear on Brown Ware through the end of the IV period. In the middle of period IV, Painted Brown Ware was seen with black painted designs including geometric and, infrequently, animal designs. At the end of this period, appliqued snake motifs appear on the surface of some vessels. One of the most prevalent vessel forms found across all ware types (grey, brown, buff ware) is a body form with the carination and everted plain rims. Among the pinkish Brown Wares of period IV, the characteristic

vessel forms include open forms like basins and bowls, deep plates (with simple rims and ring bases), carinated forms with open everted rim and triangular profiles, wares with short beak-spouts just above the body carination. The forms of the Painted Buff Wares of Period IV include beakers with handles close to the rim and an open mouth and narrow base, as well as bowls and cups with body carination and everted rims (Fig 11). Later in Period IV, for the first time, excised button-shaped decorations were applied on the external surface of vessels. This decoration is often accompanied by the decoration of geometric carvings, engraved patterns (in the form of stripes) and burnished geometric designs used especially for wheel made Grey Wares. Their forms consist of mostly open bowls and rarely closed bowls with flat bases, bell shaped tripods and bowls with basket handles, all of which become more common during the periods V and VI. One of the subgroups of Period IV Buff Wares is monochrome and polychrome ware which is painted with geometric style using brownish red and black paint. This group consist of 1 to 2 percent of the whole ceramic assemblage which continues during the beginning of period VI. Red ceramics are painted with geometric designs and a few animal designs. One of the most distinctive forms which begins during Period IV and continues into Period VI is cone-shaped clay lids with feature a wide triangular handle and are buff to brownish in color. All the surfaces of these lids are decorated with the roll of a densely grooved bands in the form of regular parallel lines enclosed in intersecting stripe frames. Techno-cultural similarities with Estark-Joshqan ceramics include the introduction of “steppe coarse ware” (Hoseinzadeh et al. 2019; Sarlak 2020). This light reddish pottery is handmade with punch or comb designs which are similar to Central Asian Andronovo ceramics (Luneau 2017; Hoseinzadeh et al. 2019, Fazeli and Nokandeh 2019). However, this type of ceramic is not known to appear in the intermediate regions. This evidence does not support the inference of any population movement, but does show that the people of the Central Plateau of Iran were familiar with this technique. In the final stages of Period IV, a new type of decoration became common on the polished grey and plain black-grey pottery, which is important in terms of decorative technique. In this technique, a white paste, usually gypsum-based, is inserted into the geometric engraved designs.

Sarlak categorizes the ceramic forms and decoration of the last two centuries of occupation at Qoli Darvish into two periods: V_{3-1} (1600-1500 BCE) and VI_{4-3} (1500-1400 BCE). He also categorized period V_{3-1} as a transitional period from the Late Bronze Age to the Iron Age. During the period V_{3-1} Grey Ware comprised 60% of the assemblage, Buff Ware (painted with geometric designs and simple) approximately 30% and Brown Ware 10%. The subgroups of Burnished Grey Ware include light Burnished Grey Ware with geometric decorations, Black Burnished Grey Ware with polished geometric designs, excised band decorations, geometric incised and button-like applique decorations, as well as Plain Polished Grey Ware (Fig 12). Vessel forms which continue during Period IV and V include vessels with body carination in combination with simple rims and flat bases as well as carinated bowls, whether open or closed. Small relatively vertical spouts are observed across all pottery groups. During early Period V, a distinctive and unique form of medium to large-sized earthenware vessels with flat bases becomes common. On the shoulders of this type of jars, on the opposite side of excised spool shapes, there is applied an animal's head, either a ram or a horned goat. Other common forms of Period V which continued from Period IV include tripod containers, bell-shaped containers, cups with vertical handles, beakers with relatively cylindrical bodies, button-based cups and bowls, as well as large- to medium-sized food storage spouted jars. The ceramic tradition of Period $VI_{4-3}$was categorized by Sarlak (2020) as the beginning of the Iron Age (1600-1400 BCE). Grey Wares increase from 70% of the assemblage to 80% by the end of the period, Painted and Plain Buff Wares comprise 25% and Brown Ware 5%. In early Period VI, medium-to-large, shouldered jars with flat restricted bases and decorated on both sides on the shoulder with appliqued animal heads (horned goats or rams) and spool-shapes continue from period V. One of the distinctive forms of Period VI is the cone-shaped clay lids with a wide handle and engraved zigzag designs which first appeared in Period IV. New forms appeared for the first-time during Period VI, including containers with horizontal handles, open-mouth beakers with narrow waists and flat bases and vertical handles with applique decorations on the handle, and long-spouted teapots in

which animal figurines were added to the spout. Grooved (or fluted) decoration on fine wheel made Burnished Black Ware appeared for the first-time during period VI. Another new form of this period, characteristic of the Plain and Burnished Grey Wares, is the cylindrical tulip cup with an open mouth and long neck and round base. These vessels have two vertical handles attached under the rim with cross-cut and incised decoration. A new innovation late in Period VI in the grey pottery group is a type of bowl with a convex body and a relatively narrow flat base, an open or slightly closed mouth with a relatively thick and slightly everted rim. Generally, the potters of this period used incised decoration in cut, intaglio, and excised bands, as well as excised buttons under the rim, and incised grooves of horizontal zigzags enclosed within a frame of horizontally arranged triangles. Vessels such as cups and beakers with button bases and small triangular handles or horizontal handles are one of the most common forms observed during Period VI. These vessels are decorated with three zigzag carved decorations and excised buttons. Tripod vessels in the shape of an animal's abstract body, pedestals in shape of an animal's foot, containers with the addition of an animal's body on the rim or body, and spouted containers are other common forms of Period VI (Fig 13). Another new form of Grey Ware is spouted bowls.

Discussion of Qoli Darvish chronological sequence

Period II (3300-2900 BCE):

Period II_{5-1} was recorded in the trenches of AP.33, AO.33 and AN.33-34 of Qoli Darvish with 3555 ceramic items consisting of Proto-Elamite tablets, seal impressions, Burnished Grey Ware of the Hissar II style, a local Painted Buff Ware, and the continuation of Sialk III_7, alongside a number of Proto-Elamite ware types including Beveled Rim Bowls, Uruk trays, four-lugged jars and painted Jemdet Nasr ware. According to Sarlak the local ceramics, especially small-spouted jars, most resemble the Late Chalcolithic ceramic traditions of the northern Central Plateau. The Grey Wares of this period, insofar as they are closely related to those of northeastern Iran and the Gorgan plain, support the inference of a meeting ground of the three cultures: north central Iranian Late Chalcolithic, Proto-Elamite and Uruk-style from the west, and Hissar and the Gorgan plain from the east.

Period IIIA (2700-2500 BCE):

Based on the relative and absolute chronology, the Proto-Elamite phase of Qoli Darvish ends around 2900 BCE. After two or three hundred years of a hiatus in occupation, during the period IIIA stratum of Trench AS.35 (90cm thick), Transcaucasian ceramics appeared. As discussed above, however, during the IIIA period a variety of ceramic types attest to a strong local component in the overall assemblage, i.e., from 2700-2500 BCE. Despite the presence of Kura-Araxes style wares, the evidence as a whole suggests few other contacts with northwestern Iran during this interval. According to Palumbi (2019), phase IIB Yanik Tepe is characterized by plain non-decorated ceramics and starts after 2750 BC. The Transcaucasian ceramics mentioned by Sarlak do not have the incised and excised decorations filled with white paste such as those recorded in phase IIA at Yanik Tepe. This suggests that sites such as Qoli Darvish were a purely local development from 2700 BC onward, with the Kura-Araxes-like wares actually representing just an imitation of Transcaucasian ceramic traditions. In the horizontal excavations of Trench AO.33-35 and AN.33-34 (5x10m, 45cm deep) and vertical excavation of Trench AS.35 (90cm deep) only pottery, ash, bones, and stone mortar was recorded, with neither trench producing any architectural evidence.

Period III_{3-1} (2300-1900 BCE)

Between the cultural contexts of periods IIIA and period III_{3-1} there is 60cm of accumulated culturally sterile natural sediment, indicating a cultural gap in the sequence at Qoli Darvish. Within the Trench AO.34, in an excavated area of 5 square meters, evidence of Period III_{3-1} was found with three architectural phases and one subphase. The radiocarbon date for the earliest of the phase's ranges from 2137-1977 BCE (Phase III_3), Phase III_2 dates to 2011-2000 and Phase III_1 2118-1973 BCE (Sarlak 2020). Rounded structures and storage facilities are the dominant architectural features of this period. As mentioned above, the ceramics of Period III_{3-1} represent a continuation from Period IIIA, despite the gap in the settlement history between the two periods. The ceramics of this

period are predominantly Grey Ware, Buff Ware (Painted and Plain), and a variety of Red-Brown Wares.

Period IV-VI (1900-1400 BCE)

From this period, we have clear evidence of religious activity at the site of Qoli Darvish from the architectural feature called the "Shrine of Qoli Darvish," which dates to the first half of the second millennium BCE. The architectural features of Qoli Darvish from Period IV to VI consist of religious spaces, residential areas, food storage zones, administrative loci and craft quarters (Sarlak 2020). The so-called "shrine with several platforms," which was revealed to have a number of stairs and to have been restored multiple times, seems to have been long in use for ritual activities at Qoli Darvish. According to Sarlak, the platform was carefully filed with adobe bricks during an abandonment episode and then later a new platform was built atop the previous construction without any disturbance. An interesting point is that prior to the in-filling of the main spaces of shrine, first they embedded specific types of ceramics and bronze objects, both in niches and spread among the large volume of mudbricks. This indicates a kind of religious tradition, in which certain vessels types and objects were offered as dedication when the spaces of a shrine were to be filled. One example of such vessels with this specific function that can be cited is the use of polychrome beakers, in which the base of the vessel has a kill-hole. Other examples include Grey Ware tripods with attached animal figures and small beakers with small handles attached to the rim. A number of bronze objects that look like bird beaks or awls were also placed as votive offerings among the filled bricks of the place of worship. The central pit in the middle of the shrine, presumably a hearth, was filled in with gypsum mortar when the building was abandoned and filled. Another interesting find in the shrine context was a large volume of accumulated animal bones, presumably for sacrifice and dedication to the shrine before the infilling the space, on one of the floor layers and in a fireplace associated with one of the main spaces of the shrine. Based on the shape of the central fire pit, at least two types of fireplaces were identified at the shrine of Qoli Darvish. There are two hypotheses related to such fireplaces based on their location and structure. The first type of fire pit has a central cavity which is cylindrical in shape (Period IV) and has a kind of fire-escape which seems to have been used for igniting the fires. The second group of fireplaces lacks this auxiliary feature, and their central cavity is bowl-shaped. These features were found in the central space of the shrine and it appears that fires were transferred here from hearths of the first type located in adjoining rooms. One anomalous hearth feature had a central cavity that was divided into four quarters. Interestingly, the shrine may have been a multipurpose space. A large storage jar was found on the platform to one side of the shrine (5x5m in size), which was probably related to the ritual activities that took place in the space. Several such storage jars were found in the storage rooms that frequently appeared at Qoli Darvish during this time. From within the main spaces and architectural features related to the complex of the Qoli Darvish shrine, additional data supporting the specific function of the site include human figurines, small animal figurines, cylindrical seals, pottery lids, which were decorated with images of gods and goddesses in narrative scenes, a large number of pieces of gypsum inside the jars, different types of tokens made from gypsum, ceramics, clay and stone all support the rituality of the site. Another indicator of administrative activities is that inside one of the rooms of the complex, 50 gypsum tokens, 30 pottery tokens, 20 seal impression, and two-cylinder seals was found. Another attestation related to such activities consists of the pieces of lids bearing seal impressions.

With respect to cultural interactions evident at Qoli Darvish during this time, our data reveals a close connection to Hissar IIIB-IIIC and Shah Tepe IIa assemblages through certain motifs and vessel forms. In particular, excised geometric and animal designs (mostly snakes), embossed geometric motifs, geometric carvings, carinated vessels with small spouts, cylindrical vessels with a flat base and tall neck, and bottle-shaped vessels. Hissar IIIC-style small miniature stone columns were also found at Qoli Darvish during Period IV, decorated with engraved geometric designs. Such stone objects have also been recorded at Tureng Tepe (Bessenay-Prolonge and Vallet 2020), Shahdad, Khinaman, and other sites in SE Iran as well as at Gonur Depe (Sarianidi 2006).

The Kashan region

The work of Roman Ghirshman and Sadegh Malek Shahmirzadi argued that after the collapse of the urban societies of the Sialk IV period during the early third millennium BCE (Fazeli and Nokandeh 2019), the Kashan plain remained unoccupied until the middle of the second millennium. Tepe Sialk chronology was updated recently bith by Sadegh Malek Shahmirzadi and Nokandeh and also by one of the authors (HFN). In the depth of the leading trench of Grishman which marks the beginning of the establishment of southern Silk, a sample was selected by Hassan Fazeli Nashli. This sample was taken from the northernmost point of the eastern wall of the trench, close to the floor (considering the sediments formed during these years, the lowest point was selected) and recorded with the code SKS-OSL6-2018. As a result of the analysis, the date of this sample was estimated to be around 4080 +-700 BC. According to the studies of Hassan Fazeli Nashli with the help of Sialk ziggurat, which was previously thought to belong to the third millennium BCE, dates back to the first millennium BCE. Two examples of absolute dating and a sample taken from the southern platform show that this area has a date between 884 and 766 BCE (Fig 14). It is possible that according to the scattered surface evidence, this area was occupied during the Achaemenid period. Recent research by the Department of Archaeology of Kashan University led by Javad Hoseinzadeh and Mohsen Javari in the hilly flanks of the Kargas Mountains in eastern Kashan, however, has produced new evidence on this crucial period. Their survey has revealed numerous cemeteries dating to the Bronze and Iron Ages in the “highlands” of Kashan. These cemeteries include three heavily looted sites in the Rahaq valley, between the villages of Estark and Joshaqan, one in Sok-e Cham near Gholam Tepe, a well-known settlement dating from the late second to early first millennium BCE and finally, a cemetery located in the village of Maraq in the heart of the Kargas Mountains. From 2016-2019, a team from the Department of Archaeology of the University of Kashan, in collaboration with Archaeology Institute of the University of Warsaw conducted four seasons of excavations at the site of Estark-Joshaqan. These excavations brought a wealth of new information to light about the burial customs of the Central Plateau of Iran over the course of the entire second millennium BCE (Hoseinzadeh et al. 2017). Features that recall the Middle-to-Late Bronze Age burial traditions of northeastern Iran include cremations, shaft graves, and the interment of animal parts (hands, legs, and jaws) as grave goods. The five ^{14}C dates from the site have helped us to gain greater insight into the previously ambiguous chronology of the Central Plateau during the second millennium which was rooted in two factors: the existing chronology is out of date and lacks any stratigraphic anchor in a well-excavated site (Hoseinzadeh et al. 2019).

As is well-known, the basis for the chronology of material culture dating to the second millennium BCE on the Central Plateau is based on the early excavations of Roman Ghirshman at Sialk, particularly those of Cemeteries A and B, as well as on comparisons to material from the uncontrolled stratigraphic excavations of Tepe Giyan (Contenau and Ghirshman 1939). With regard to the dynamic nature of the horizontal stratigraphy and lack of absolute dates at these cemeteries, one can easily imagine how difficult it is to establish a reliable chronology. But fortunately, the excavation of the Estark-Joshaqan, located less than 15 km west of Sialk and sharing most of its cultural material with Sialk Cemeteries A and B, has allowed more reliable data about chronology of this period to be obtained. The cemetery of Estark-Joshaqan is composed of two hills (eastern and western), located on the southern terrace of a dry river channel, named Rood Geleh, that runs from west to east through the whole Rahaq valley. Like many other sites in Iran, both of these hills have been heavily looted in the past two decades and the four seasons of excavation at the site have been performed on the areas of the site that were less disturbed. These excavations unfortunately showed that the western mound has been comprehensively looted, but the eastern mound had enough cultural strata still intact to reveal new information both on the chronology and cultural traditions of the second millennium BCE. After four seasons of excavation across four trenches in quadrant E-J 1 (Trenches A, B and D along the western edge and Trench C along the eastern edge) it has been made clear—based on radiocarbon dating and stylistic analysis of pottery forms and decorations—that there is a chronological difference between the eastern and western parts of the E-J 1 cemetery. According to two calibrated radiocarbon dates obtained from

charcoal recovered from a stone-walled grave with cremated human remains from Trench A (discussed below), the dates of the grave range between 2146-1960 BCE. Two more radiocarbon dates from Trench C returned a date range of 1189-936 BCE. Stylistic analysis of the pottery assemblages from these contexts also demonstrates this chronological differentiation.

From the Trenches A, B, and D (at the western edge of E-J 1) the most prevalent vessel forms are large, spherical, open-mouthed jars, medium-sized open-mouthed bowls, small bowls with ring-bases and straight or inward-oriented rims, a small number of tripod bowls, small-to-medium sized ring-base bowls with restricted mouths and single handles. Rare forms include two-handled jugs. One very important category of ceramics is incised conical handmade lids with geometric patterns. These incised conical lids bear an important implication: while they do not have any precedents in the entirety of the prehistory of the Central Plateau, they appear suddenly at some settlements (e.g., Qoli Darvish, Sialk and Ozbaki) and cemeteries (e.g., Sarm, Sialk, Estark-Joshaqan) during the first half of the second millennium BCE. Although there is no consensus about the function of these lids (Sarlak 2020), their incised geometric patterns are undeniably similar to Late Bronze Age Andronovo-associated traditions of vessel decoration (Luneau 2017). If this resemblance is not just a coincidence and they in fact represent actual cultural contacts between these neighboring cultural zones, then the nature of these contacts is an important subject to be further addressed. Trench C (on the eastern edge of E-J 1) was radiocarbon dated to ca. 1200-900 BCE. Here, we are faced with an entirely different ceramic assemblage in terms of form and decoration. Here, in addition to large jars, ring-base bowls and cups, we encounter large flat plates with one or two horizontal handles, pitchers with narrow necks and everted rims and one or two vertical handles, medium-sized hemispherical cups with a single handle and simple base, crocks of different sizes with flat lids and kohl containers with simple or zoomorphic handles. One of the most characteristic features of the Trench C pottery assemblage is the decoration of some vessels. In particular, the kohl containers and middle size bowls exhibit special representations of snakes as handles, which are totally absent in Trenches A, B and D. Another characteristic of Trench C vessels is painted decoration on some pottery types such as cups and plates, which is missing from the western trenches of the site. Here some geometric motifs in plum colors are executed on light gray or buff grounds, or in other cases, the whole vessel is covered by a plum color slip and then decorated with simple burnished parallel lines. Some of these vessels appear to represent the beginning of Sialk VI decorative traditions (Cemetery B) **(Fig 15)**.

