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Zohreh OVEISI-KEIKHA [*] (University of Zabol, Iran)

Hosseinali KAVOSH [**] (University of Zabol, Iran)

The Investigation of residential architecture in the Bronze Age. Tape Yal (Yalda), Sistan and Baluchestan province, Iran

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Abstract: *The first villages were formed during the Neolithic period, when people began building residential architecture. Villages continued to exist in Iran until the 2nd half of the 4th millennium BC, when the first cities appeared. Settlement in Shahr-i Sokhta had begun during this period, and in the 3rd millennium BC, the city's size expanded and many related-settlement sites were formed in the Sistan plain. A prominent related-settlement site of Shahr-i Sokhta is Tape Yal or Taleb Khan 2, located 11 kilometres from the city. An excavation was conducted at this site by one of the author. This article analyses the architectural features of this site, a Bronze Age village of the Hirmand civilization, based on the findings of this excavation. It has been determined that this site contains residential buildings, workshops, and storage rooms with mudbrick construction. The above residential buildings probably belonged to the craftsmen of this village who lived next to their workshops.*

Key words: Archaeology, Iran, Sistan, Hirmand Civilization, Bronze Age, Architectural Archaeology

Introduction

Although there is evidence of architecture from the Palaeolithic and Mesolithic periods, permanent settlement, the creation of villages, and clay-wall and mudbrick architecture are innovations of the Neolithic period. Archaeologists who research on the Neolithic period pay a lot of attention to architectural structures and changes in plan and materials.[1] But in later periods, such as the Bronze Age, more attention is

[*] Corresponding Author. ORCID ID: https://orcid.org/0009-0006-3500-8215. z.oviese@uoz.ac.ir; This work was supported by the University of Zabol under Grant Uoz-gr-6181.
[**] ORCID ID: https://orcid.org/0000-0001-8653-4529. h.kavosh@uoz.ac.ir; This work was supported by the University of Zabol under Grant Uoz-gr-7523.

[1] Aurenche, 1981; Bar-Yosef, 1986; Byrd, 1994; Flannery, 2002; Goring-Morris & Befler-Cohen, 2013; Khanipour, Niknami & Abe, 2021.

paid to urban and public architecture, and less attention is paid to rural architecture. Meanwhile, in order to better analyse the archaeological findings, the knowledge of architectural spaces and the function of each space can lead to the knowledge of social and economic features. most theories about the relationship of human beings to their constructed environment share the idea that there is something to be learnt about individuals or groups from the way people construct, organize and furnish their physical living spaces.

It is the architecture of past societies – the rooms, houses, and settlements unearthed by archaeologists – that provides evidence for how people constructed their built environment to suit their biological and social needs. Both theoretical and pragmatic debates continue to surround how to analyse and interpret this material evidence. Sociologists, anthropologists, architects, environmental scientists and archaeologists have contributed to the debate about how people relate to their environment and the spaces they occupy.[2]

Formerly built structures have always captivated the imagination, and since archaeology has begun to influence lifestyles, so has architecture within the field. Both of these domains are included in the built environment, which is the way humans render their surroundings and construct their structures. Among the topics covered is the study of private spaces as well as the analysis of social and political aspects, concluding the perspective of the whole. Architecture is often a canvas for social or cultural changes. As societies evolved, the most profound changes have been witnessed in household settings, function, and lifestyles influenced by the prominent architecture. Architecture and archaeology have been disrupted by differing elitism, epistemology, and reciprocal individualism – not only in terms of research and analysis, but also in terms of the design and restoration of new facilities, and in terms of the transformation of the asset into a modern landscape. Despite the fact that archaeological studies give us insight into past suspense in architecture, they tend to be confined to objects.[3]

Most of the research on the Sistan civilizations during the Bronze Age has focused on regional and inter-regional connections and trade based on the findings of Shahr-i Sokhta.[4] It is necessary to pay attention to related-settlement sites in this region in order to fully understand the Bronze Age. Thus, during the two seasons of excavations of Tape Yal, different residential spaces were identified, and this article aims to first analyse the architectural characteristics of this site, and then to analyse the cultural findings in accordance with the architectural spaces mentioned above.