As it is clear, radiocarbon dating in combination with stylistic analysis at the recently excavated sites of Estark-Joshaqan have led us to a better understanding of the typo-chronological situation of the Central Plateau of Iran during the second millennium BCE. These data are significant because they are useful in estimating the chronology of old excavated cemeteries like Sialk A and B, Khorvin, Qeytariyeh, Chandar and Sarm which had previously lacked a strong stratigraphic anchor for their absolute chronology.Another astonishing find from the Estark-Joshaqan cemetery is its ritual practices. During the first season of excavation at Trench A, an oval stone grave was found, ca. 3.5x2.5m with the longer axis oriented southeast-to-northwest (Fig 16). In the middle and along the northern side of this structure, which had been filled with medium-to-large pebbles, were two conical pits. These pits measured approximately 110cm in diameter at the top and 30cm in diameter at a depth of 1m. They were filled with potsherds, ashes, and the cremated bones of humans and animals. After examining the fill of these pits, it was determined that they contained the remains of at least 13 individuals of varying sex and age at death (Sołtysiak et al. 2016). While the excavation team screened the entirety of the fill of more than 50 looted pits at or near the site, not even one additional piece of cremated remains was found in the whole cemetery. This evidence suggests that these remains were cremated elsewhere and subsequently transported to this grave (ibid). Hence, the team concluded that cremation was not a dominant burial custom at the cemetery. Instead, it appears to have been a singular phenomenon whose origins and existence in this cemetery should be further investigated.

Like the more exceptional example mentioned above, the majority of oval graves at the site were built using stone slabs that appear to have been obtained locally. The overall structure of the other graves differs from the cremation burial, however. Indeed, the majority of burials are shaft graves, with a single rectangular shaft (averaging 180×80×80cm) and a chamber cut either to the north or south side of the shaft, of approximately similar dimensions. While this type of grave has been identified at Shahr-e Soukhteh and at Shahdad in southeastern Iran during the Middle-to-Late Bronze Age, the most comparable examples appear to be the contemporaneous graves from Tepe Hissar (Dyson 1989). Our inspections of the published record show at least a few such burials at cemeteries such as Sarm as well, but they due to poor excavation techniques, the complexity of burial structures as well as taphonomy processes, the excavators unable to identify their original morphology, thus hindering the discernment of these examples as proper comparanda. If we take all these attractive and puzzling data from Estark-Joshaqan 1 & 2 into account, it persuades us that a deep reconsideration of the entire literature concerning the chronology and culture history of the second millennium BCE of the Central Plateau of Iran is required.

Conclusion

As we mentioned in the beginning of this paper, archaeological research conducted in both the northern and southern zones of the Central Plateau permits us to revise our earlier conclusions about the nature of socio-political changes in the Central Plateau of Iran during the third and second millennium BC. Future research will seek to understand how environmental changes impacted local societal transformation in this region; more specifically, how did changing climate patterns affect the settlement shift and subsistence system of the Iranian Central Plateau between the late fourth and middle of the second millennium BCE (Schmidt et al. 2011; Leroy et al. 2013; Carolin et al. 2019; Palmisano et al. 2021). A full Holocene paleoclimate record produced from a stalagmite collected from Katalekhor cave (1719 masl) in the Zanjan Province (35.84°N, 48.16°E; Fig. 1) shows a reduction in local rainfall/soil moisture between 5.4 and 4.5 ka BP, and a broad decrease in rainfall amount beginning around 4.3 ka BP and ending around 2.0 ka BP (Andrews et al., 2020). Additionally, a shorter third millennium BCE record of abrupt regional dustiness and regional rainfall amount, produced using a stalagmite collected from Gol-e Zard cave on the southern slopes of the Alborz mountains (35.84°N, 52.00°E, 2535 masl; Fig. 1), indicates two abrupt centennial-length periods of enhanced summer dust events: 4.51-4.40 ka and 4.26-3.97 ka BP (Carolin et al., 2019). The dust is suggested to be sourced from the Tigris and Euphrates river valley region, due to either enhanced aridity, stronger winds, and/or change in soil properties or vegetation cover. Several factors suggest a drier regional climate coincident with these two century-scale dusty periods (Carolin et al., 2019). Our preliminary hypothesis is that the 4.51-4.40 ka and 4.26-3.97 ka BP events, characterized by expanding aridity and widespread aeolian dust deposition, negatively impacted agricultural production on the Iranian Central Plateau, causing the previously settled populations to scatter at various points during the Bronze Age.

Archaeologically, cemetery sites such as Yousef Khan Khaveh or Estark-Joshqan evidence a population with a pastoral economy based on animal husbandry and suggest a different socio-ecological and economic system than that which characterized the previous period (Vidale et al. 2018). Palmisano has postulated that the Bronze Age societies of Iran between 5300 and 4500 calBCE were resilient to climatic variation during the Middle Holocene period and it seems to us this variation should be seen regionally in all over Iran (Palmisano et al. 2021: 21). The results from the Gol-e Zard cave stalagmite record show abrupt shifts to drier climate with larger and/or more frequent dust events from 4.51ka to 4.40ka and from 4.26ka to 3.97ka (Carolin et al. 2019: 4). This interval correlates to a period in which the populations of Qazvin, Qom and the Zayandeh Rud region visibly increased, attesting to this degree of cultural resilience during the second half of third millennium BCE. The aeolian dust, strong winds and aridity of the Central Plateau during the three-hundred-year duration of the 4.2 ka event (ibid: 5) likely continued to affect the vegetation pattern and systematic agricultural practices of the region. It is now clear that there is no evidence of complete settlement collapse in the Central Plateau during later prehistory, especially in comparison with

Mesopotamia and elsewhere in Iran. The Central Plateau of Iran during the sixth, fifth and fourth millennia can be characterized by an extensive agro-pastoral economy. During the third millennium BCE, with its decadal-scale shift into and out of drier and dustier conditions from 4.51ka to 4.40ka and again from 4.26ka to 3.97ka (2560-2450 BCE and 2310-2020 BCE), the adoption of new ways of life did not afford the development of large urban centers. Such urbanization processes would have to wait until irrigated agricultural systems were developed during the second millennium BCE. While the settlement types, agricultural practices, system of writing and administrative system characteristic of the late fourth and early third millennia BCE were abandoned by people of the Iranian Central Plateau people during the socio-ecological shifts of the mid-third millennium BCE, mortuary rituals from the cemetery sites mentioned above show that complex society lived on in this region although the scale of societies were changed in respect of former period.

We hope this new look at the archaeology of the Iranian Central Plateau will encourage further fresh perspectives on this history and stimulate new comprehensive and multidisciplinary research programs in the near future.

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Cultural Period (BCE)		**Sites**
Iron Age 1	1250-1050 BCE	Sialk, Estark, Sagzabad
Bronze Age 3400-1500 BCE	Final Bronze Age 1500-1250 BCE	Sialk, Shizar, Sagzabad, Pardis, Qoli Darvish, Qom plain
	Late Bronze Age 1900-1500 BCE	Estark, Shizar, Sagzabad, Kopandeh, Qoli Darvish- Qom plain
	Middle Bronze Age 2200- 1800 BCE	Shiretal, Kopandeh, Qoli Darvish, Qom plain
	Early Bronze Age II Kura-Araxes 2800 – 2200 BCE	Shizar, Yousef khan khaveh, Qoli Darvish, Varzaneh (051-013), Kopandeh
	Early Bronze Age I Proto-literate 3400 – 2800 BCE	Arisman, Sialk, Sofalin, Qoli Darvish, Qom plain
Note: Sites from the Qom plain are described in Table 2.		

Table 1- Cultural Period of North and south-central plateau of Iran

Chronological table of Qom plain and cultural phases of Qoli Darvish			
Simultaneous Sites in The Qom Plain	**Period**	**Date (BCE)**	**Chronological sequence of The Qoli Darvish**
Teppeh Gerdali, Teppeh Sarm, Shamshirgāh, Shalmout B, Teppeh Zaynab Khathon, Jam-e Lavdar, Teppeh Kaftarkhor, Teppeh Ashtarieh	Beginning of Iron Age	1500-1400	*VI4-3*

Teppeh Gerdali, Teppeh Sarm, Shamshirgāh, Shalmout B, Teppeh Zaynab Khathon, Jam-e Lavdar, Teppeh Kaftarkhor, Teppeh Ashtarieh	Transition to the Iron Age	1600-1500	*V3-1*
Teppeh Gerdali, Teppeh Sarm, Shamshirgāh, Shalmout B, Teppeh Zaynab Khathon, Jam-e Lavdar, Teppeh Kaftarkhor, Teppeh Ashtarieh, Northern Teppeh Khalaj Ābād, Teppeh Chehel Bandegān	Late Bronze Age	1900-1600	*IV6-1*
Teppeh Alborz, Teppeh Giv, Shalmout B, Jam-e Lavdar, Teppeh Kaftarkhor, Northern Teppeh Khalaj Ābād, Shamshirgāh, Teppeh Chehel Bandegān	Middle Bronze Age	2300-1900	*III3-1*
Settlement Gap			
Teppeh Yousef Khan Khaveh	Early Bronze Age, Kura–Araxes	2700-2500	*IIIA*
Cultural Gap			
Teppeh Gerdali, Shalmout B	Proto-Elamite, Early Bronze Age	3300-2900	*II5-1*

Table 2- Chronological table of Qom plain and cultural phases of Qoli Darvish

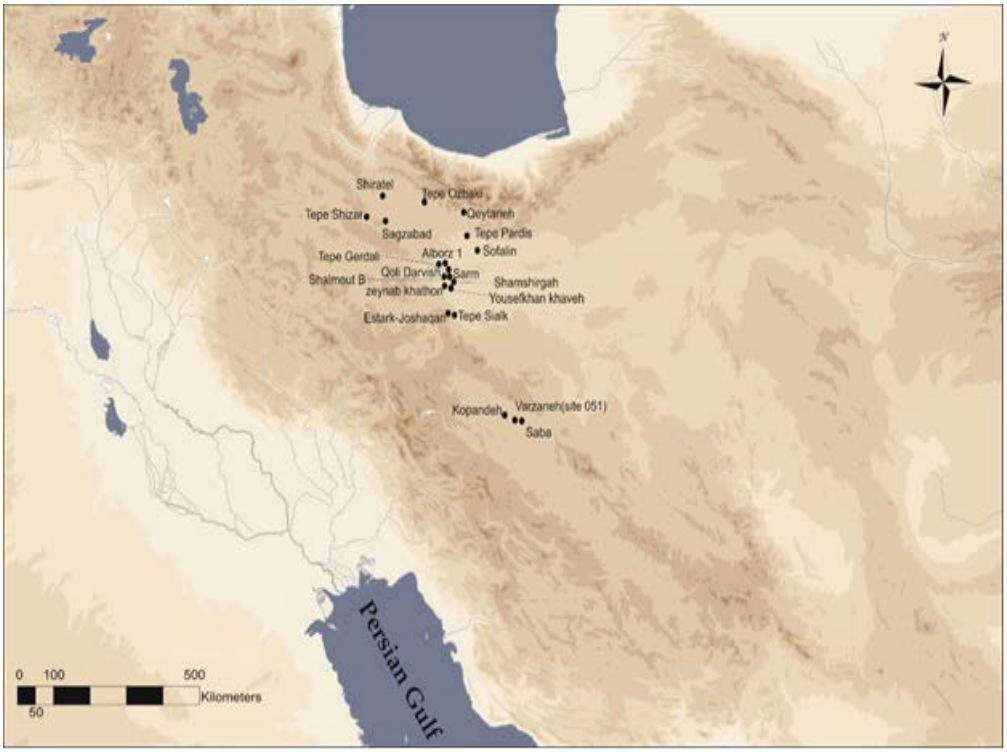

Figure 1- Fig. 1 Bronze age sites (Northern and Southern zones of the Central Plateau of Iran)

Figure 2- Iron objects, Qoli Darvish IV (Sarlak 2020:322)

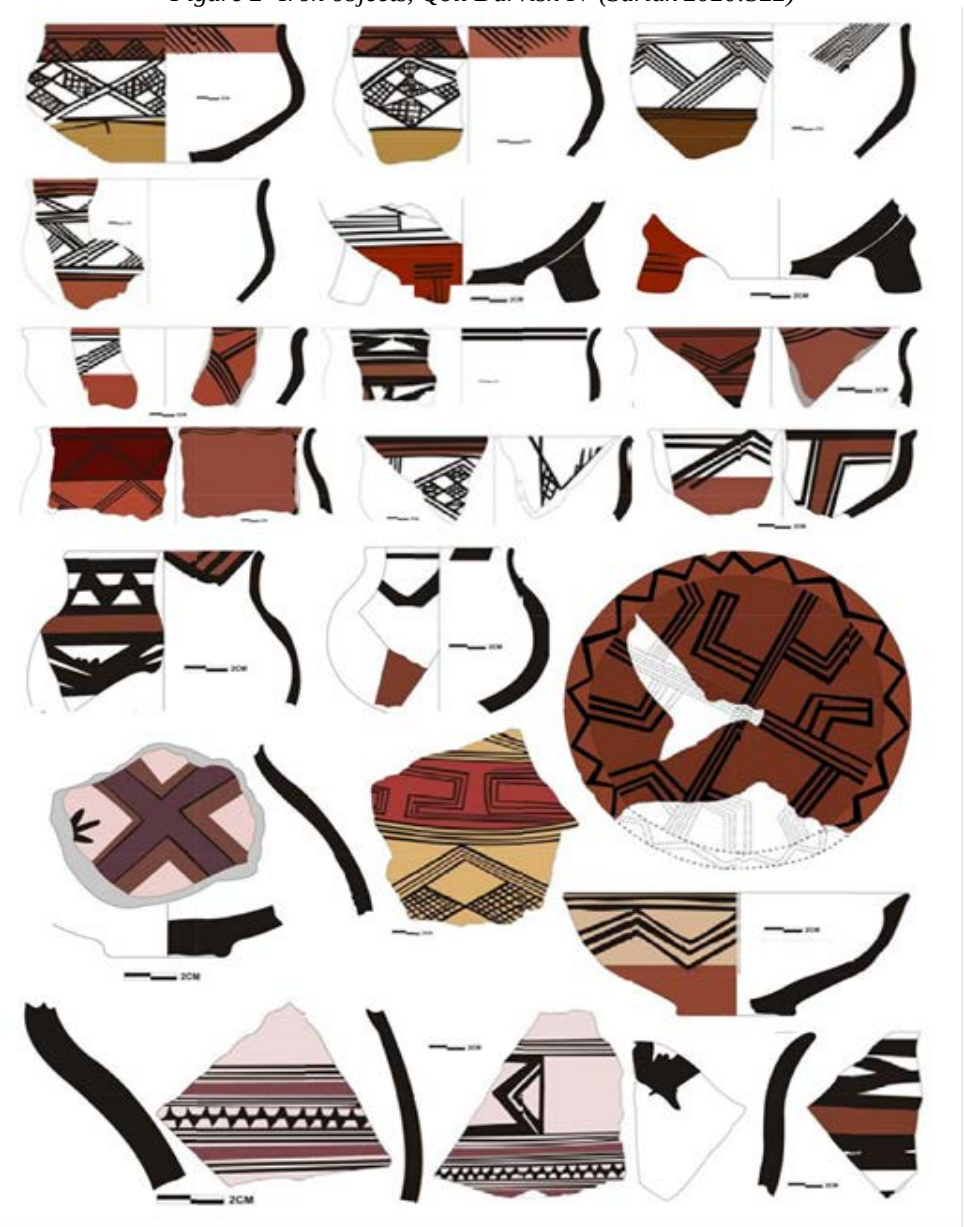

Figure 3- Selection of Sagzabad Polychrome wares (Azizi et al. 2011: fig2)

Figure 4- Pottery of Tepe Pardis: milk-bottle (a); pitchers (b-c); spouted jars (d); conical bowls with flat base (e); handled pitcher with open spout (f); cups (g and k); Rare vessel (h); beaker (i); tripods (j,l,m)

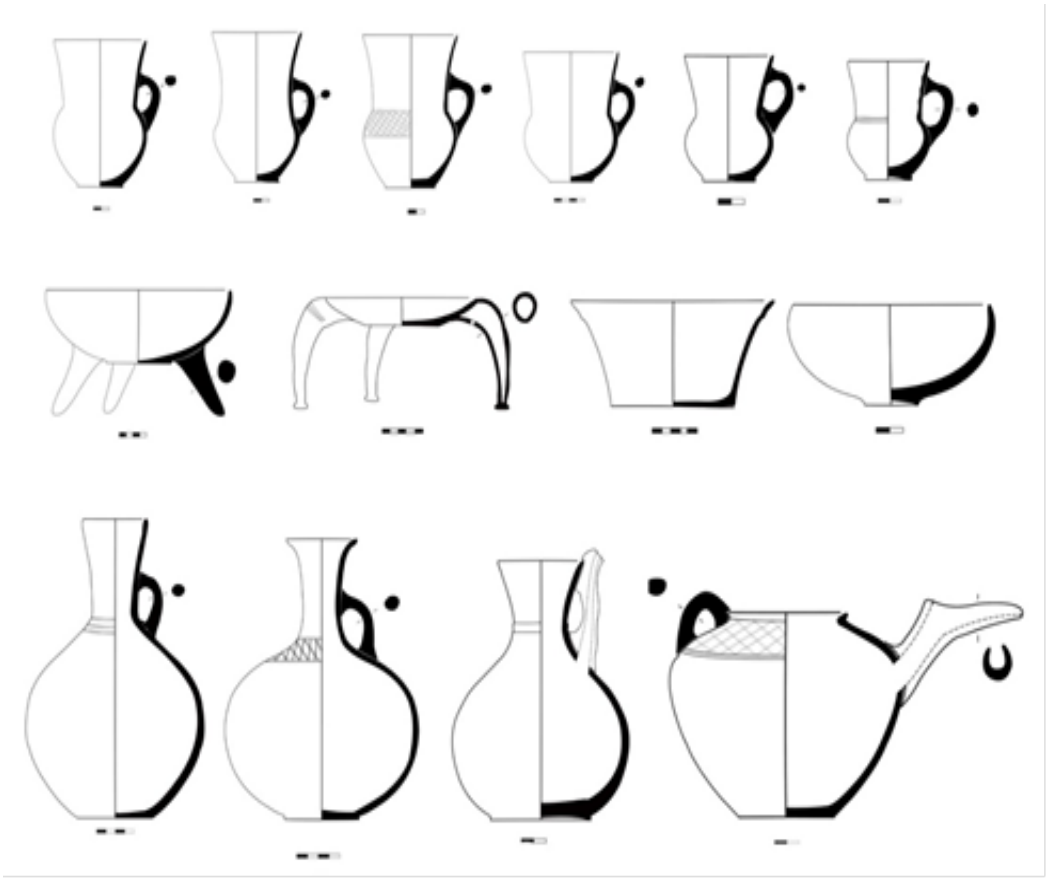

Figure 5- Selection of Tepe Pardis wares

Figure 6- Comparison of Tepe Pardis and Khorvin wares

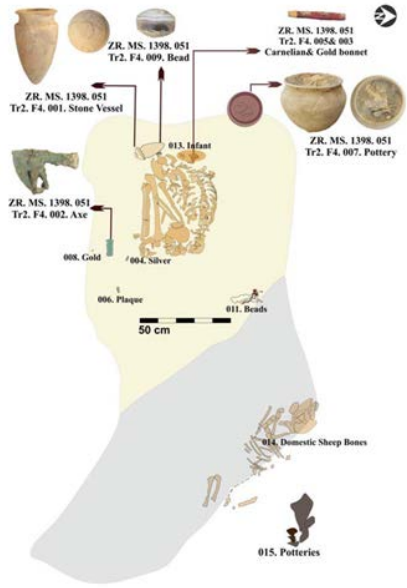

Figure 7- Site 051, trench 2, feature 4: plan of the grave and location of the grave goods (Ilkhan et al, 2019: fig 5)