[2] Banning & Byrd, 1987; Mithen, 1989; Binford, 1990; Whitelaw, 1994.
[3] Pakhale, Mishra & Soni, 2019.
[4] Lamberg-Karlovsky, 1972; Kohl, 1975; Tosi, 1977; Salvatori & Vidale, 1997; Aruz & Wallenfels, 2003; Potts, 1982; 1993; 2009; Wilkinson, 2014: 126-9.

Sistan Plain in the Bronze Age

Historically, archaeologists have focused their attention on the Sistan plain in the southeast of Iran due to the presence of human habitats in it and also because of its cultural significance as a link between western cultures in Iran and those in the east, such as the Indus Valley and Central Asia. The first archaeological research in this area was conducted by Stein. While surveying vast areas from the Persian Gulf to Pakistan, Stein also excavated some Sistani sites.[5] Fairservis was another archaeologist who conducted surveys in Sistan.[6] Italian teams have also conducted comprehensive and systematic archaeological research in Sistan.[7]

Sajjadi has been excavating the Shahr-i Sokhta since 1997.[8] Mehrafarin and Mousavi Haji surveyed the Sistan Plain.[9] Zabol University has been excavating the related-settlement sites of the Shahr-i Sokhta (since 2003) and has excavated four sites for 18 seasons, including Taleb Khan,[10] Graziani,[11] Yal (Taleb Khan 2)[12] and Tepe Rostam.[13] In addition, the Department of Archaeology of the University of Sistan and Baluchistan has conducted excavations at Tape Dasht[14] and Tape Sadeq.[15]

Shahr-i Sokhta, with an area of 151 hectares, is the largest human settlement in this region, and as a result of its size, culture sequence, and successive excavations, it has had a significant impact on the cultural image of the region during the 4th and 3rd millennia. In the Sistan region, the chronology has been determined based on the stratification sequence of Shahr-i Sokhta, which is divided into four main cultural periods and 11 phases from the end of the 4th millennium to the beginning of the 2nd millennium BC.[16] The results of recent excavations in the Graziani[17] and Taleb Khan [18] suggest that the absolute dates in the chronology of this region should be revised.

Archaeological surveys in this plain indicate that numerous settlements existed at the same time as Shahr-i Sokhta,[19] further study of which is required to gain a deeper understanding of the region's social and economic structure.

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[5] Stein, 1937.
[6] Fairservis, 1961.
[7] Tosi, 1969; 1970; 1973; 1983; Salvatori & Tosi, 2005.
[8] Sajjadi, *et al*., 2003; Sajjadi & Moradi, 2015a; 2015b; Sajjadi, 2019.
[9] Mehrafarin & Mousavi Haji, 2009.
[10] Kavosh, 2022.
[11] Kavosh, Vidale & Fazeli Nashli, 2019.
[12] Kavosh, 2012.
[13] Kavosh, 2020.
[14] Mortazavi, Mishmast & Good, 2011.
[15] Shirazi, 2019.
[16] Tosi, 1973; Salvatori, 1979; Salvatori & Vidale, 1997.
[17] Kavosh, Vidale & Fazeli Nashli, 2019.
[18] Kavosh, 2022.
[19] Mehrafarin & Mousavi Haji, 2009; Moradi, *et al.*, 2022.

Tape Yal

Tape Yal is located 67 kilometres southwest of Zabol city, about a thousand meters from the southern front of the Zabol-Zahedan Road, which is about 11 kilometres away from Shahr-i Sokhta and is considered one of its related-settlement sites [Fig. 1]. The mentioned site has dimensions of 70×50 square meters and a total area of 3500 square meters with a height of 5.5 meters from the surrounding land [Fig. 2], which is a circular ridge with irregular and steep slopes, and the effect of erosion and destruction due to natural factors such as wind and rain can be seen on all slopes of the site.