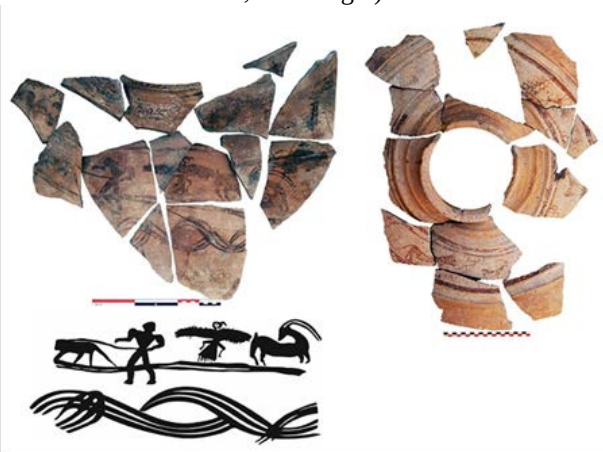

Figure 8- Two Painted Jars Discovered at the Site No. 051 (Rafi´i-Alavi et al. 2021: fig 9)

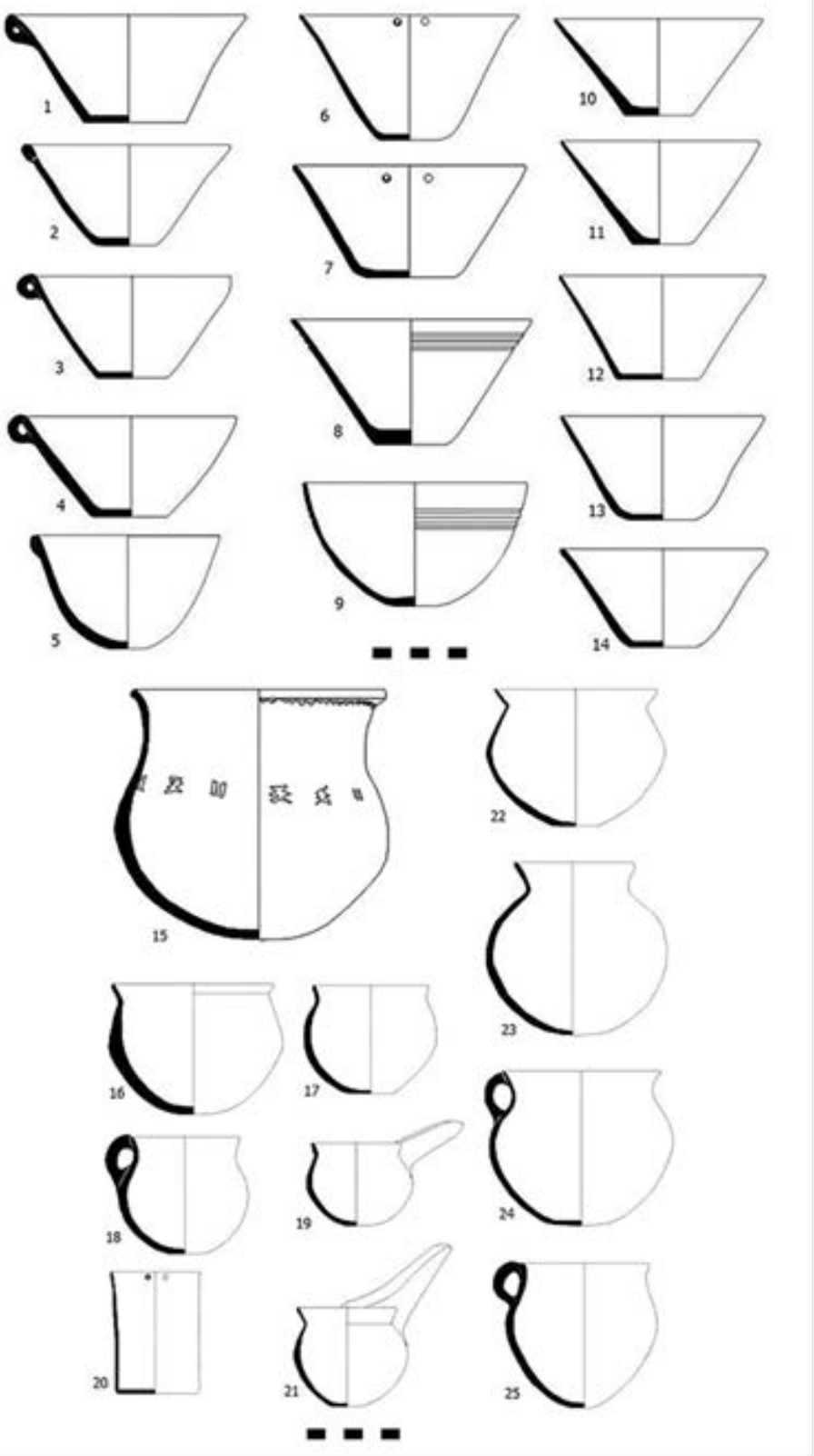

Figure 9- Black burnished grey ware (1-5, 10-18, 22-25); Burnished Brown ware (6-9,20); Buff ware (19,21) from Yousef Khan Khaveh (Qoli Darvish IIIA) (Sarlak 2020)

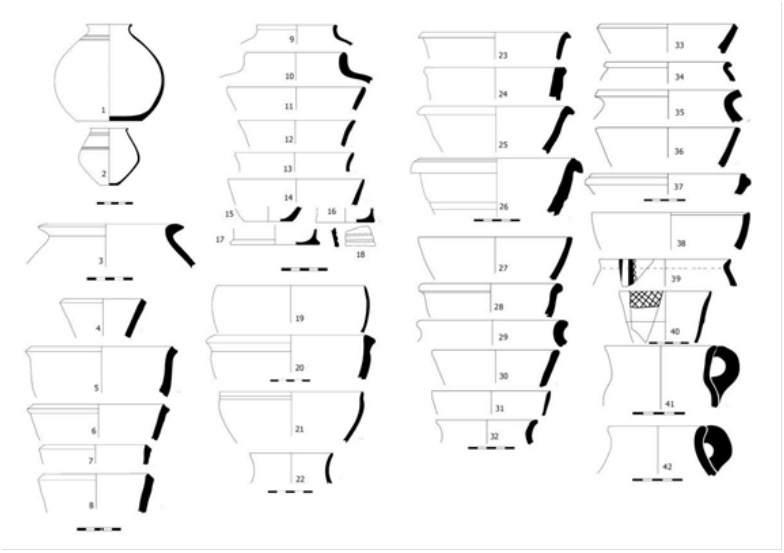

Figure 10- Qoli Darvish III 1-3 (Sarlak 2020)

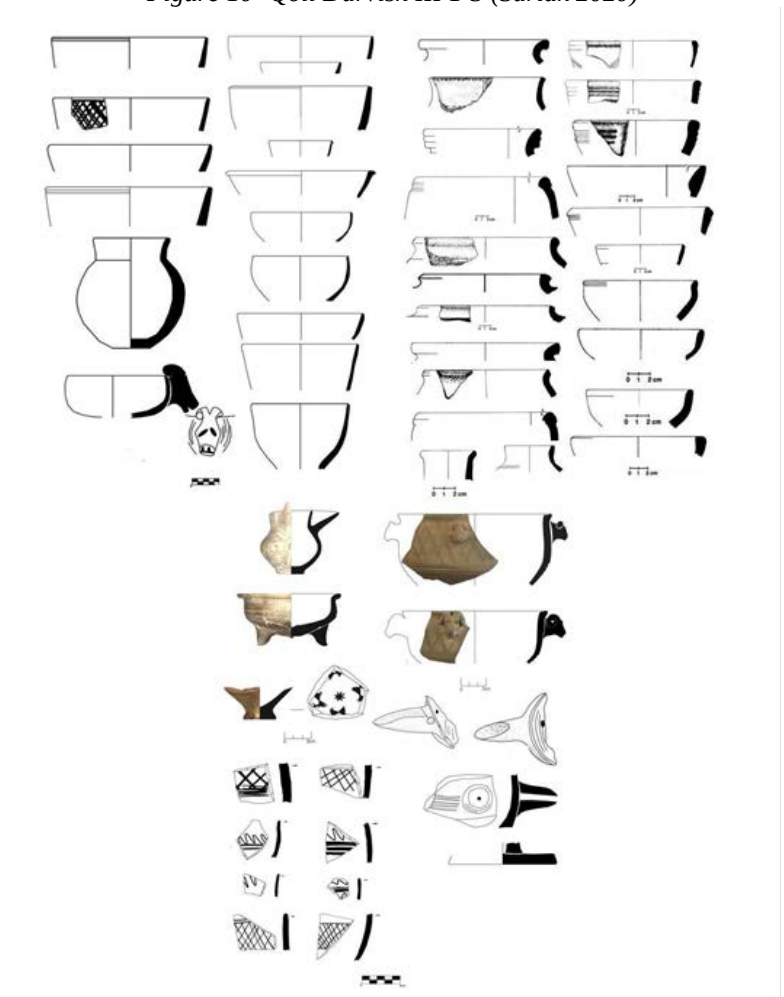

Figure 11-- Black burnished ware, Qoli Darvish IV (Sarlak 2020)

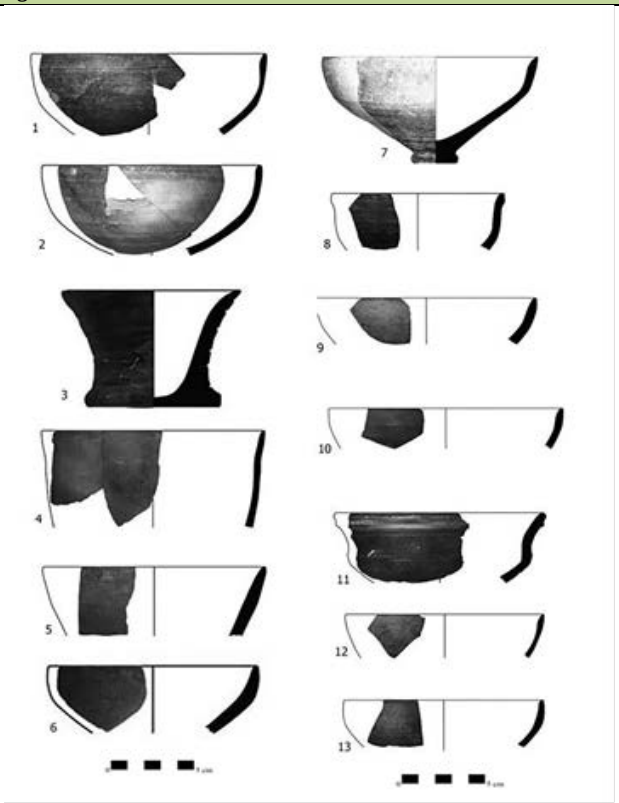

Figure 12- Wheel-made black burnished grey ware (1-13); Qoli Darvish V (Sarlak 2020)

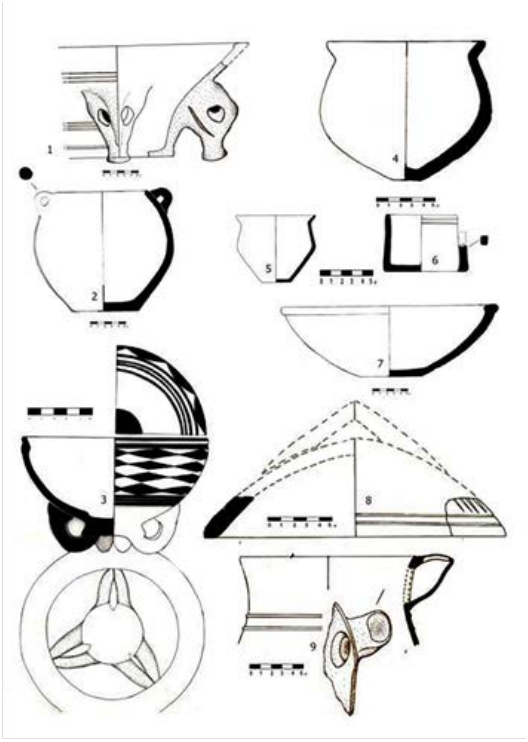

Figure 13- Selected pottery of Qoli Darvish VI (Sarlak 2020)

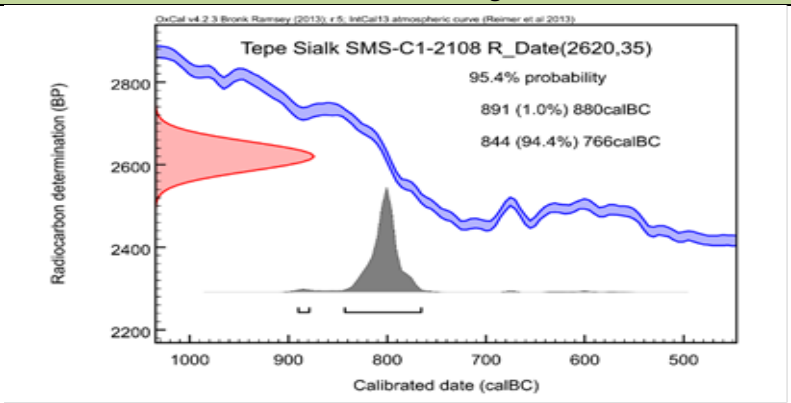

Figure 14- Recent 14C date from Tepe Sialk (South)

Figure 15- Reconstructed pots from the oval grave, Estark (Hoseinzadeh et al. 2017)

Figure 16- Ordinary Burial and Pit A for Cremated Remains in the Oval Stone Structure of Trench A, Estark.

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شمال و جنوب مرکز فلات ایران در هزاره سوم و دوم پیش از میلاد (۳۲۰۰-۱۵۰۰ ق.م)

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چکیده

جوامع نواحی شمال و جنوب «مرکز فلات ایران/فلات مرکزی ایران» در ربع آخر هزاره چهارم پیش از میلاد به نهایت شکوفایی رسیدند. این شکوفایی با ظهور سیستم‌های اجتماعی پیچیده، تجارت با مناطق دور دست و نظام های جدید در مدیریت فعالیت‌های اقتصادی، مانند «سیستم نوشتاری اولیه آغاز عیلامی» مشخص شد. این شواهد این دیدگاه را تأیید می کند که ساکنان فلات ایران در این زمان با یک سیستم نوشتاری نسبتاً یکنواخت و سازمان اقتصادی مشابه به یکدیگر متصل بودند. با این حال، امروزه می دانیم که تشابه «فرهنگ ظروف خاکستری» در محوطه های پروتو-عیلامی شمال فلات مرکزی مانند تپه سفالین، قلی درویش، میمنت آباد و سیلک نیز حاکی از ارتباطات بین منطقه ای، فراتر از دوره «آغاز عیلامی» است. به هرحال به نظر می رسد که این جریان فرهنگی در طی هزاره سوم پیش از میلاد دچار گسست شده و جمعیت ها پراکنده شده و نظم نوینی جوامع انسانی را فراگرفته بود. اطلاعات کنونی نشان می‌دهد که بیشتر سکونت‌گاه‌های مس سنگی در حدود ۳۴۰۰ سال قبل از میلاد به تدریج متروک شدند، به طوری که جوامع انسانی هزاره سوم رویگرد دیگری را برای تطابق با محیط پیرامونی خود تجربه کرده بودند. به نظر می رسد که یک چنین تغییرات اجتماعی ممکن است با رویدادهای اقلیمی در ربع آخر هزاره چهارم قبل از میلاد (5.2ka) مرتبط باشد، که مشخصه آن خشکی و افزایش فعالیت بادی است که سیستم کشاورزی را بی ثبات کرده بود. همان طور که ویداله فرض کرد (Vidale et al 2018) تکامل اجتماعی فلات مرکزی، بر اساس شبکه های غیرمتمرکز در طول دوره مس-سنگی و اندکی پس از ۳۰۰۰ سال قبل از میلاد خاموش شد، اما در مدت کوتاهی دوباره شکل نوینی بخود گرفت که متفاوت از دوره قبلی بوده است. این مقاله با مرور کشفیات اخیری که در شمال فلات مرکزی صورت گرفت سعی نموده است که ضمن ارائه یک گاهنگاری جدید برای منطقه، تحولات فرهنگی آن را نیز با رویکرد دیگری توضیح دهد. در این مقاله، تحولات اجتماعی درون منطقه‌ای و ارتباطات فرهنگ مادی بین منطقه‌ای را براساس داده های جدید شرح داده است.

واژه های کلیدی: شمال فلات مرکزی، عصر مفرغ، قلی درویش، استکرجوشقان، تپه سرم، تپه پردیس، سفال خاکستری، آغاز عیلامی.

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In Search of the Message of Srōš: Investigation of the Deity Srōš and his Iconography During the Sasanian Period

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Abstract

Srōš is a great Zoroastrian diviniy in the Avesta and Middle Persian texts. He functioned as a warrior and a fighter against evil, a high priest, and one of the judges of the soul in the afterlife. In the Avesta, four separate hymns are dedicated to Srōš, which implies his important position among the Zoroastrian divinities. The name of Srōš survived as a divine messenger in the Iranian literature of the Islamic period. However, Srōš's name was missing in royal inscriptions, and his name did not appear among the pantheon of Iranian divinities in Greek, Roman and Syriac sources. Due to this absence, the status of Srōš in ancient Iran and his possible visual representation has not given due recognition or attention. In this paper, first the characteristics and functions of Srōš in Zoroastrian literature studies are described. Then, on the basis of Zoroastrian textual sources, and Srōš's status and iconographic evidence in pre-Sasanian Iran and in eastern Iran, and his possible visual representation is investigated during Sasanian period. The results of this study indicate that Srōš was probably depicted both anthropomorphically (charioteer motif) and non-anthropomorphically (the rooster and ear motif), and these images were inspired by Zoroastrian beliefs.

Keywords: Srōš, Avesta, Middle Persian Texts, Rooster, Ear, Divine Chariot.

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Introduction

Srōš is one of the prominent deities in the Zoroastrian pantheon. According to the Gāhān, the Younger Avesta, and Middle Persian texts, he has numerous abilities and qualities. His name appears both as an abstract concept signifying "obedience" or "hearkening", and as a proper name of the divinity. Srōš also maintains special position in Islamic literature as a "divine Messenger". Despite numerous references to him in Zoroastrian sources, many questions arise about the presence of Srōš in archaeological evidence. What was the real status of Srōš among ancient Iranians? Did he have a particular visual manifestation? If so, how was he depicted, and according to what artistic and religious patterns? Furthermore, during the Sasanian period, in which Zoroastianism flourished and visual representations of Zoroastrian deities were part of Iranian culture, what is our knowledge about Srōš?

Clearly, providing explicit answers to these questions encounters problems. Ancient Iranians preferred to preserve and propogate their religious compositions orally. This would be a lost opportunity to discern their beliefs and cults for a modern scholar. Moreover, the present Avesta is not a complete scripture; rather, it is a compilation dating to the Sasanian period. Unfortunately, most of our religious knowledge is limited to royal inscriptions and art, while we have little idea of the other people in society. The royal class mainly chose special gods as their protector. As a result, studying the real status of other divinities, including Srōš, and the identification and interpretation of artistic scenes in various media becomes difficult. It is possible that, in spite of importance of some deities, they do not have any visualization, or perhaps, their figures and symbols have been forgotten today. In addition, our unawareness of artistic patterns for providing religious representations makes distinction between mortal and immortal images complicated.

Considering Zoroastrian scripture, linguistic and archaeological evidence related to Srōš both in pre-Sasanian Iran and in Eastern Iran, the present paper discusses the status and iconography of Srōš in Sasanian period.