The above site was identified in the survey of the Cultural Heritage Institute of Zabol under the name of 291 site of Shahr-i Sokhta site. The excavators of Taleb Khan site named it tape Yal or Taleb Khan 2 due to the proximity of this site to tape Taleb Khan. However, during the archaeological survey of the Sistan Plain, which was conducted to prepare a comprehensive archaeological map of the country, carried out by Mousavi Haji and Mehrafarin in 2009, this site was registered with number 85 in the area south of Qale Rostam.[20]

The author excavated Tape Yal in accordance with the educational program of archaeology students at Zabol University, which is one of the most remarkable related-settlements of Shahr-i Sokhta. The aim is to understand the cultural and economic characteristics of the Sistan Plain in the 3rd millennium BC. The excavations revealed various architectural spaces, hearths, kilns, and pits filled with ash, as well as pottery, stone tools, stone vessels, human and animal figures, counting tablets, tokens, metal objects, and decorative beads. The results of the excavations show that the above-mentioned site can be considered as a workshop centre related to Shahr-i Sokhta where pottery production was carried out specialized. Kilns and pottery production objects such as clay bases, rectangular storage rooms, seals, tokens, and counting clay tablets all suggest pottery production and administrative management in this region.

The C14 analysis indicates a date between 2568 and 2293 BC for the settlement sequence of this site. Similarly, a comparison of the pottery from this site with those from Shahr-i Sokhta, Tape Graziani, and Tape Yal suggests that this site was occupied during the Shahr-i Sokhta III and IV periods.

[20] Mehrafarin & Mousavi Haji, 2009.

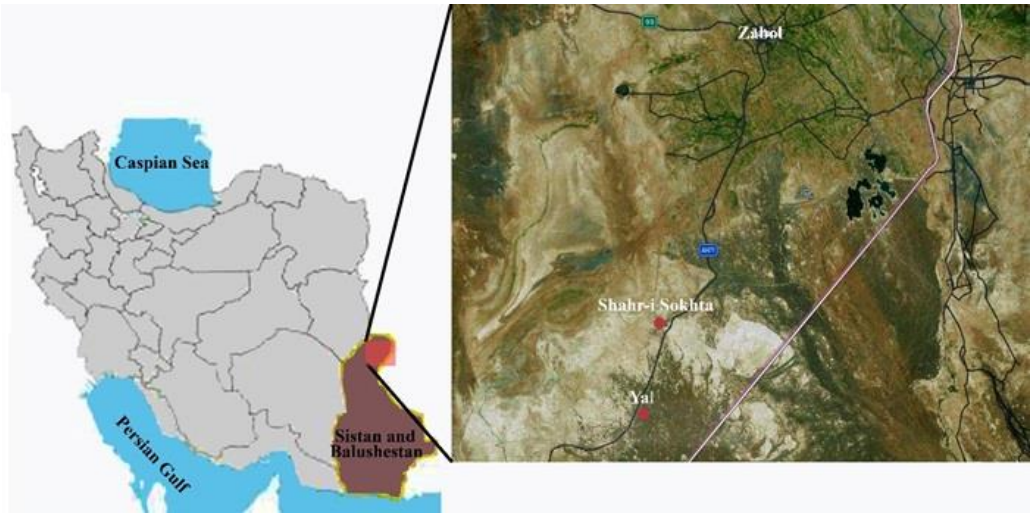

Fig. 1. Location of Tape Yal (by H. Kavosh)

Fig. 2. Overview of Tape Yal (by H. Kavosh, 2010)

Residential architecture in Tape Yal

Trench 1

A trench measuring 5 × 5 meters was excavated in the central part of the site to better understand the site's function and architectural features. The most important finding of this trench is the presence of a coherent architectural structure, which corresponds with the fourth period of Shahr-i Sokhta according to the pottery typology. There were 52 different contexts identified and recorded from the above-mentioned trench, which were categorized into structural and deposit contexts according to their depth from the fixed measurement point. The deposit contexts total 24 and the structural contexts include 28 different types of structures, including walls, floors, and hearths [Fig. 3].