Srōš; the status and functions in the Avesta and Middle Persian texts

The word "Səraoša-" in the Gāhān (Kreyenbroek 1985: 7), "Sraoša-" in the Younger Avesta (Srōš Yasn, Rashed Mohassel's annotation 2003: 9), and Srōš in the Pahlavi texts (Kreyenbroek 1985: 108) is a masculine name (Srōš Yasn, Rashed Mohassel's annotation 2003: 9), drived from "Srav-", meaning "to hear, hearing and obedience", especially "hearkening and obedience to god's commands". The name thus denotes one of the greatest divinities in Zoroastrianism who is also a symbol of hearing, compliance, and personification of piety and honesty (Avesta, Doostkhah's annotation 2013: 1007). In the Gāhān, Srōš is mentioned seven times as a general or proper name (Kreyenbroek 1985: 7). He is one of the few gods named in this part of Avesta, and except for Ashī, no other God has earned this privilege (Srōš Yasn, Rashed Mohassel's annotation 2003: 8). In Gāhān, Srōš entitled as "the most excellent amongs (all yazatas)" (Y. 33.5), and the one who come for assistance (Y. 33.5) and "accompanied by rewards" (Y. 43.12).

In the Younger Avesta, four verses were dedicated to Srōš that allude to his prominant place in Zoroastrianism. These include the "Srōš Yašt Hādoxt"

(Yt.11), and the “Srōš Yašt sar-e Šab” (Y.57) which is quite lengthy, and recited on the first three nights after death, and every night before sleep throught the year. There is also the verse known as “Srōš Darūn,” including six chapters (hāt) of Yasna (Y.3-8), and the “Srōš bāj” or “Nirang-Dast-sho” in the Khordeh Avesta that was recited every morning after getting up, appreciating Srōš for his guardianship and protection throughout the night. Furthermore, all the prayers of the Zoroastrians, in particular, the prayers related to the ceremonies of deceased begins with Srōš bāj (Avesta, Doostkhah’s annotation 2013: 1008-1009).

In addition, Yasna 56 is fully dedicated to Srōš, despite not bearing his name. In the Younger Avesta, Srōš has more functions and abilities: “the one who accompanied by rewards” (Y. 1.7; Y. 3.1, 9; Y. 4.12; Y. 7.1, 9; Y. 56.3, 4; Y. 57.2; Yt. 2.5; Ušahin gāh.2; the smaller Sr.7), “and the one who come for assistance” (Yt. 11.8), “the one whose speech is good, whose speech gives protection, whose speech is timely, who was made sovereign through all-adorned wisdom, having full knowledge” (Y. 57.20), “the one who fashions a strong house for the pious man and woman after the setting of the sun” (Y. 57.10), “The best protector of the pious” (Yt. 11.3), “the vanquisher of the kayaδa-sinner, the vanquisher of the follower of the kayaδa-sinner” (Y. 57.15; Yt. 11.10), “the guardian and supervisor of the promotion of all wordly creature” (Y. 57.15; Yt. 11.10), “the protecter in both lives (material and spiritual)” (Y. 57.25), “the one who, never sleeping, vigilantly, protects Mazdā’s creations” (Y. 57.16; Yt. 11.11), “the one who, with upraised weapon, protects the entire material existence, after the setting of the sun” (Y. 57.16; Yt. 11.11), “the one who has not slept (afterwards) since the two spirits created, the Bounteous one and the Evil one, watching over the world of righteousness” (Y. 57.17; Yt. 11.12), “the one who because of his strength and victoriousness, familiarity (with religious matters), and knowldege, the Aməša Spəṇta came down to the earth of seven countries” (Y. 57.23; Yt. 11.14), “the one who watches over the truces and treaties between the Drug and the most Bounteous (spirit)” (Yt. 11.14), “the one who smites Aēšma” (Y. 57.10, 25, 32; Yt. 11.15), “the one who smites Druz” (Y. 57.15; Yt. 11.3, 10), “the one who smites Kunda” (Vd. 19.41), “the one who smites Bushyasta” (Vd. 18.14-17, 22-25), “the one who smites Vidhatu” (Y. 57.25), “the one who smites Mazainya” (Y. 57.17, 32; Yt. 11.12), “the assistant of Mithra in battles” (Yt. 10.41). According to Nyberg, Srōš takes up a large part of the duties of Mithra in the later Zoroastrian tradition (1938: 61); as a result, the role of Mithra diminished and Srōš reached a higher status (*Ibid.*: 66). Srōš is also among the Avestan deities who owns a chariot; “[his chariot] is drawn by four white, radiant, transparent, bounteous, knowing steeds, casting no shadow, belonging to the spiritual realm. Their hoofs of horn are inlaid with gold” (Y. 57.27).

In the Middle Persian texts, the importance and special status of Srōš is preserved. As mentioned in the Pahlavi Rivāyat accompanying the Dādestān ī Dēnīg (PRDd. 56.3), “Srōš should be worshiped separately”. In the Dēnkard (Dk III. 312) and the Zand ī Wahman Yasn (ZWY. 7.20), Srōš is a messenger from Ohrmazd. In the Bundahišn (GBd. 11:112), Dâdistân-î Dînîk (Dd. 28.5) and Pahlavi Rivāyat (PRDd. 56.3), Srōš is called "the lord and ruler of (this) world". According to these texts, he has duties toward deceased, such as protecting their soul against demons. It recommended to recite the Srōš Yašt during the first three

days after death, because when the soul separates from the body, only Srōš will be able to save it from the hands of the demons (ŠnŠ. 17.3). It is said that on the fourth day, in the light of dawn he is one of the deities accompany the soul to Činwad-puhl (MX. 1.115), and mediating along with Mihr and Rašn (MX. 1.118). Srōš is one of the the judges of afterlife who performs the accounting with Hormūzd, Vohu Manah, Mihr, and Rašn (Dd. 30.10). After judging the deeds, the souls of the righteous will pass over the Činwad-puhl with the cooperation of Srōš (MX. 1.124; GBd. 11:112). According to Handarzīha ī Pēšīnagān, Srōš takes those to paradise whose good deeds (Kerfah) are more than their guilts (Orian 1992: 84). One of the other texts indicated the role of Srōš in afterlife is the Book of Ardā Vīrāz (Ardā Vīrāz Namag). On the first night after death, Srōš, along with Ādur, meets Ardā vīrāz (AWN. 4.1), and conducts him through the soul-journey to heaven and hell. The ruwān (soul) of Ardā vīrāz then crosses the Činwad-puhl with the assistance of Srōš and Ādur (AWN. 5.2). Srōš is also attested as one of the collaborators of Arta Vahišta (GBd. 4:49). While the Amәša Spәntas stand on either side of Ohrmazd, Srōš stands in front of him (GBd. 11:109). Srōš is mentioned in the Shāyist Nāshāyist (Shāyest nē Shāyest) as the smiter of demons and the destroyer of greed, wrath and want (ŠnŠ. 22.17). In the Zand-i Wahman Yasn, under the command of Ohrmazd, Srōš and Nēryōsang cry out three times, and upon the fourth time wake Sām up from sleep (ZWY. 9.20-22); in other words, they rescue him from Būšāsp. Srōš is especially in opposition to Xēšm (GBd. 6:55). His weapon is a club and bears upon the heads of the fiends (Vd. 19.15).

The representative of Srōš on Earth is a rooster (Avesta, Doostkhah's annotation 2013: 1008). In Vendidad (Vd. 18.22-25), Ādur, the son of Ahuramazdā, on the third part of the night, calls the holy the Srōš for help. He himself wakes up the bird named Parūdarš[(1)]; then it lifts up his voice against the mighty Ushah. In Bundahišn, the rooster and the dog cooperate with Srōš in destroying the fiends (GBd. 9:103). In the Mādayān ī Yōšt ī Friyān, "the rooster called the bird of righteous Srōš, and when it crows, it keeps misfortune away from the creation of Ohrmazd" (MJF. 2:24). In the Pahlavi text, Drāyišn i Ahreman ō Dēwān, Srōš claps his hands to the rooster; and when the rooster crows, the Warahrām fire smites one part and the house-fire, when they kindle it at midnight, (smites) one part; Srōš smites all the rest (Anklesaria 1957: 134).

The name of Srōš is also found in the Islamic literature as the messenger of freedom, and the message-bearer of God (Rashed Mohassel 2003: 9). There is a major caveat to this interpretation, however, insofar as the majority of the appearances of the name Srōš in the Šāhnāmeh cannot be considered exclusively as the Zoroastrian deity; rather sometimes Srōš simply refers to a general name meaning "angel" (Heydari and Qassempour 2014: 132-133).

Iconographical Descriptions of Srōš in the Zoroastrian texts

In the Avesta and in Middle Persian texts, the anthropomorphic characteristics of Zoroastrian deities are very limited, and mainly related to their characters, attributes, and functions. This is true of Srōš. Among descriptions of the texts, there are two types of images related to him. First, as a warrior, as in the Avesta, Srōš described with the characteristics of mighty men of valor, martial, and in an armed form:

"The strongest of young heroes, the bravest of young heroes, the most active of young heroes, the swiftest of young heroes, the most dreaded afar of young heroes" (Y. 57.13), "the brave, the valiant, the warrior endowed with strength of arm" (Y. 57.33; Yt. 11.19), "the swift, the strong, the bold, the powerful" (Y. 57.11), "the one with hard weapon" (Y. 3.20; Y. 4.23; Y. 7.20; Y. 57.1; Yt. 11.23; Yt. 13.85; Srōš bāj 1, 4; the smaller Sr.17; Vd. 18.14), "the one who with a shattering weapon, inflicts a bloodless wound on Aēšma" (Y. 57.10), "the one who has a weapon in his hand, sharp-edged, good to thrust against the evil heads of the demons" (Y. 57.31), "the one who with upraised weapon, protects the entire material existence" (Y. 57.16), and the warrior beside Mithra (Yt. 10.41, 100). The weapon of Srōš is a club, which implies the military nature of his personality, and he uses it to smash the heads of demons (Vd. 19.15).

The second type of iconography associated with Srōš is that of the Zoroastrian clergy. In Avesta (Y. 57.23; Yt. 11.14), he is described as a "teacher of religion" and "to him Ahuramazdā taught the religion" (Yt. 11.14). Moreover, Parūdarš is the Sroaš's Sraošuuarəza(2) (Vd. 18.14). In Bundahišn, Srōš is Raspi (3) and placed after Ohrmazd, who come to the world as Zot(4) (GBd. 19:148). This position provided him another weapon to destroy demons, and it is invocations and prayers (Y. 57.22).

Archaeological evidence of Srōš in pre-Sasanian Iran

Despite the special position and respected status of Srōš in the sacred Zoroastrian texts, he has not been unambiguously recognized in archaeological evidence. So far, a few images have beenattributed to Srōš, but none definitively. One of the earliest images attributed to Srōš is one of the Lurestan bronzes: an idol with a human head strangling two monsters and flanks by the heads of two roosters-(Ghirshman 1963: 41-45). As Kreyenbroek points out, however, "this identification can only be regarded at present as a rather speculative hypothesis" (1985: 176). In the Achaemenian era, on one of treasury tablets from Persepolis which bears Elamite inscription, the toponym "šu-ra-u-šá" is mentioned (Hallock 1969: 431, PF.1541), which Hinz (1973: 79) related to the Zoroastrian deity Srōš. The name of Srōš also attested as part of a personal name in a Greek papyrus from Hellenistic Egypt (Huyse 1990: 130). His name appears in several anthroponyms on the Parthian ostraca from Nisa (Kreyenbroek 1985: 179; Schmidt 2013: 252, 256, 260, 263). However, no representations of Srōš has yet been discerned.

Archaeological evidence of Srōš in Eastern Iran

In Eastern Iran, more conclusive evidences suggesting an assosiotion between this region and the reverence of Srōš. One of the oldest images attributed to Srōš is attested in a wall painting at Akchakhan-Kala in ancient Chorasmia. Although the scene was damaged but three colossal gods can clearly be detected. The figure on the left wears a tunic, which its central vertical band adorns with repeated motif of pairs of bird-priests–half-bird, probably rooster, and half-man covering his mouth with a padām, while holding a barsom and in one case a short whip in the hands (Fig.1). The motif of bird-priests recurred later in Sogdian art in several of Samarkand's ossuaries and Sino-Sogdian tombs. This hybrid figures usually hold a barsom and stand symmetrically beside a fire alter. Similar bird-priests were depicted in the wall painting of Bamiyan, but there they carry a torch (Grenet *et al.* 2004: 275). Skjaervø first associated this motif with Srōš. He

referred to Vendidad 18.14, in which Parūdarš is the Sroaš's Sraošuuarəza (*Ibid.*: 278). This identification has been approved by other scholars (Grenet 2007b: 470-471; Riboud 2012; Minardi 2021), however, Shenkar avoids attributing this motif to Srōš. He believes that bird-priests are not divine images, but if one insists on their divine interpretation, Srōš is not the only theoretical possibility, and Haoma can be regarded as well (Shenkar 2014: 148). Due to the motif of Parūdarš on Srōš's tunic, the figure at Akchakhan-Kala regarded as an individual personification of Srōš (Grenet & Minardi 2021: 160-163). Moreover, he is depicted armored, which corresponds to his warrior character described in Zoroastrian texts.

Srōš was also known in Bactria. In the inscription recovered from Rabatak, he occupied the fifth place among the seven deities, each of which having a statue erected in the temple by the Kushan king, Kanishka (Sims-Williams 2004: 56).(5) This inscription is significant because it indicates that Srōš worshipped as a cultic statue (Shenkar 2013: 220). Furthermore, in the Rabatak inscription, between lines 9 and 10, and immediately after the last letter of Srōš's name, there are traces of an additional interlinear inscription in small letters, mentioned Indian gods Mehāsena and Višākha (Sims-Williams 2004: 64). Most of the scholars have related these Indian gods of war and sacred wisdom to Srōš (Grenet 2006: 88; Gnoli 2009: 151). This connection is evident in Gandhāran art, which depicted Skanda dressed in armour, holding a spear and a rooster or other bird (Mann 2001: 118- 119). Skanda also appeared on a Kushan seal (Fig.2), dressed in armor while holding a spear and shield with a large rooster on it. In the Kushan numismatic pantheon, the name of Srōš is absent, but he is represented under the title of his Indian counterpart, Mehāsana (Mann 2001: 121; Shenkar 2013: 214- 215). On the reverse of gold coins of the Kushan king, Huvishka (Fig. 3), Mehāsana holds a standard with a bird (rooster)(6) finial, and clasps the hilt of a small sword with his left hand (Rosenfield 1967: 79). In the Iranian literature, birds are often associated with warrior-gods (Mann 2001: 119). Srōš, who has a warlike character and has been emphasized as the vanquisher of demons in sacred Zoroastrian texts (Shenkar 2013: 215), he has coworkers such as rooster (7) (Vd. 18.22-25; GBd. 9:103; MJF. 2.24).

In addition to bird-priests, Srōš has other anthropomorphic representations in Sogdian art. On a fragment of an ossuary (Fig. 4) discovered in Samarkand area, the scene of judgment of the soul in the afterlife depicted as described in the later Pahlavi texts (Grenet 2002: 94). Srōš wears a crenellated crown like his image at Akchakhan-kala. He has a small portable altar/incense burner, and with his left hand, grasps the hand of a figure who unfortunately is missing because of a fracture in the ossuary. Both are facing left toward Rašn. He has a crenellated crown, and holds a scale in his hand (Pugachenkova 1994: 238; Grenet 2002: 94; Shenkar 2014: 146)(8). Srōš was also identified in two wall paintings from Panjikent; although these attributions are not certain (Shenkar 2013: 218). In the first image (Fig. 5), Srōš (?) is portrayed as a statue carried in a procession. The statue is shown above a large codex or a litter decorated with two divine figures, as if rising from it. He holds a mace in his right hand and probably an altar or a portable incense censer in the other hand. This image corresponded closely to the Avestan title of Srōš, "Tanu. Mąθra" (9) (Grenet 2007a: 170). In another tentative

image (Fig. 6), Srōš (?) has a nimbus surrounding his head and mounts on a bird, maybe a rooster (Shenkar 2013: 218). Furthermore, names containing the theonym Srōš in Bactria (one name), Topraq-Qal'a, Chorasmia and Sogdiana (Shenkar 2014: 146), indicating that he was known widely in Eastern Iran.

Archaeological evidence of Srōš in Iran during Sasanian period

In Sasaian royal inscriptions and in the inscriptions of Kartīr, the high clergy of early Sasanian, only the names of Ohrmazd and Ānāhītā are mentioned (Humbach and Skjærvø 1983: 9.19; Skjærvø 2011). Thus far, except for the images of Ohrmazd at the Naqš-i Rustam rock relief (Back 1978: 282) and Mithra on a seal (Callieri 1990: 87), no other deity has definitely been attested by inscriptions. However, these are exceptional cases, and commonly there is no explicit mention of the name of deities, instead, their attributes and functions indirectly refer to their identity. Obviously, it would be necessary to interpret such inscriptions through Zoroastrian texts. The best example is attested in Kartīr's heavenly journey mentioned in the inscriptions at Sar Mašhad and Naqš-i Rustam. During his journey, Kartīr encounters divine characters whose identity have been suggested according to the Avestan and Pahlavi texts, in particular, Ardā vīrāz nāmag and Aogəmadaēca (Kellens 1973: 136; Kellens 1975: 466-467; Skjærvø 1983: 294-304; Russell 1990: 186; Shaki 1994; Shaked 1994: 36; Shenkar 2014: 54, 94, 140, 159, 163). This limitation draws attention toward other epigraphic evidence such as inscriptions on seals,(10) as well as the theophoric component in personal names or place names, and uses them as important and valuable resources for understanding the importance and popularity of Zoroastrian deities.(11) Despite having enjoyed a significant status in Zoroastrianism, Srōš was among the deities whose name was not mentioned in Sasanian royal inscriptions nor contemporary Greek, Roman, and Syriac sources. However, the name of Srōš was used in combination with a few personal names in Sasanian period (Kreyenbroek 1985: 179).

In Sasanian art, Srōš was not depicted similar to his images in Chorasmian, Kushan and Sogdian art, but the rooster (Fig.7) is among the most popular motifs, especially on seals. Ackerman (1964: 807) raises the possibility that the images of rooster on seals refers to "Parūdarš". According to Shenkar (2014: 145), if the image of Srōš presented in Sasanian art that would have been related to the rooster. Grenet (2014: 115) proposes the image of Srōš in a scene showing a rooster holds a scorpion with its beak. In Zoroastrian literature, whether in earlier texts such as Shāyist Nāshāyist (ŠnŠ. 10.9) and Pahlavi Rivāyat (PRDd. 58.81) or in later texts such as Saddar Nasr (34.3) and Saddar Bundehesh (83.4), and Ravāyāt-ī Dārāb Hormazdyār (Unvâlâ 1922: Vol. I: 265), the rooster was considered as a sacred animal, and killing him severely sanctioned, indeed, regarded as a great sin. Additionally, keeping a rooster at home is advised (ŠnŠ. 10.30) since it prevents Darūj from finding a way into that house (Unvâlâ 1922: vol.II: 413). Therefore, the motif of a lady feeding a rooster with a bunch of grapes on a Sasanian seal is probably the demonstration of such a belief (Koulabadi 2017: 610)(12). There are several reasons for the relationship between Srōš and roosters. The most important is Zoroastrian texts including the Vendidād, Bundahišn, Matikān-ī Yosht Fryān, and the Pahlavi text about Drāyišn

ī Ahreman ō Dēwān, which refers to the rooster—Parūdarš—as the pet animal of Srōš. In addition, on Huvishka coins and a Kushan seal, the rooster is depicted on the weapon of Mehāsaneh, the counterpart of Srōš. The image of bird-priests also consisted of a rooster and human. However, the image of rooster may have been completely unrelated to Srōš. According to the Kārnāmag ī Ardaxšīr ī Pābagān, Ādur Farrobay ī pērōzgar (victorious) was appeared as a red rooster to Ardaxšīr I in order to save him from the poisonous drink.(13) Moreover, not every image of animals in Sasanian art, including roosters, was necessarily related to a special divinity. As Shenkar has noted, no inscription accompanied the animals and the images did not appear in clear cultic contexts. Some animals may be depicted just because they serve as totems (Shenkar 2008: 241-242), emblems of natural power, exotic interest, aesthetic purpose, apotropaic significance, folkoric meaning, astrological signs, or economic beneficients and their associations with human life (Brunner 1979: 34-35).