During the excavation of trench I, an architectural complex with multiple spaces was found, parts of which were severely damaged and eroded due to various factors. There are the remains of seven square rooms in the main architecture, some of which are outside the trench. In this architectural context, what is most interesting is how this architecture has changed over time. All these changes along with the cultural findings obtained from this trench indicate that this complex was used in two phases. A first phase of construction involved mud bricks and straw mortar being used to make quadrangular rooms. In this period, the rooms were generally large, and on average some rooms covered about four square meters. As a result of inconsistent angles in some rooms, the angles in the northwest and northeast corners are a little more than 90 degrees, which makes the south wall of each room appear slightly larger than the north wall.

Other architectural features of the rooms include the walls on the east and west sides, which run parallel to one another. They are typically integrated and built in one direction, such as the eastern wall of room A, which extends and forms the eastern wall of room E. In addition, the eastern walls of rooms C and F are built in the same direction. In contrast, there is no common direction for the north and south walls of the rooms. This suggests that the builders of the above collection gave more importance to north-south orientation in building their architectural spaces. Regarding the function of architectural spaces in the first phase, it can be stated that due to the lack of findings that are related to industrial and workshop activities in this place, architectural spaces are associated with residential architectural contexts [Fig. 4].

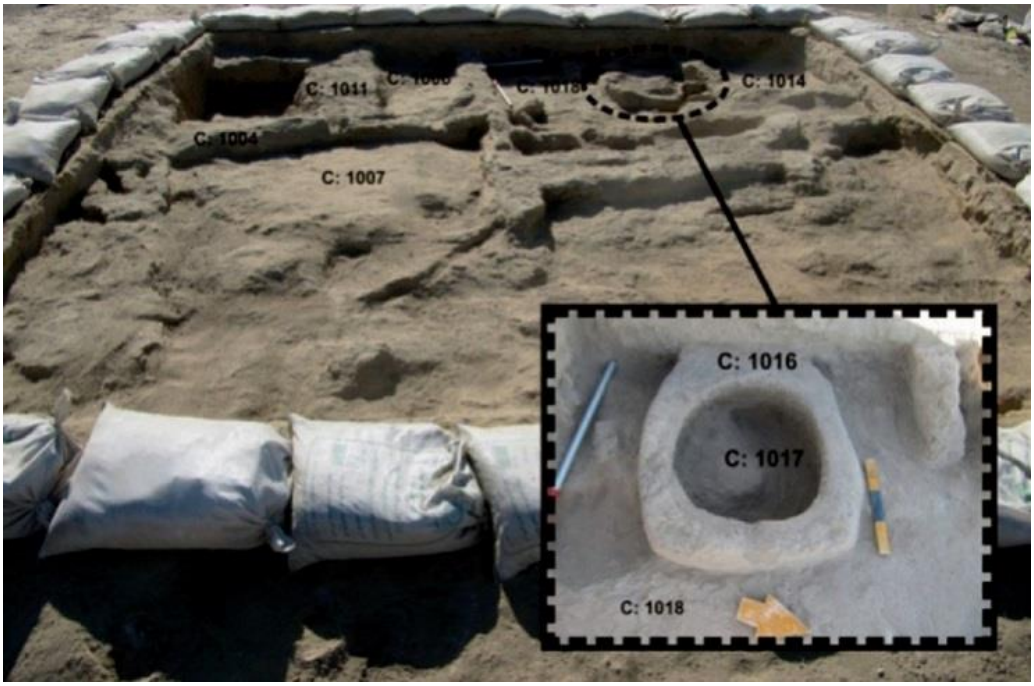

Fig. 3. Architectures different phases at Trench I (by H. Kavosh, 2010)

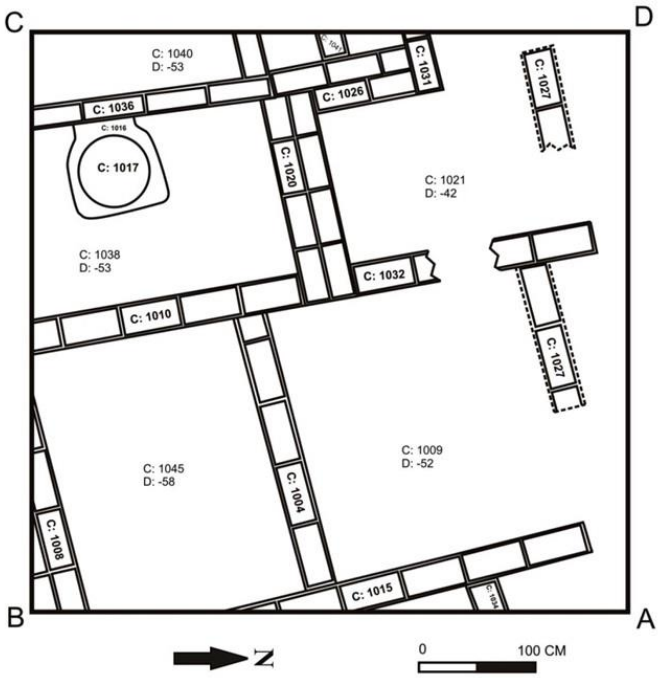

Fig. 4. Plan of architecture from trench I, phase 1 (by H. Kavosh, 2010)

The hearth found in room C and in the western part of the trench was a sign of habitation during this architectural phase, which is consistent with the use of the room as a kitchen and for cooking bread and food during this period. Also, a similar hearth was found at Taleb Khan 1,[21] Tappeh Graziani,[22] and Shahr-i Sokhta.[23] Mudbricks used in walls of this period are often of a specific standard with dimensions of 10 x 20 x 42 cm, except in one wall (Context 1036) where their dimensions are different. The walls, however, are not all the same thickness, and some are made of two rows of mudbrick, while others are built of one row of mudbrick. Two-row brick walls, however, do not have joints between the bricks. Because the architectural spaces were destroyed and the excavation area was small, we cannot comment on the entrance to the rooms. Since the rooms are often attached to each other, the entrances have been designed so that each room has an entrance facing the courtyard without disrupting the spatial independence of the neighbouring room, as is evident in the example of the entry of room F and the entryway of room E.

In the second phase of settlement in the architectural space of Trench I, the inhabitants of this site made changes in the architectural structure and existing rooms. Including the replacement of new floors in residential spaces with the same structure as the previous floors, which finally raised the floor of the rooms by about 10 cm on average. Other changes that are evident in the architectural space at this phase are the division of room A and B in the southern part of the trench into two smaller spaces by a thick wall (Context 1011). This wall is the only wall found in this architectural space where the mudbricks are placed lengthwise next to each other and in this respect it is different from all the existing walls.

The next case is adding a narrow wall in the north of room C and building a small space in this area, which is probably for storing food and related to the hearth. Also, building a mud wall made of soft sifted soil in room D is one of the other cases of these changes. The last change in this phase is the removal of wall 1041 in room G. Therefore, although the changes made in the second phase are minor, it seems that it has answered some of the needs of its residents in the past. In such a way that the division of the architectural space into two smaller parts may have been the result of the need for a place to store and place for daily food items, because these smaller spaces do not seem suitable for rest and work. Also, the creation of storage space in room C (kitchen) is a sign of the order and complexity of the architectural structure in the second phase of settlement in this complex [Fig. 5].

[21] Kavosh, 2022.
[22] Kavosh, Vidale & Fazeli Nashli, 2019.
[23] Salvatori & Vidale, 1997L Fig. 23.