Another motif probably associated with Srōš is the depiction of an ear on Sasanian seals. The representation of parts of a human body such as hands, eyes and ears is a major part of Sasanian glyptic art. Unfortunately, no inscription accompanied any of these scenes; as a result, the definite meaning is not clear. However, the presence of other symbolic elements (e.g., flowers, birds, ribbons, wings, etc.) in association with the motif of the hand reinforces the suspicion that these images were not meaningless. Grenet (2014: 115) believes that the motif of the ear on Sasanian seals (Fig. 8) is probably a reference to Srōš. The authors consider this interpretation likely, since Srōš is derived from the root "*Srv*-" meaning "to hear, hearing and obedience", especially "hearing and obedience to the God's commandments and words". However, one should not overlook that one of the prominent attributes of Mīthra repeated in the Avesta is: "having a thousand ears and ten thousand eyes". Therefore, relating the ear motif to Srōš is not definite, but not impossible either.

Interestingly, another image seems to be related to Srōš is engraved again on a seal. A beardless male head in full frontal view is depicted above the protomes of two birds—probably roosters—facing in opposite directions and in profile (Fig. 9). As Shenkar notes, "a frontal bust above two juxtaposed animal protomes is a conventional symbolic representation of divine chariots in the Sasanian sigillography". However, unlike other divine chariots depicted in Sasanian seals (the chariot of Mithra and Māh), the chariot in this seal lacks any wheel, presenting instead a more abbrivated form of the similar divine chariot (Shenkar 2013: 212). The seal bears an inscription "Farrbay" (Gignoux and Gyselen 1982: 143). Brunner (1979: 35), for the first time attributed the motif on this seal to Srōš. Shenkar (2013: 212-13) believes that the clue for identifying this person is the mounts of his chariot, and since in Zoroastrian tradition, the rooster is most closely associated with Srōš, he considers this image as Srōš. According to the Kārnāmag ī Ardaxšīr ī Pābagān which Ādur Farrobay ī pērōzgar was appeared as a red rooster, and also the name "Farrbay" on this seal, Grenet believes that the character depicted on the seal could in fact be an anthromorphic representation of Ādur Farrobay or manifestation of Adūr. However, according to Shenkar (2013: 212-213), Farrobay (alone or as a part of a compound containing

it) is a common personal name on Sasanian seals; therefore, the relation of this name to the image of the seal may be purely coincidence.

The divine chariot is an ancient motif occurring in Urartian, Assyrian, Babylonian, Greek, Roman, Indian, and Iranian art. A few images of divine chariots have been attested in ancient Iran. The Hasanlu Bowl is one of the oldest instances showing the gods riding chariots (Winter 1989). During the Parthian and Sasanian periods, the image of Dionysus riding a chariot originating from Roman and Byzantine world appeared on silver vessels (Ettinghausen 1972: 4-5; Gunter and Jett 1992: 121-125). Other representations of divine chariots are found on a number of Sasanian seals (Herzfeld 1920: 108; Goldman 1988: 100; Callieri 1990: 87; Gubaev *et al*. 1996: 56), and on a unique ossuary from Bīshāpūr (Ghirshman 1948: 298). Litrary sources also refered to divine chariots. According to the classical historians (Herodotus 7.55, Xenophon 8.3.12, Curtius Rufus 3.3.7), one of the special royal military processions during the Achaemenid period was the moving of empty divine chariots drawn by white horses. Divine chariots were mentioned in Zoroastrian texts as well. In the Avesta, Anāhītā (Yt. 5.11), Mithra (Yt. 10.67-68, 76, 112, 124-125, 128-132, 136, 143), Srōš (Y. 57.27-29), Ashī (Yt. 17.1, 21), Pārandi (the smaller Sīrūza.25; the bigger Sr.25), Drvāspā (Yt. 9.2) and Wayu (Yt. 15.56), and in Bundahišn (GBd. 6:56; 7:58-60), the deities of Xwaršēd and Māh owned chariots drawn by horses. The innovation in the imagery on this seal is in having roosters as the animal drawing the divine chariot. As discussed earlier, rooster is a sacred animal related to Srōš, but in the Avesta horses draws the chariot of Srōš. This contradiction is also seen in other divine chariots depicted in Sasanian art. For example, the chariot of Mithra was drawn by two winged horses on several seals and the ossuary from Bīshāpūr, and the chariot of Māh harnessed to bulls on a seal. These images do not correspond exactly with Zoroastrian texts, since in Mihr Yašt, four horses drawing the chariot of Mithra and in Bundahišn, despite the close connection between bulls and Māh,(14) the animals drawing the chariot of Māh were horses. It seems that the Sasanian chariots of Mithra and Māh borrowed their visual appearance from the Graeco-Roman chariots of the sun god Helios and the moon goddess Selene (Goldman 1988: 88). It is noteworthy that the motif of solar and lunar chariots is a popular theme across widespread territories. Unlike Mithra and Māh, Srōš had no counterpart in the non-Iranian world that directly influenced his vehicle. The only source that refers to him as “the owner of divine chariot” is the Avesta. Since there is no complete correspondence between the Zoroastrian texts and religious illustrations, it is not strange that an animal other than horse draws the chariot of Srōš. Moreover, the rooster is the assistant of Srōš, so it is probable that the portrait on this seal belongs to Srōš who drives his own chariot, a vehicle that is pulled not by horses but instead by roosters.(15)

Conclusion

The present paper suggests that despite the special place of Srōš in the Avesta and Middle Persian texts, and notwithstanding the persistence of his name in later Iranian literature, Srōš is almost absent in pre-Sasanian monuments (inscriptions and visual representations), as his name appears only in several anthroponyms and potentially in one toponym. Similarly, during the Sasanian period, no inscriptions or iconographic representations are known to refer directly to Srōš. The name of

Srōš is attested in very few personal names as a theophoric component. Yet, the archaeological evidence reflects only a small part of ancient religious life. Since most of the remaining monuments do not have inscriptions or images represented symbolically, they are not easily interpreted. Considering all the available sources including images of Srōš found in Eastern Iran together with references from Zoroastrian literature, three forms of images can be attributed to Srōš, although none of these is definitive. First, the rooster, was a very favored motif during the Sasanian period, especially on seals, which in some cases may have refered to Srōš. Second, the image of ear on seals, although its connection with Mihr can not be discounted. The other is an anthromorphic representation of Srōš on a seal showing frontal view of a male head above a chariot drawn by roosters.

Endnotes

1. The word “Parūdarš” which is also seen in the Dēnkard (Dk VIII. 44.69) means “the foreseer of the dawn” (Dk VIII. West’s annotation 2013: 163). In the Bundahišn, the rooster is called “Pēš-daxšag” (GBd. 9:85), which means, "having the first sign.” It refers to the morning crow of rooster (GBd. Tafazzoli's annotation 2011: 181). According to the Vendidad (Vd. 18.15, 23), the ill-speaking people call this bird kahrkatās, which means “when he is not called so, he is powerful" (Avesta, Doostkhah’s annotation 2013: 848).
2. A Mobad stands up in front of Zot when he reciets the hymn to Sroaš (Kreyenbroek 1985: 160).
3. A Mobad holding second position in religious ceremonies (GBd. Tafazzoli's annotation 2011: 196)
4. A Mobad holding highest rank in religious ceremonies (GBd. Tafazzoli's annotation 2011: 196)
5. The deities listed in Rabatak inscription are, in order, Umma, Aurmuzd, Muzhduvan, Sroshard, Narsa, and Mihir.
6 . Here the rooster “symbolizes the solar energy and the agitation of young warriors” (Grenet 2015: 221)
7. In Bundahišn, the dog is another familiar of Srōš (GBd. 9:103).
8. Pugachenkova (1994: 238) believes that Mithra and the soul of the deceased portrayed in the missing part of the ossuary.
9. “Tanu. Mąθra” meaning “having the sacred word for body” (Kreyenbroek 1985: 166).
10 . The legends on Sasanian seals such as, "Reliance on Mithra" (Bivar 1969: 80), “Burz Mithra”, and “Adur Mithra” (Frye 1978: 210) can be regarded as evidence of the prominent status of Mithra.
11. "The use of theophoric names as an index to the historical conditions of a religion is, of course, beset with many difficulties. The chance occurrence of a name, compounded with the name of a deity, in an inscription could be misleading, but the repeated appearance of various theophoric names, yet compounded with the name of the same deity, could be used as an indication of the popularity of that deity in naming children" (Frye 1975: 62).
12. Grenet (2013: 203) identifies the lady as Daenā and the rooster as a symbol of Srōš.
13. See: KAP. 9.11. Some scholars reads “red hawk” instead (See: Nöldeke, 1878: 59; Horne, 1917: 244; Russell, 1987: 310)
14. See: Avesta (Yt. 10; Māh-Nīyāyeš) and Bundahišn (GBd. 8:65-66).
15. In the Shahnameh, Srōš is described in various anthromorphic guises. These inclue “Parī-e Palangineh Pūš” (پریی پلنگینه‌پوش) —“a fairy in garment made of leopard skin”—when he appeared to Kayōmart (Ferdowsi 1987: 23); as “a beautiful “hūrī” having very long hair with a very pleasant smell and a face as beautiful as the heavenly “hūrīs” (فرو هِشته از مُشک تا پای موی* بکردار حور بهشتیش روی) when appeared to Frēdōn (Ferdowsi 1987: 71, footnote 12); and as a “mounted man with a green garment” (همه جامه‌اش سبز و خِنگی به زیر) in an encounter with Husraw II (Ferdowsi 2007: 144).

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Fig. 1: Bird-priests on the vertical band of the God's tunic from Akchakhan-Kala (Minardi 2021: Figs. 1, 3)

Fig. 2: Skanda on Kushan Seal (Mann 2001: Fig. 11)

Fig. 3: Coin of Huvishka (Grenet 2015: Fig. 1)

Fig. 4: Fragment of the ossuary from Samarkand area (Pugachenkova 1994: Fig. 12)

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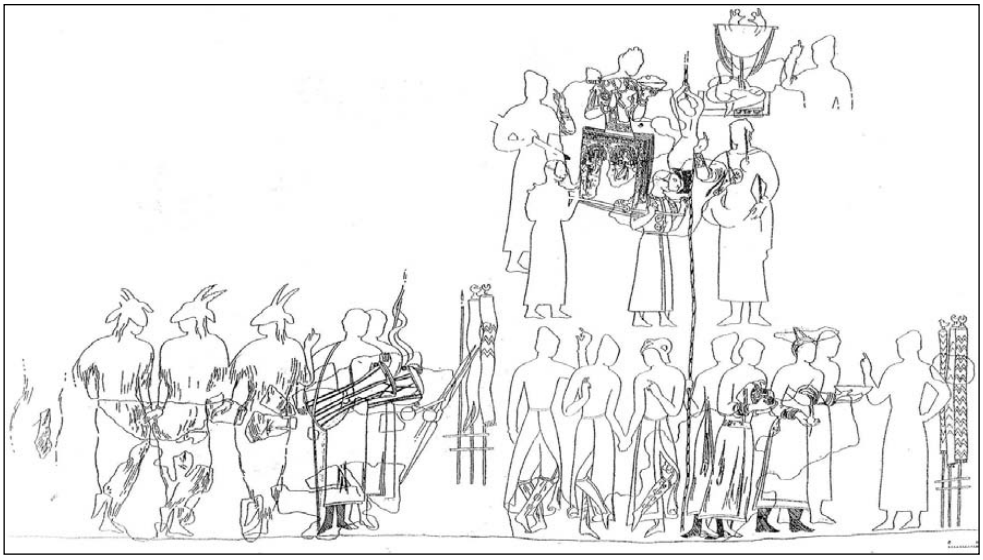

Fig. 5: A golden statue carried in a procession from Panjikent (Shenkar 2013: Fig.6)

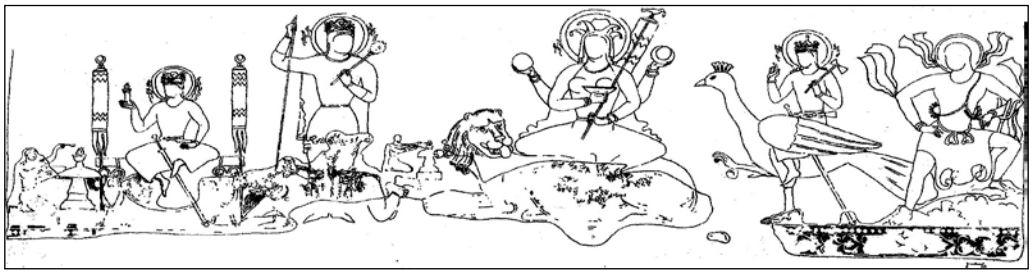

Fig. 6: A group of gods on the wall painting from Panjikent

Fig. 7: A rooster on the Sasanian seal
(Gyselen 2007, 30.G.1)

Fig. 8: An ear on the Sasanian seal
(Gyselen 1993: 10.F.1)

Fig. 9: A chariot drawn by roosters on the Sasanian seal
(Frye 1971: Pl. XXXVIII. 68)

در پی پیغام سروش؛ جستاری پیرامون ایزد سروش و شمایل‌نگاری آن در دوره ساسانی

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چکیده

سروش مظهر اطاعت و فرمانبرداری، یکی از ایزدان برجسته زردشتی است که در اوستا و متون پهلوی بارها مورد ستایش قرار گرفته و به یاری خوانده شده است. وی در کسوت یک جنگجو و ستیزه‌گر با پلیدی، روحانی عالی مقام و نیز یکی از داوران روان درگذشتگان، نقشی کلیدی و مهم در دیانت زردشتی ایفا می‌کند. در اوستا چهار سروده مستقل به این ایزد اختصاص یافته که نشان از اهمیت وی در میان ایزدان مزدیسنا دارد. نام سروش حتی در ادبیات ایران دوران اسلامی و به عنوان پیام‌رسان الهی نیز باقی مانده است. با این حال هیچ گاه از او در کتیبه‌های سلطنتی نام برده نشده و در منابع یونانی، رومی و سریانی نیز اشاره‌ای به سروش در میان ایزدان ایرانی نمی‌شود. همین امر موجب شده تا امروزه نقش و جایگاه سروش در میان ایرانیان باستان و تصاویرِ احتمالی این ایزد در آثار باستان‌شناختی آن‌گونه که بایسته است مورد توجه قرار نگیرد. در این مقاله ابتدا جایگاه، ویژگی‌ها و خویشکاری‌های ایزد سروش در متون مقدس زردشتی بررسی شده و سپس با استناد به همین منابع و همچنین نظر به جایگاه و شمایل‌نگاری سروش در ایران (پیش از ساسانی) و ایرانِ شرقی، احتمالِ وجود شمایل‌نگاری‌های این ایزد در آثار دوره ساسانی مورد ارزیابی قرار گرفته است. نتایج به دست آمده از این پژوهش نشان می‌دهد که تصاویر مرتبط با سروش به احتمال به شکل غیر انسانی (خروس و گوش) و در یک مورد با سیمای انسانی (گردونه سوار) بر آثار این دوران نمایش داده شده و این نقوش تاحدود زیادی متأثر از اندیشه‌ها و باورهای دینی زردشتی است.

واژه‌های کلیدی: سروش، اوستا، متون پهلوی، خروس، گوش، گردونه الهی.

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Qolam Tepe of Jafarabad: Recognition of the Sialk VI Satellite Site in Kashan Foothills

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Abstract

Until recently, the culture of the late Iron Age in the central Iranian Plateau had only been identified at the southern mound of Sialk. In this study, a newly discovered site, called Qolam Tepe, is introduced in the foothills of western Kashan at a very close distance to Sialk. None of the surface findings of Qolam Tepe show any era other than the Iron Age III, or there is no Sialk VI, so we have ascertained one of the satellite sites of Sialk VI. Since the Qolam Tepe is exclusively a single-period site (Iron III), given the apparent fact that the decorative bricks found in Qolam Tepe in every aspect match the decorative bricks of "la Grande Construction" of Sialk. They can be attributed to a single cultural period and are surveyed as a single chronological horizon, thus again leading to the attribution of the "la Grande Construction" of Sialk to the end of the Iron Age. Surface survey finds from this site indicate that it is contemporaneous to the Iron Age, layers 5 and 6 of the southern mound of Sialk (and Cemeteries A and B).

Keywords: Kashan, Qolam Tepe, Sialk, Sialk VI, Iron Age, Decorative Bricks.

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Introduction

Most of the southern parts of the Central Iranian plateau (i.e., the Kashan and Isfahan districts) are still unknown from the perspective of Iron Age archeology apart from the southern mound of Sialk, which was excavated more than eight decades ago (Ghirshman 1935, 1938, 1939). Recently, a reconsideration was carried out through renewed excavation (Malek Shahmirzadi 2002, 2003, 2004, 2005, 2006, 2012). There have been only a few archaeological field projects on the cultural effects of the Iron Age in the cultural zone of Kashan[1]. According to previous studies of the Iron Age in the southern parts of the Iranian Plateau, nothing could be said except Sialk of Kashan[2]. Due to the cultural credibility and significance of Sialk both in prehistoric and historical periods of the region, its meticulous investigation is required since it was (and is) an essential site in cultural climate of Kashan (also more comprehensive than that area: the center of the Iranian Plateau).

Thus, Kashan and its surrounding areas are waiting for a comprehensive archaeological survey to be fully legible on the archaeological map of the country, and to allow for near or far future field research. With such a consideration of the insignificance of the presently-available archeological knowledge, the survey and introduction of Qolam Tepe of Jafarabad of Kashan—as part of an extensive research on the geographic range of the Iron Age III cultures in the center of the Iranian Plateau—is our goal in this article. In short, all of the surface finds from Qolam Tepe indicate that we are likely to encounter one of the Sialk VI satellite settlements at this site. The site's introduction, with its remarkable surface findings—specifically decorative bricks—can play an essential role in improving our understanding of the puzzle of cultural evolution in the Iron Age of the Iranian Plateau.