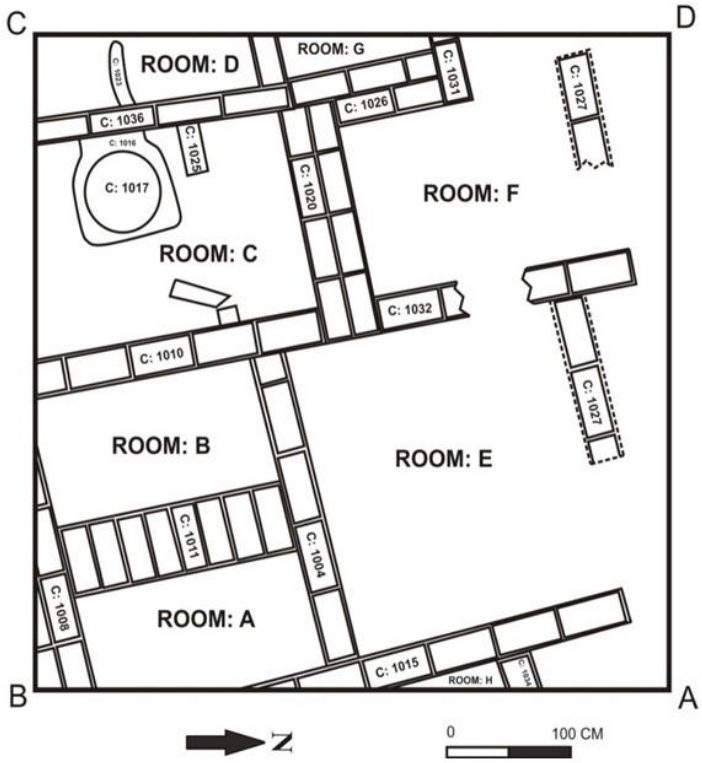

Fig. 5. Plan of architecture from trench I, phase 2 (by H. Kavosh, 2010)

Trench III

An excavation of a trench measuring 5×5 meters was conducted in the vicinity of trench I's western side in order to identify the architecture. Initially, surface materials were collected from the trench, including pottery, stones, and other cultural materials, and the excavation continued to a depth of approximately 150 cm from the fixed point of measurement. A total of 58 different contexts were identified and recorded, which were placed in two structure and deposit groups. The number of deposit contexts is 27 and the structural contexts are 31 different structures including walls, floors, hearths and kiln. Four settlement phases can be identified based on the identified contexts.

Fig. 6. Heaths structure at Trench III (by H. Kavosh, 2011)

In the most recent phase, heated structure (Context 3002) and some soil deposit were obtained, which are located from the surface of the trench to a depth of about 50 cm. Under the first phase, approximately 95 cm deep, the second phase consists of the remains of mud brick walls, three hearths, and several layers of floors.

One method is the construction of rectangular walls with circular interior spaces using a rectangular framework outside (Context 3006), whose size is approximately 75 × 70 cm, with an inner space diameter of 50 cm and between 10 and 20 cm in thickness. The other hearth has a circular shape (Context 3008) [Fig. 6]. The hearth has an inner diameter of 37 cm and an outer diameter of 46 cm. There are similar examples of these hearths in Shahr-i Sokhta,[24] Graziani[25] and Taleb Khan.[26]

[24] Salvatori & Vidale, 1997: Fig. 23.
[25] Kavosh, Vidale & Fazeli Nashli, 2019: 60.
[26] Kavosh, 2022.

Fig. 7. Remnants of three reconstructed floors (by H. Kavosh, 2011)

There were many walls built from north to south during this architectural phase, often with a row of mud brick walls still standing. The walls were also covered with straw mortar. There are several layers of thatched floors that were constructed during this architectural phase. The average thickness of these floors is between 5 and 10 cm, in figure 6, it is clear that the floor of the room has been rebuilt three times [Fig. 7].

The third phase consisted of mud brick walls, a hearth (Context 3033) and a pit (Context 3036) which is located at a depth of about 130 cm. During this phase, two architectural spaces with mud brick walls were created in the northern half of the trench and a pit in the southern half. In contrast to contexts 3011 and 3012 (the northern parts of the second phase), where the walls are parallel, contexts 3028, 3029, and 3034 (the southern parts of the second phase) have different spaces whose walls are perpendicular to each other.

In the fourth phase, mud brick walls and the remains of a hearth were found (Context 3051). The hearth is almost in the centre of the trench, and there were nine mud bricks revealed from its wall. The bricks are stacked vertically next to each other, and the shape of the hearth is horseshoe (semicircle). There is a red colour on all the mud bricks of this kiln since they have been heated from the inside [Figs. 8, 9].