Sialk: The Past and future research

Before talking about Qolam Tepe, we have to make a brief mention of Sialk; Sialk has a well-known cultural position and, perhaps there is no doubt that Sialk was a particular cultural center in the southern regions of the Iranian Plateau (Helwing 2010; Nokandeh *et al*. 2019; Fazeli Nashli and Nokandeh 2019; Fazeli Nashli *et al*. 2022; Matthews and Fazeli Nashli 2022: 396-466). A large part of the cultural reconstruction, stratigraphy, and settlement sequence, as well as our understanding of cultural evolution from the prehistory to the end of the Iron Age, are owed to the excavations of Sialk in the center of the Iranian Plateau and the excavations of Roman Ghirshman, as well as the results of the "Sialk Reconsideration Project" under the direction of Malek Shahmirzadi. What is important is that for almost 80 years, Sialk has been the only and exclusive indicator of the cultural change and transformation and evolution in this area.

Archaeology requires many comparisons and examinations to understand how many cultural changes happen, as reflected in archaeological evidence; undoubtedly, archaeological material reflects the degrees of cultural evolution. If archeology excavates only a single site of a single period, no matter how important and valid the site is (like Sialk), naturally, it will be insufficient for comparative reconstruction of its degree of cultural development and we will not be able to talk about the process of change and evolution. This is because it will not have a benchmark or criterion to measure against.[3] For a long time, due to the

lack of continuous excavations and field surveys, the archeological problem of the Iron Age was the same in the center of the Iranian Plateau. In the region, the Iron Age II and III periods were known almost exclusively from the Cemeteries A and B of Sialk and its concurrent layers on the Southern mound (Sialk V and VI).[4]

Though from about ten to fifteen years ago, with the flourishing of targeted field programs, surveys and excavations, a new door was opened to our understanding of the cultural transformation of the Iron Age in the center of the Iranian Plateau. Archaeologists succeeded in discovering and identifying other sites that were comparable to Sialk (at the same time, a bit older and slightly newer), and now, in the context of comparative research, the process of cultural change in the center of the Iranian Plateau could be rebuilt much more clearly. In the meantime, the most critical archaeological researches were in the plain of Qom and its western foothills, especially the long excavation of Qoli Darvish of Jamkaran (Sarlak and Aqili Niyaki 2004, 2005; Sarlak 2007, 2009, 2010, 2011). Moreover, there were excavations of the single stone building of Zarbolagh of Ali Abad and the survey around it (Malekzadeh *et al*. 2014); the introduction of the single stone building of Vasoon Kahak (Malekzadeh 2004a); the excavation of the Cemetery of Sarm of Kahak[5] (Sarlak 2003); the first introduction of the stone fortress of Shamshirgah of Khourabad (Kleiss1983) and its excavation (Fahimi 2003a; 2012b), as well as targeted surveys of the Iron Age of the Iranian Plateau (Manouchehri *et al*. 2013; Naseri and Malekzadeh 2013b; Naseri *et al*. 2013). The most important achievement was the recognition of the tremendous cultural complex of the "*Šahr-e Šalamūt*" of Khourabad (a set consisting of: the Stone Fortress of Shamshirgah of Khourabad, the Sarm Cemetery in Kahak, Šalamūt A Cemetery and Šalamūt B stone Platforms) where each of them reflected more unknown sides than the cultural evolution of the Iron Age in the broader perspective than our intended area.

Most importantly, the cultural materials from Qoli Darvish and the "Šahr-e Šalamūt" showed cultural similarities with the Iron Age known from Sialk. Archaeology has succeeded in acquiring such cultural material that for the first time that it has been possible to make the proceeding comparisons (Sarlak and Malekzadeh 2005, Malekzadeh and Naseri 2005). Sialk V and VI, and the enumerated sites of Qom, witnessed the evolution of a local culture of the Iron Age. This local culture has its own clear and distinctive signs.[6] These signs that are the traits of this culture,[7] and thus are not confused with other cultures of the Iron Age.[8-9] The diagnostic trait of this culture, which was known only from Sialk beforehand, has now been identified at Qoli Darvish, Shamshirgah, and Qolam Tepe, is brick architectural decorations.

Qolam Tepe: Field survey

Qolam Tepe of Jafarabad of Kashan was first identified in the field survey of the manager of the Sialk Research Center, Ms. Zahra Saroukhani, in early 2006 (Qolam Tepe, later numbered 23035 and on July 23rd, 2008 was listed in the national monuments register of Iran). Considering the importance of subsequent surface findings in the middle of March 2007, on the invitation and suggestion of the Sialk Research Center, Qolam Tepe was again surveyed more carefully by Mehrdad Malekzadeh and Reza Naseri. The surface findings of the site indicated that we were faced with the material culture of the Sialk VI period, which was

very important. Our archeological studies in Kashan, except for the southern mound of Sialk and its massive mud-brick platform ("la Grande Construction") and the Cemetery B, we did not[10] and do not[11] know of another site of this culture. Given this critical issue, for more serious research of the site and its surface findings, especially samples of decorative bricks of the Iron Age, a plan was designed and organized and carried out with the support of the Sialk Research Center under the title "Study of decorative bricks of Sialk and Qolam Tepe of Jafarabad".

Qolam Tepe is located at the latitude and longitude 33°59'01.55" and 51°16' 41.98," and is 1178 meters above sea level, about 11 km west of Kashan, after the Suk-e Cham crossroad and south side of Kashan-Mouneh road (Fig. 1). The site is an 80 × 180 meter ellipse that is located 80 meters from the south side of the asphalt road (Fig. 2); on the southwest side of the mound, aviculture and on its eastern side, there are remnants of a half-ruined workshop of sand production. The site was built up on a natural stone bed, where rocks are visible on the eastern side of the mound (Fig. 3). Almost the entire surface of the mound is covered with cultural materials (Fig. 4); the abundance of potsherds of Sialk VI type (simple and painted buff ware) and fabulous and impressive pieces of decorative bricks.

The Roads and Urban Development Department of Kashan have worked on modernizing and improving the communications of Kashan city with Niasar and other western neighboring areas in the Kuhsar-e Karkas mountains. The old axis was the third class asphalt road which is absolutely necessary nowadays to reconstruct due to increasing traffic volume between Kashan and these areas. However, road expansion between the village of Jafarabad and the Barownaq village has disturbed the delimitation of the Qolam Tepe. Before that, the fate of Qolam Tepe was like Tepe Shurabe, a mound with material culture (perhaps) older than Sialk I, which was destroyed (Malek Shahmirzadi 2003: 177-169). We should avoid further destruction by performing rescue excavations. The first goal of the probable excavation of Qolam Tepe in the future is to save the site from destruction (if this has not happened already), and in the next stages, the recognition of the action and reaction of the site with the Iron Age Sialk will be taken into account.

Architecture

The Iron Age architecture of the central Iranian Plateau has been surveyed and studied in two local architectural forms of mud brick and stone: for example, at the southern mound of Sialk, the large hilltop platform is a mud-brick structure (Hardy 1939: 25-23), as well as a recognized architectural collection similar to the structure in Qoli Darvish, is a mud-brick platform (Sarlak 2010: 167, Fig. 19; Sarlak 2011: 430, Fig. 1). Also, north of the Qom plain, in the Tehran plain, at Tepe Sofali Mamurin, everything that has been introduced and published has been indicative of mud-brick architecture (Mehrkian 1996). Besides these adobe architectures, two single structures at Zar Bolaq (Malekzadeh 2003) and Vasoon (Malekzadeh 2004a), as well as from the Shamshirgah Khowrabad fortress (Fahimi 2010), are examples of stone architecture of the Iron Age. The remnants of the destroyed architectural structures of Qolam Tepe, as it is shown on the surface, indicate the existence of a stone structure (or structures), but among the surface evidence, there is no indication of mud-brick buildings or probable adobe

structures. According to the recent dating of the stone architecture (Iron III) to the adobe architectures (Iron I and II) in the architectural traditions of the Iron Age of the central Iranian Plateau, perhaps before excavating, the buried architecture in Qolam Tepe can be related to Iron Age III.

As mentioned, unfortunately, the site was severely damaged during the adjacent road operation, and its soil was used by bulldozers for the roadbed construction. The volume of destruction was so great that there was nothing left but some rows of a stone foundation. Fortunately, the remains of stone walls can still be seen on the surface, and if the rescue excavation program is carried out, can be somewhat recognized, and the site's plan can be reconstructed (Fig. 5). A remarkable point among the architectural ruins, and indeed, across the entire mound surface is the scattering of architectural decorative bricks. The finding of these decorations of architectural structures shows that there might have been a building (monument) concurrent with "la Grande Construction" of Sialk, though of course, of smaller dimensions. We said that the change in cultural material reflected the level and degree of cultural evolution. In the archeology of the Iron Age of the central Iranian Plateau, besides changing the pottery styles—which is very much considered and analyzed by archeologists—we are also faced with other cultural materials that help us analyze the level and the development process of the cultures of the Iron Age of the region.

This collection of cultural materials contains architectural brick decorations that Ghirshman called *briques de revêtement* (Ghirshman 1939: 216), as we have previously named "decorative bricks of the Iron Age of the central Iranian Plateau" (Sarlak and Malekzadeh 2005; Malekzadeh and Naseri 2005; Naseri 2011). Such brick decorations were first discovered in the excavations of the southern mound of Sialk in the 1930s, and the first excavator of Sialk considered that they were related to great architecture of the southern mound: "la Grande Construction" of Sialk (Ghirshman 1939: pl 21, Figs. 6-5, pls 98 and 99). For seventy years, only the known samples of these architectural decorations were the same samples from Sialk (in addition to several bricks newly discovered from the same place (Noruz Zade Chegini 2002; Fahimi 2004: 87, 2005: 137), and other samples of such bricks found in that area during the continuous excavations of Qoli Darvish (Sarlak 2010:168, Fig. 20, Sarlak 2011: 500, Drawing 2) were related to the size of the architectures that the excavator of Qoli Darvish called it an "Adobe Platform" (Sarlak 2010: 163, Sarlak 2011: 395-397). In this way, along with "la Grande Construction" of Sialk and its brick decorations, the "Adobe Platform" of Qoli Darvish and its brick decorations became known (Sarlak and Malekzadeh 2005). A little later, more than 60 such architectural decorations were discovered from the stone fortress of the Shamshirgah, somewhere south of Qoli Darvish, during targeted surveys of the Qom Iron Age (Malekzadeh and Naseri, 2013). Until that moment, these architectural decorations were recognized only at three sites: Qoli Darvish and Shamshirgah in Qom district, Sialk in Kashan district. We are adding here another site with its surface findings, including such architectural decorations, to this list: Qolam Tepe of Jafarabad of Kashan.

Decorative Bricks

Decorative bricks of the late Iron Age are one of the most critical surface findings from Qolam Tepe. Previously, these decorative bricks were found only at Sialk (Fig. 7), Qoli Darvish (Fig. 8) and Shamshirgah (Fig. 9), and now Qolam Tepe is another site, which provides an indicator of architectural brick decoration traditions of the Iron Age. What is the significance of these bricks? These bricks decorated the (perhaps external) facades of large and important monuments such as “la Grande Construction” of Sialk and the “Adobe Platform” at Qoli Darvish. The finding of bricks such as the decorative bricks of “la Grande Construction” of Sialk at Qolam Tepe could probably show that a (perhaps memorable) building of the Late Iron Age was locatedhere.

The quantitative dispersion of decorative bricks among the cultural materials of Qolam Tepe surface is considerable, but since all of these bricks are of the same type and contain very similar motifs, only a limited number (19 pieces) was selected for the research.[12] The blend of bricks has mineral materials with a variable size in gray, black, and brown color, and sometimes white particles of lime, and the correct temperature was used to bake them. All of these bricks were made from red paste and have a regular buff to reddish-brown slip. Nineteen samples of the selected bricks from the surface of Qolam Tepe were of two types; the first type was the bricks that can be called decorative frames. These brick frames were composed of a simple or decorative margin along with a deep groove in the interior, and some had geometric motifs along the margin. Based on the arc of the outer and inner corners, these types of frames were likely to be used in the corners (Fig. 10a). However, the second type might contain a motif or motifs of a more central scene framed with the mentioned bricks of the first type and thus formed a picture or scene. These bricks were decorated with various combined or individual geometric designs such as parallel and crossing grooves, triangles, diamonds and circles (Fig. 10b and Fig. 11a). Among the bricks related to “la Grande Construction” of Sialk, there were samples reported in both simple brick frames and bricks with geometric decorations (Fig 11b; Ghirshman 1939, pl. 19). Unlike the semiotic typology of Sialk decorative bricks, which contained a diverse collection of geometric, plant, animal, and human motifs (Malekzadeh 1383: 21-18) the motifs of the bricks (so far found) of Qolam Tepe were totally geometric. Considering the importance of these architectural decorations, we will describe them. [Pieces are numbered like this: S.Q means Surface of Qolam-Tepe, and the number is Registration Number].

Piece S.Q.001. (Registration number: QT.85 / S.001, 12×17.4×7.8 cm), a brick of length 21, width 17.4, and thickness 7.8 cm, which is broken from four sides; the paste of this brick is reddish yellow (on the Munsell chart: 5YR 6/6 reddish yellow), and its outer slip is buff (on the Munsell chart: 10YR 7/3 very pale brown). The motifs of this brick are horizontal with the vertical carved lines, which in some places crossed each other and made square and rectangular shapes (Fig. 10; drawing 1).

Piece S.Q.002. (Registration number: QT.85 / S.002), a brick of length 17.1, width 12.3, and thickness 4.5 cm, which is not broken from the top but other sides are broken; the paste of this brick piece is red (on the Munsell chart: 5YR 6/6 reddish yellow) and its outer slip is colored from buff to pale brown (on the

Munsell chart: 7.5YR 6/4 light brown). This piece is a frame made up of a simple edge along with a deep groove at the bottom (inner side). It is probably placed in the corner depending on the arc of the outer and inner corners (Fig. 10; drawing 2).

Piece S.Q.003. (Registration number: QT.85 / S.003), a brick of length 14.7 cm, width 10.5, and thickness 4.8 cm, it is not broken from the top, but the other three sides are broken; the paste of this brickbat is buff (on the Munsell chart: 7.5YR 6/3 light brown), and its outer slip is red (on the Munsell chart: 7.5YR 6/6 reddish yellow). This piece is a frame made of a simple edge and a deep groove at the bottom (inner side) (Fig. 10; drawing 3).

Piece S.Q.004. (Registration number: QT.85.S.004), a brick of length 10.5, width 10.2, and thickness 6.3 cm, it is not broken from the top, but three other sides were broken; the paste of this brick is red (on the Munsell chart: 5YR 6/4 light reddish brown), and its outer slip color is buff (on the Munsell chart: 2.5Y 7/3 pale yellow). This piece consists of a simple edge and a deep groove at the bottom (inner side) (Fig. 10; drawing 4).

Piece S.Q.005. (Registration number: QT.85 / S.005), a brick of length 27.6, width 13.2, and thickness 4.6 cm, which is not broken from top but three other sides are broken; the paste of this brickbat is red (on the Munsell chart: 5YR 6/6 reddish yellow), and its outer slip color is buff (on the Munsell chart: 10YR 6/4 light yellowish-brown). This piece is a brick frame consisting of a grooved edge and a deep groove at the bottom (inner side). On the right side of the frame, the arc shows that the brick was likely to place in the corner (Fig. 10; drawing 5).

Piece S.Q.006. (Registration number: QT.85 / S.006), a brick of length 13.2, width 12, and thickness 4.6 cm, which is not broken from top but three other sides are broken; its paste color is buff to red (on the Munsell chart: 7.5YR 6 / 4 light brown), and its outer slip is buff (on the Munsell chart: 10yR 6/3 pale brown). This piece consists of a simple edge on the side and a deep groove at the bottom (inner side) (Fig. 10; drawing 6).

Piece S.Q.007. (Registration number: QT.85 / S.007), a brick of length 13.5, width 11.4, and thickness 3.7 cm, broken out of four sides; its paste is red (on the Munsell chart: 5YR 5/6 yellowish-red) and outer slip color is buff (on the Munsell chart: 10YR 6/3 light yellowish-brown). The motifs of this piece are the horizontal grooves on the surface. (Fig. 10; drawing 7).

Piece S.Q.008. (Registration number: QT.85 / S.008), a brick of length 10.8, width 9 and, thickness 3.2 cm, broken from each of the four sides; its paste (on the Munsell chart: 5YR 6/6 reddish yellow) and the outer slip color is buff (on the Munsell chart: 2.5Y 7/3 pale yellow). The motifs of this piece are the additional stripes and circular impressed decoration in the form of a circle; the additional decorations collide with each other forming triangles in which the small circles (impressed) are decorated in it (Fig. 10; drawing 8).

Piece S.Q.009. (Registration number: QT.85 / S.009), a brick of length 16.5, width 10.8, and thickness 4.5 cm, which is not broken from the top but three other sides are broken; its paste is red (on the Munsell chart: 5YR 6/6 reddish yellow), and the outer slip color of the brick is buff (on the Munsell chart: 10YR 6/6 brownish yellow). This piece is a frame that consists of a grooved edge and a deep groove at the bottom (inner side) (Fig. 10; drawing 9).

Piece S.Q.010. (Registration number: QT.85 / S.010), a brick of length 11.7, width 9.7, and thickness 4.2 cm, broken from all four sides; its paste is red (on Munsell chart: 7.5 YR, 7.4 pink) and the outer slip color is buff (on the Munsell chart: 2.5Y 6/4 light yellowish-brown). The decoration of this piece is horizontal grooved designs. (Fig. 10; drawing 10).

Piece S.Q. 011. (Registration number: QT.85 / S.011), a brick of length 16.5, width 12.6 and thickness 5.8 cm, it is not broken from the top and the left side, but the other sides of it are broken; its paste is red (on the Munsell chart: 7.5YR 6/4 light brown), and its outer slip color is buff (on the Munsell chart: 2.5Y 7/3 pale yellow). This piece is a frame made of a simple edge on the sides and a deep groove in the inner side. Given the arc of the outer and inner corners of the left, it is likely placed in the corner (Fig. 10; drawing 11).

Piece S.Q.012. (Registration number: QT.85 / S.012), a brick of length 18, width 21, and thickness 5.4 cm, which is not broken up from top but other sides are broken; its paste color is buff (on the Munsell chart: 5Y 7/3 pale yellow) and the outer slip color is buff (on the Munsell chart: 5Y 7/4 pale yellow). This piece is a frame made of a painted edge on the sides and a deep groove in the inner side. Considering the arc of the outer and inner corners of the right, it was probably located in the corner. The decorations of the edge of the frame contain the crescent and semicircular lines that were probably created by hand (Fig. 10; drawing 12).

Piece S.Q.013. (Registration number: QT.85 / S.013), a brick of length 12.9, width 13.5, and thickness 4.4 cm, it is not broken from the top, but other sides are broken; its paste color is buff (on the Munsell chart: 10YR 6/4 light yellowish brown); its outer slip color is buff (on the Munsell chart: 10YR 7/4 very pale brown,). This piece is a frame made up of a simple edge on the side and a deep groove on the inner side. Considering the remains of the arc of the inner corner on its left, it was likely placed in the corner (Fig. 10; drawing 13).

Piece S.Q.014. (Registration number: QT.85 / S.014), a brick of length 10.5, width 9.3, thickness 6.7 cm, it is not broken from the top, but the other sides are broken; its paste is red (on the Munsell chart: 5YR 6/6 reddish yellow) and the outer slip color is buff (on the Munsell chart: 10YR 6/4 light yellowish-brown). The motifs of this piece are horizontal and vertical incised (scratched) lines that form rectangles and squares, decorated with small circles impressed Fig. 10; drawing 14).

Piece S.Q.015. (Registration number: QT.85 / S.015), a brick of length 15.9, width 15.3, and thickness 5 cm, all four sides are broken; its paste is red (on the Munsell chart: 5YR 6/6 reddish yellow) and its outer slip color is buff (on the Munsell chart: 10YR 7/4 very pale brown). The motifs of this brick are horizontal and vertical incised lines that form squares that are approximately the same size. (Fig. 10; drawing 15).

Piece S.Q.016. (Registration number: QT.85 / S.016), a brickbat of length 11.7, width 11.1, and thickness 5.6 cm, that is not broken from top but other sides are broken; its paste is red (on the Munsell chart: 7.5YR 6/6 reddish yellow), and its outer slip color is buff (on the Munsell chart: 10YR 6/4 light yellowish-brown). The motifs of this piece are the decorative impressing lines created in the form of small circles (Fig. 10; drawing 16).

Piece S.Q.017. (Registration number: QT.85 / S.017), a brick of length 14.1, width 13.5, and thickness 6 cm, which is not broken up from top but other sides are broken; its paste color is buff (on the Munsell chart: 5Y 7/3 pale yellow), and the outer slip color is buff (on the Munsell chart: 2.5Y 7/3 pale yellow). The motifs of this brick contain grooved lines in the shape of oblique (Fig. 10; drawing 17).

Piece S.Q.018. (Registration number: QT.85 / S.018), a large brick of length 43, width 39, which is not broken up from top but other sides are broken; its paste is red (on the Munsell chart: 5Y 5/6 yellowish-red), and its outer slip color is buff (on Munsell chart: 2.5Y 7/4 pale yellow). There is a groove in the lower part of the brick that the brick is broken from this part; the function of this brick is unknown (Fig. 10; drawing 18).

Piece S.Q.019. (Registration number: QT.89 / S.082), a large brick of length 8.7, width 6.2, and thickness 5.8 cm, it is not broken from the top and the left but, other sides are broken; its paste is red (on the Munsell chart: 5YR 5/4 reddish brown), and its outer slip color is buff (on the Munsell chart: 10.YR 6/4 light yellowish-brown). The motifs of this brick are horizontal grooved lines (Fig. 6).

Ceramics

Eighty years ago, Roman Ghirshmann introduced the pottery culture of Sialk VI during the archaeological excavations of Sialk ("la Grande Construction" and the Cemetery B), which was related to the beginning of the first millennium BCE (Ghirshman 1939: 94ff.). These imprinting ceramics, as the basis for the dating of "la Grande Construction" and the cemetery, were cited by later researchers (Boehmer 1965; Dyson 1965; Young 1965, 1967; Goff Meade 1968; Stronach 1974; Medvedskaya 1983, 1986). However, for relative and comparative chronology researchers compared the sites with such pottery types with adjacent cultures nearby or sometimes far away since these sites were not found in the regional context. For example, Robert H. Dyson Jr., who considered the culture of Sialk VI painted pottery as a part of the tradition called the "Triangle Ware", and since this tradition dates back to Iron Age III, he assigned Sialk VI to around 700 BCE or fifty years thereafter (Dyson 1965: 201-200, pl. 41, pl. 2). T. Cuyler Young Jr. also believed in such a chronology; he dated the Sialk VI to about 900/1000 to 700/750 BCE (Young 1965: 61-62, Fig. 14, 1967: 27-29). Because Clare Goff Meade was involved with another painted pottery of the Iron Age (i.e., the pottery "Luristan Genre" in her excavations in Babajan), she had a great deal of concern about the dating of such a tradition in the heart of the Iron Age. She believed that Sialk VI required needed to be revision, but it seemed that she was more conservative to publicly put it (and the Luristan Genre) in Iron Age III and only knowing it from the late Iron Age II (Goff 1968:125). By comparing the pottery styles, David Stronach analyzed the painted ceramics of the Achaemenid village of Susa and concluded that the Sialk VI dated back to the ninth and eighth centuries BCE (Stronach, 1974: 242).

The dating of Sialk VI itself was the subject of several independent pieces of research. First, Rainer Michael Boehmer, with a typological analysis of the painted pottery of Cemetery B of Sialk VI, recognized two relatively distinct periods and named them Sialk B1 and Sialk B2 (Boehmer 1965). He believed that the Sialk B1 culture was characterized by an abundance of gray-black potteries,

the absence of the teapots that did not have a flange at the junction of their spout to the body, and the presence of a large group of vessels with grooved spouts. He considered this culture to belong from the end of the ninth century to the middle of the eighth century BCE (e.g. the objects of graves 31, 53, 61, 62, 123). Boehmer also believed that the Sialk B2 culture included painted pottery, horse equipment decorations that were not older than the Tiglath Pileser III period (745 to 728 BCE), and the presence of teapots that had a flange at the junction of their spout to the body; He considered this culture to belong to the middle of the eighth to the beginning of the seventh century BCE (for example, the objects of graves 1, 3, 7 b, 15, 21, 38, 52, 66, 74, 78, 94).

Inna Nikolaevna Medvedskaya also tried in two separate articles—from two different viewpoints—to provide a more reliable chronology for the Sialk VI culture. First, she began to study the horse equipment in the Sialk Cemetery B, and after a long comparative discussion, she indicated that the dating could not be older than the middle of the eighth century BCE (Medvedskaya 1983: 78). Her research on motifs of the Cemetery B ceramics and their examination with the Greek geometric style also yielded a similar result, and this time, she proposed dating of the second half of the eighth century BCE (Medvedskaya 1986: 120).

Fortunately, in recent years, much more information has been obtained about this pottery type. With the onset of a new period of research and excavations at Sialk, entitled “Sialk Reconsideration Project”, once more attention has been paid to this important ancient site. However, the excavator, surprisingly, almost immediately after the first days of excavation, declared that massive mud-brick platform of the southern mound was not a construction of the Iron Age but a Proto Elamite Ziggurat (Malek Shahmirzadi 2002: 27ff.) despite all the disagreements and criticisms and protests (Malekzadeh 2002:17, 2004b, 2004c; Azarnush and Helwing 2005: 226; and especially P.S 172; Potts 2006; Pfälzner 2008: 422; P.S 75; Herles 2012). Over the past decade, he has still insisted on his opinion. What is important now is not whether the ziggurat was or not itself of “la Grande Construction” of Sialk, but the important thing is the large volume of publications that the “Sialk Reconsideration Project” provided on cultural materials (including the Sialk VI Pottery Culture) of the Iron Age of the Southern mound (Fahimi 2003b, 2004, 2005, 2012; Helwing 2006). However, the presentation of the new theory of “Sialk VII”, like the result of the recent field research on the Southern mound of Sialk (Fahimi 2012a), is a bit confusing and slightly misleading.

At the same time as the first exciting news on the discovery of the Ziggurat of Sialk, more serious research was carried out on the cultural materials of the Sialk Iron Age. The examination of one of the motifs of Sialk VI types of pottery vessels with a spout (now it is kept at the Museum of Fine Arts in Boston) showed that the famous dagger (short sword) of the Iranian world of the Median and Achaemenid period, Akinakes (Ακινάκης), provided a more documentary and reliable criterion for the dating of the Sialk VI pottery typology in the early decades of Iron Age III (850-550 BCE) (Malekzadeh 2002).

In these years, archaeological research and discoveries at Goortan, Esfahan (Javari 2004: 41 and 44-43, drawings 3-1), in the collection of “Šahr-e Šalamūt”. (Naseri and Malekzadeh 2013b), at Qoli Darvish (Sarlak 2010: 211, drawing 607,

280 Fig. 1, 281 Fig. 1, 295 Fig. 2; Sarlak 2011: 500, drawing 2) and in Milajerd, Kashan (Fahimi 2009, 2011)[13] showed that this pottery type[14] was not a culture that was limited to Sialk, but rather, it included a broader range in the center of the Iranian Plateau (especially around Kashan and Qom). Of course, we have to admit that so far, our knowledge of this pottery culture is related to its painted type, and its plainware pottery is not well-presented and studied. This pottery culture is nothing but the same horizon as The late western buff ware (Iron Age III). Both types (simple and painted) are found together at Sialk and the sites mentioned above. Currently, the ceramics of the Sialk VI culture were not only observed in Sialk itself but also in its satellite site in Qolam Tepe, and we have the opportunity to study and introduce this pottery culture in a good regional context.

The ceramics obtained from Qolam Tepe can be divided into four types in terms of slips and motifs. The first is the painted pottery which used red (Jujube red) on buff to create the motif, and the motifs are geometric (Fig. 13b, drawings 072 and Fig. 14, drawing 054, 056, 058, 060, 061, 065, 071, 090). The second type is pottery, one side of it (more exterior), and sometimes both sides are covered with a thick red slip (Fig. 12, drawings 035, 076, 075, 077, 079, 087). The third type is monochrome buff pottery or sometimes brick red pottery (Fig. 12, drawings 020, 023, 025, 030, 033, 034, 075; Fig. 13b, 019, 059; Fig. 14, Plot 053). The fourth type consists of gray pottery, which is statistically (according to the surface distribution of the site) less than the other types (Fig. 13a, drawings 046, 045, 043, 042). In terms of morphology, it should be said that the Qolam Tepe ceramics are the same as the familiar forms of the Sialk VI culture, which can be simple downspout pottery teapots, painted and with button decorations around the neck, simple and painted cups with a handle and without a handle, simple carinated ware bowls and with red slip that sometimes marked with small handles beneath the edge, deep bowls, campanulate bowl and simple and painted jars. Ceramics paste are made of dense mineral material and golden shining particles; the exterior of most of ceramics are polished.

Among the Qolam Tepe surface finds, along with the dominant pottery culture of this site (i.e. Sialk VI), samples of gray ware with additional decoration and burnished ware are similar to sites of the Iron Age II in the centarl Iranian Plateau (e.g., Shamshirgah / Sarm / Qoli Darvish / Milajerd). The finding of this pottery type, along with a ceramic assemblage of the late western buff ware horizon at a single period site, may indicate that the Sialk VI pottery culture is more related to the beginning of Iron Age III than its end.

In the end, it can be said that along with Sialk, we now know Qolam Tepe in Kashan along with the other sites of the province of Isfahan and Qom, which presents some corners of a coherent cultural type. This inclusive cultural horizon, which is the same as the dominant pottery culture of the Iron Age, and in addition to its local features can be recognized as well: Sialk VI painted pottery typology, a typology that is believed to be rooted in the ancient pottery of the central Iranian Plateau.

Conclusion

We have seen that the collection of surface finds of Qolam Tepe, including ceramics and decorative bricks, indicates a single-period site except for some of the slightly older pottery materials (i.e., Sialk V), None of the surface finds of

Qolam Tepe show any era other than Iron III, so we have achieved one of the satellite sites of Sialk VI. Since Qolam Tepe is exclusively a single-period site (of the Iron Age III), given the apparent fact that the decorative bricks found at Qolam Tepe are in every aspect matched with the decorative bricks of "la Grande Construction" of Sialk, they can be attributed to a single cultural period and surveyed in a single chronological horizon, thus again the attribution of "la Grande Construction" of Sialk based on other and newer examinations is confirmed to the end of the Iron Age.

The cultural materials of Iron Age III during the Sialk VI period show the flourishing of such a culture in the area (cf Ghirshman 1974: 77). During this period, a large mud-brick platform was constructed with the function of a memorial on the southern mound ("la Grande Construction"), its exterior was decorated with decorative bricks, the architectural context of the Iron Age III extends at the highest point of the southern mound of Sialk and somehow an Iron Age city emerged here. Such a culture with such works is logically impossible to manifest itself only at a single site with no satellite or peripheral sites; for example, in the northern regions of Qom plain and its adjacent foothills, as it is known, the Iron Age city of Qoli Darvish and its nearby satellite sites are the well-known cultural complex of "Šahr-e Šalamūt." A comprehensive survey of the Kashan plain and its surrounding foothills in search of such collections as Sialk, has not yet been accomplished. Qolam Tepe is known only because of the destruction brought by road construction. It is possible that targeted surveys in search of Sialk VI satellite sites in the Kashan plain and its adjacent foothills may also reveal other sites. Until then, we must be content with recognition of Qolam Tepe.

It should be said that the location of Qolam Tepe and the importance of its surface findings, first enable us to discuss a few ideas about the site. What was the function of a small mound such as Qolam Tepe in the late Iron Age at a distance so close to a large and authentic base like Sialk? What has been the great cultural institution that set up "la Grande Construction" at Sialk (with those brick decorations)? Why was a monument built with the same decorative bricks at Qolam Tapeh? "La Grande Construction" at Sialk is a mud brick building, but the surface evidence of Qolam Tepe suggests a stone building that was not as big or wide. How could this little palace-like building be decorated with these memorial decorative bricks? Was there the same relationship between Sialk and Qolam Tape as is known between Qoli Darvish and Šahr-e Šalamūt? These and other related questions remain to be answered through further fieldwork.

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Notes

1. We are referring precisely to the targeted field programs of the Iron Age; otherwise Kashan has hosted archaeological groups in Arisman, Noushabad, etc. in the last few decades.

2. Few known materials of the Iron age of the cultural zone of Kashan, such as the findings of Milajerd, appeared completely randomly on the archaeological horizons and were not the result of any scientific and predicted program! (Fahimi 2009, 2011).
3. Here is the claims of some archaeologists seem ridiculous when they naively talk about their "unique" discoveries; the discovery of something unique and incidentally, incomparable and incommensurable with other artifacts and cultural data is the discovery of something unfounded (and archaeologically worthless)!
4. Based on the first report of the "Sialk Reconsideration Project" shows the director and members of this project from the beginning, did not think and seek the cultural materials of the Iron Age in Sialk (Malek Shahmirzadi 2002, especially the description of the goals of the project: 23).
5. Unfortunately, the preliminary sounding report, three seasons of extended excavations by Khosrow Pourbakhshandeh, and the supplementary excavations of Siamak Sarlak in the Sarm Cemetery (Kahak) have not yet been published; only one or two Master's thesis on the Cultural Materials of this Cemetery have been written in these years (Bahranipour 2006, Dolati 2012).
6. We define the **sign** as: "something that implies the existence or presence of reality, quality, or another situation", and its plural is signed.
7. We define the **trait** as: "any feature that can be observed by an artifact or a structure or any other cultural material."
8. We define the **archaeological signature** as: "the form of a feature that helps to recognize a phenomenon in archaeological evidence."
9. We define the **diagnostic trait** as: "any trait that distinguishes a group of artifacts or structures or cultural materials from another group."
10. Especially see Danti survey in 2006, that his work results are disappointing.
11. Fahimi introduces only a piece of painted pottery of Sialk Vl type from a place other than the southern mound of the Sialk, from Khazāq (Fahimi, 2003b: 91 and 125, pl. 18, no. x), and of course a single piece of pottery (if so?) One can never be the basis of conclusions.
12. All samples were rendered to the Sialk Research Base after being washed, photographed and, drawn (Brick 19 [QT.89 / S.082] was removed in a separate visit).
13. Of course, the data of these last two sites (Qoli Darvish, Milajerd) are historically and culturally earlier and closer to the Sialk V pottery traditions.
14. And its predecessor: Sialk V (Iron Age II or the horizon of the late western Gray ware); About the Continuity or Discontinuity of the Sialk V and Sialk VI pottery types. See also: Turovets 1989.

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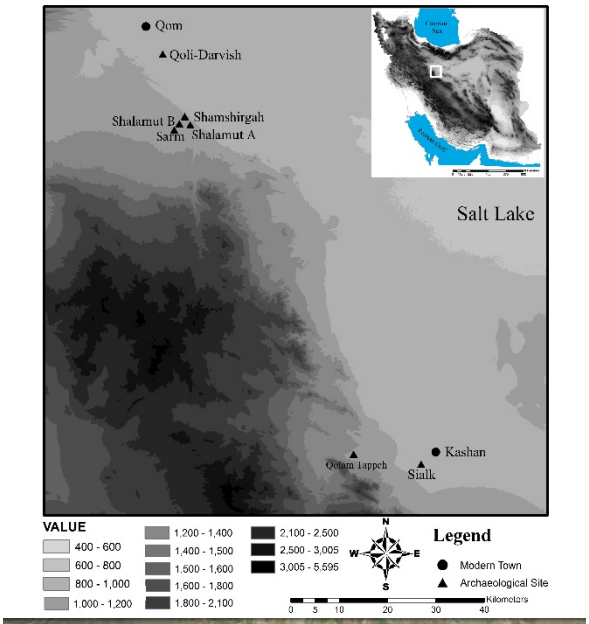

Figure 1 (above): A map of the dispersal of some sites of the Iron Age in Kashan and Qom plain (Malekzadeh and Naseri 2013: Fig. 1) / Figure 2 (bottom): Aerial photo of Qolam Tape location toward Sialk (Google Earth).

Figure 3: The Qolam Tape prospect, view from the East (By Reza Naseri).

Figure 4 (above): Surface distribution of cultural materials (By Reza Naseri) / Figure 5 (bottom): Remnants of architectural monuments on the mound surface (By Reza Naseri).

Figure 6 (above): A sample of brick obtained from a surface survey of Qlam Tepe of Jafarabad, Kashan (visiting in 2019). Figure 7 (bottom): A sample of decorative brick obtained during the researches of the Sialk Reconsideration Project (Malek Shahmirzadi, 2002: 206, pl. 8A; Malekzadeh and Naseri, 2013: Fig. 3).

Figure 8: A brick sample obtained from the excavation of Qoli Darvish of Jamkaran (Sarlak and Malekzadeh, 2005; Malekzadeh and Naseri, 2013: Fig. 4).

Figure 9: A bricks sample obtained from a surface survey of the stone fortress of Shamshirgah of Khourabad (Malekzadeh and Naseri, 2013: Fig. 5).

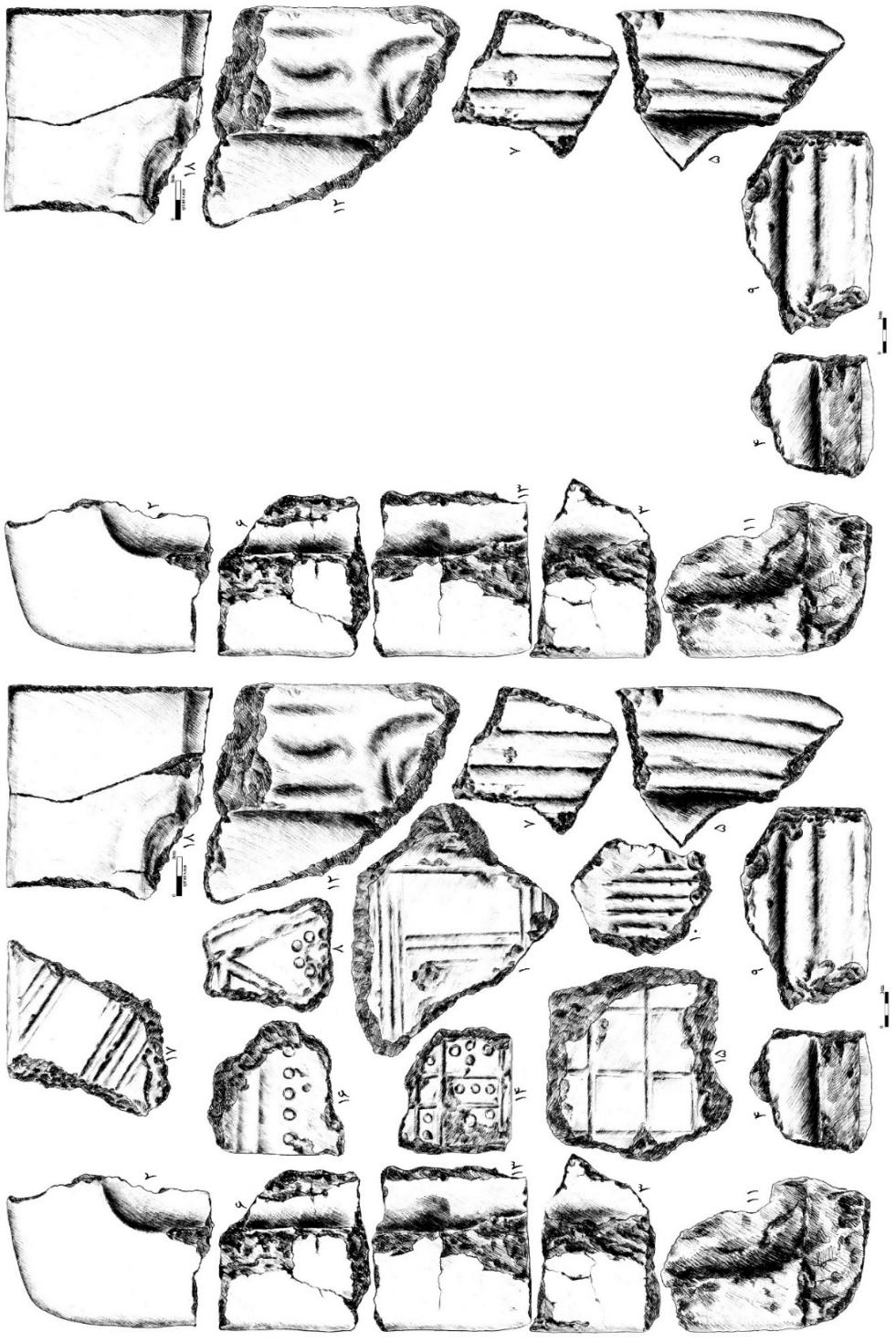

Figure 10a (above): Proposed arrangement of brick frames of Qolam Tepe (Drawing by Ali Naseri). Figure 10b (bottom): Arrangement of brick frames of Qolam Tepe along with other surface samples (Drawing by Ali Naseri).

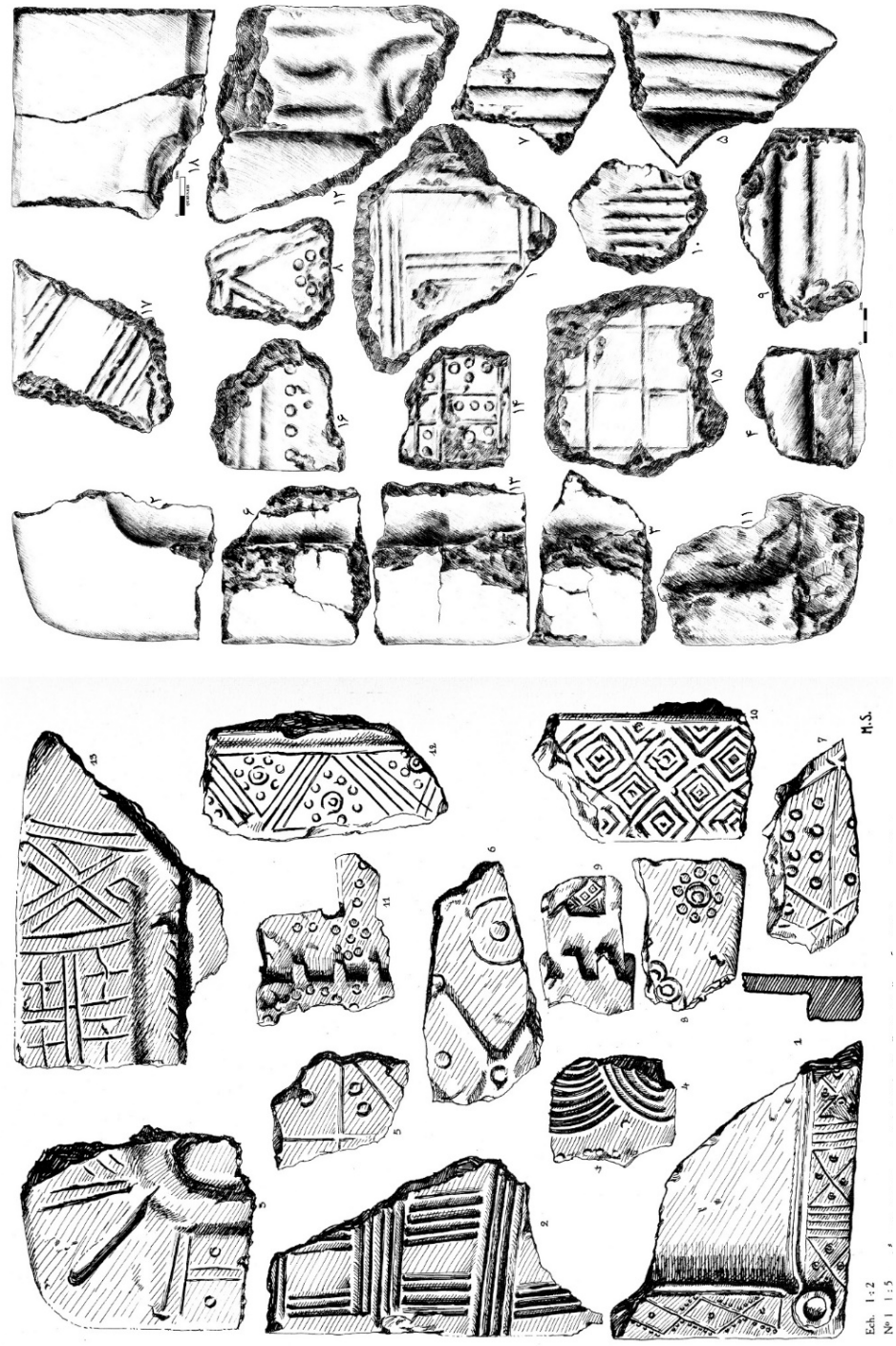

Figure 11a (above): Arrangement of brick frames of Qolam Tepe for comparison with similar pieces in the southern mound of Sialk (Drawing by Ali Naseri). Figure 11b (bottom): Arrangement of brick frames of "La Grande construction" of Sialk (Girshman 1939: pl. xcix).

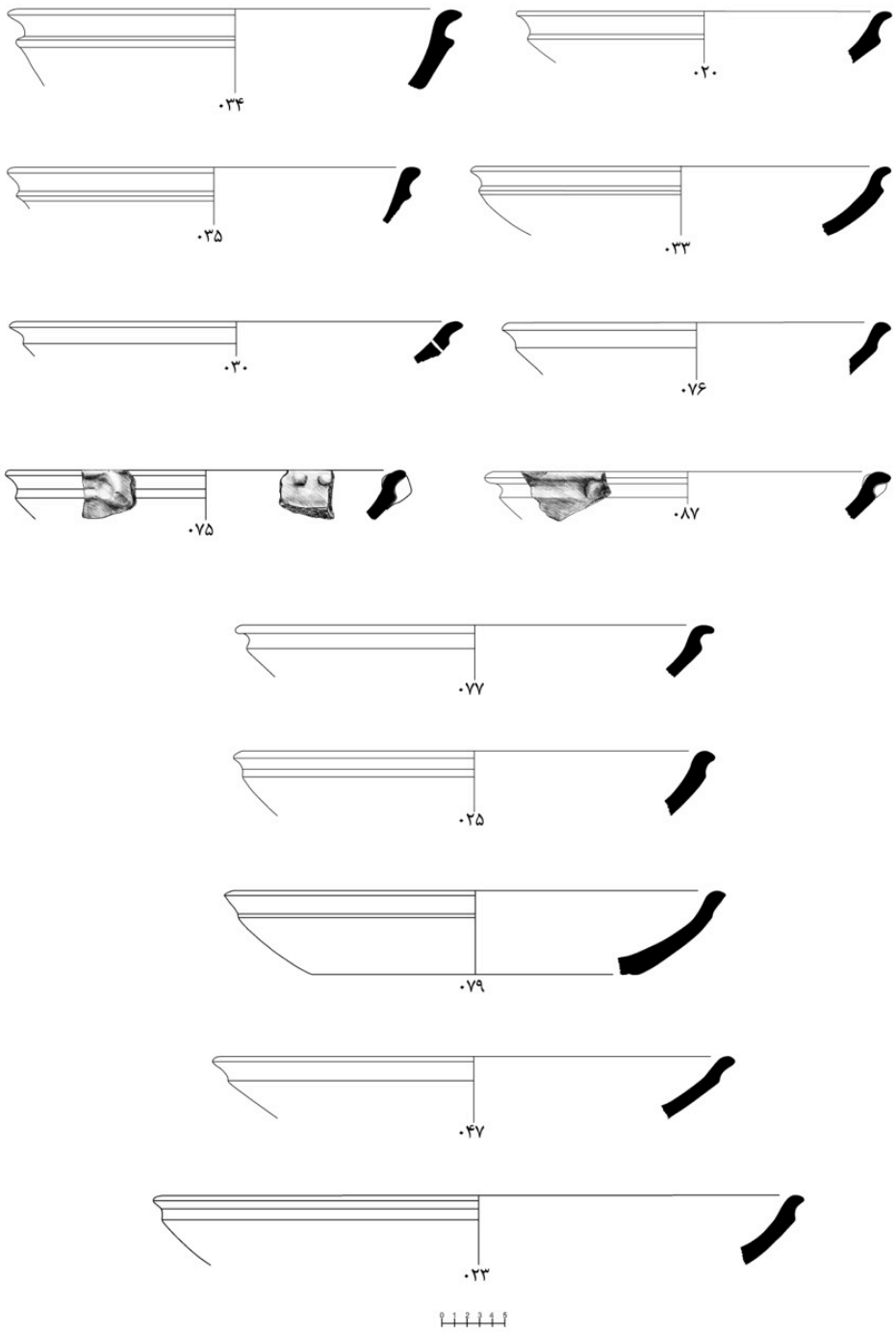

Figure 12: A sample of buff and red S-carinated rim bowls of Qolam Tepe surface (Drawing by Reza Naseri).

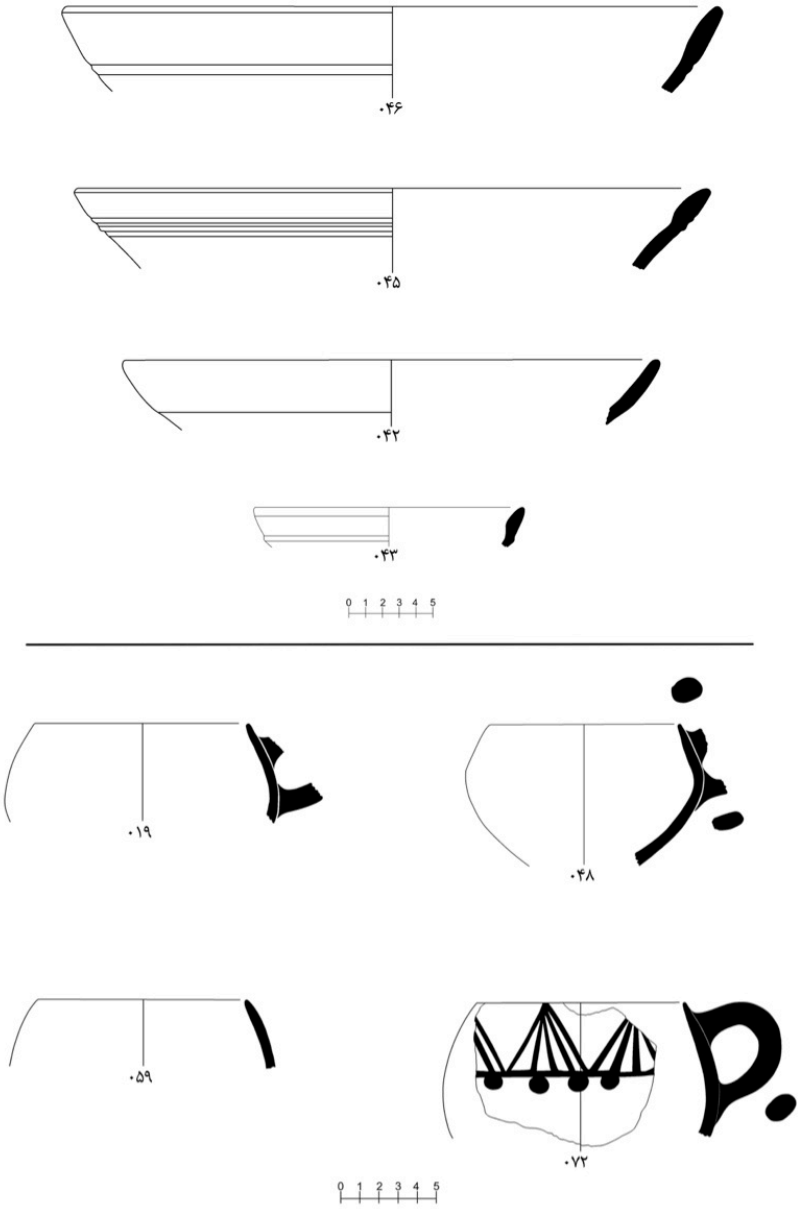

Figure 13a (above): A sample of the gray ware of Qolam Tepe Surface (Drawing by Reza Naseri).
Figure 13b (bottom): A sample of simple and painted pot-sherds of Sialk VI culture obtained from Qolam Tepe Surface (Drawing by Reza Naseri).

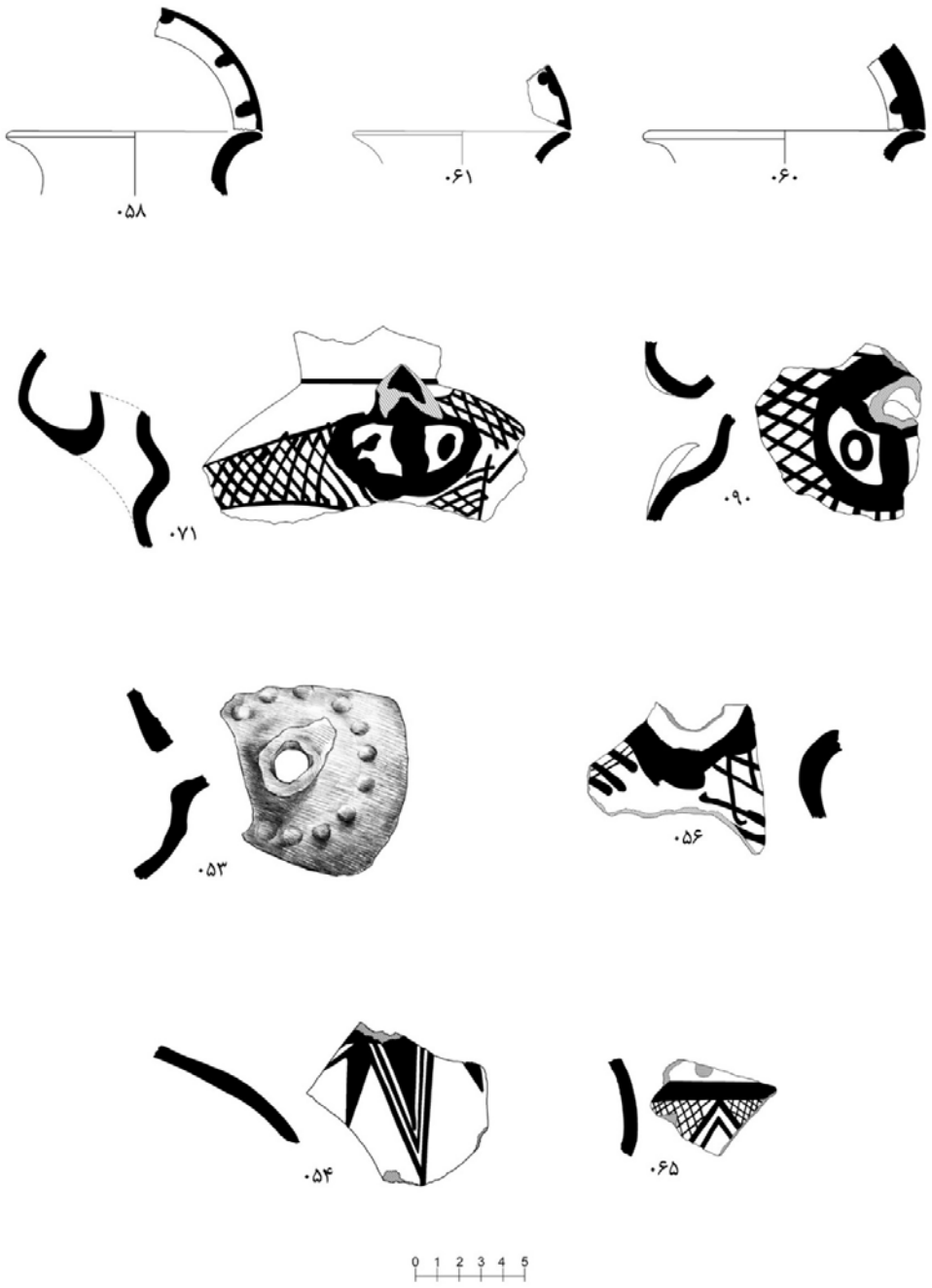

Figure 14: A sample of various ceramics of Sialk VI culture obtained from Qolam Tepe Surface (Drawing by Reza Naseri).

غلام‌تپهٔ جعفرآباد: بازشناسیِ یک محوطهٔ اقماریِ سیلک ۶ در کوهپایه‌هایِ کاشان

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چکیده

تا همین اواخر فرهنگ عصر آهن پایانی در مرکز فلات ایران تنها در تپه جنوبی سیلک شناسایی شده بود. در این تحقیق، محوطه تازه کشف‌شده‌ای به نام غلام تپه در دامنه‌های غرب کاشان در فاصله بسیار نزدیک به سیلک معرفی شده است. هیچ‌یک از یافته‌های سطحی غلام تپه دوره‌ای به غیر از عصر آهن۳ (یا سیلک۶) را نشان نمی‌دهد، بنابراین ما به یکی از محوطه‌های اقماری سیلک۶ دست‌یافته‌ایم. ازآنجایی‌که غلام تپه منحصراً یک مکان تک‌دوره‌ای (عصر آهن) است، و با توجه به این واقعیت آشکار که آجرهای تزیینی یافت شده در غلام تپه از هر نظر با آجرهای تزئینی «سازه بزرگ» سیلک مطابقت تمام دارند، آنها را می‌توان به یک دوره فرهنگی واحد نسبت داد و در یک افق زمانی بررسی کرد؛ بنابراین باز دیگر انتساب «سازه بزرگ» سیلک بر اساس بررسی‌های دیگر و جدیدتر به عصر آهن پایانی تأیید می‌شود. یافته‌های بررسی سطحی این محوطه نشان می‌دهد که هم‌زمان با فرهنگ عصر آهن پایانی (لایه‌های ۵ و ۶ بر روی تپه جنوبی سیلک و گورستان‌های الف و ب) بنایی سنگی به همراه با چندین نمونه از تزئینات آجری در غلام تپه برپا بوده است.

واژه‌های کلیدی: کاشان، غلام تپه، سیلک، سیلک ۶، عصر آهن، آجرهای تزئینی.

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