Fig. 8. Architectures and Heath at Trench III (by H. Kavosh, 2011)

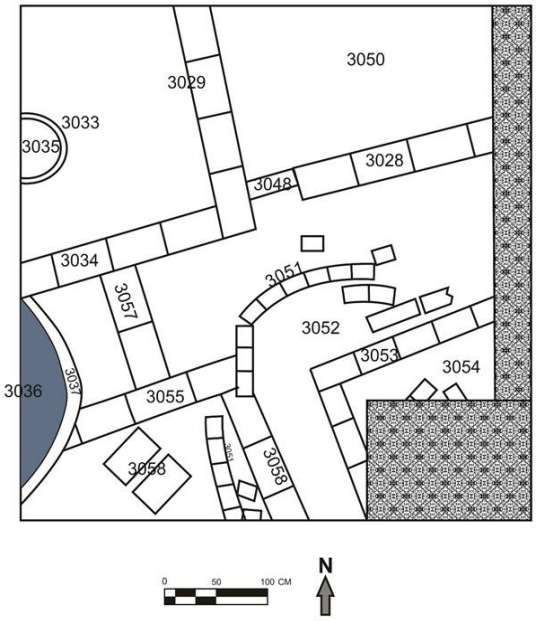

Fig. 9. Plan of architecture from trench III (by H. Kavosh, 2011)

Pottery

In general, the pottery obtained are buff and red, although it is rare to find grey pottery. It should be noted that all of the pottery mentioned here is wheel-made and made on an advanced pottery wheel. Tape Yal's pottery is made of mineral temper and sand. In the inner surface of the clay pieces, marks left by the wheel are clearly visible. A large amount of decoration is seen on pottery in Shahr-i Sokhta during the second and third periods, but in the fourth period, there is no decoration on dishes, and this tradition is also found in Tape Yal pottery. The pottery had geometric painting on the outside in the lower layers, but the upper layers were generally plain and without patterns. Aside from geometrical decorations, carved decorations are rare in pottery. It has been stated that all the pottery obtained from Tape Yal was wheel-made, and Vidale and Tosi agree that the occurrence of some pottery made directly on a pottery wheel was a characteristic of the pottery of the late third period of Shahr-i Sokhta, which peaks during the fourth period.[27]

Pottery No. 3 [Fig. 10.3] is comparable to Shahr-i Sokhta phases 1 and 0[28] and layers attributed to Shahr-e-Sokhteh III and IV Graziani,[29] pottery No. 4 comparable to the pottery of the related site no 29 of Shahr-i Sokhta dated by Moradi to the IV period of Shahr-i Sokhta,[30] pottery No. 5 [Fig. 10.5] contains a bowl with an out-flaring rim comparable to the pottery discovered from Mondigak IV.3,[31] Pottery No. 8 is comparable to Graziani pottery.[32] Pottery No. 9 [Fig. 10.9] including an open mouth bowl with turned inwards rim which in terms of form, it is comparable to the 0 phase pottery of Shahr-i Sokhta,[33] Shahr-i Sokhta IV[34] pottery from Shahr-i -Sokhta related-site No. 32 dated to the period of IV in Shahr-i Sokhta by Moradi and his colleagues,[35] Garaziani,[36] IVB1 period of Yahya[37] and Mondigak IV.3[38] that by comparing the discovered pottery the settlement of this site can be considered relatively related to the Shahr-i Sokhta III and IV phases.

[27] Vidale & Tosi, 1996.
[28] Biscione, 1974: Fig. 9.
[29] Kavosh, Vidale & Fazeli Nashli, 2019: Fig. 123, no. 18.
[30] Moradi, *et al*., 2022: Fig. 11, No. S.29.18.
[31] Casal, 1961: 97, 720.
[32] Kavosh, Vidale & Fazeli Nashli, 2019: Fig. 124, no. 1-15-6.
[33] Sajjadi, 2019: 63, Fig. 56.
[34] Moradi, 2019: Figs. 7, 10 & 11.
[35] Moradi, *et al*., 2022: Fig. 11, No. S.32.2.
[36] Kavosh, Vidale & Fazeli Nashli, 2019: Fig. 123, no. 6.
[37] Lamberg-Karlovsky & Potts, 2001: 173, Fig. 6.12, J.
[38] Casal, 1961: 128, 737.

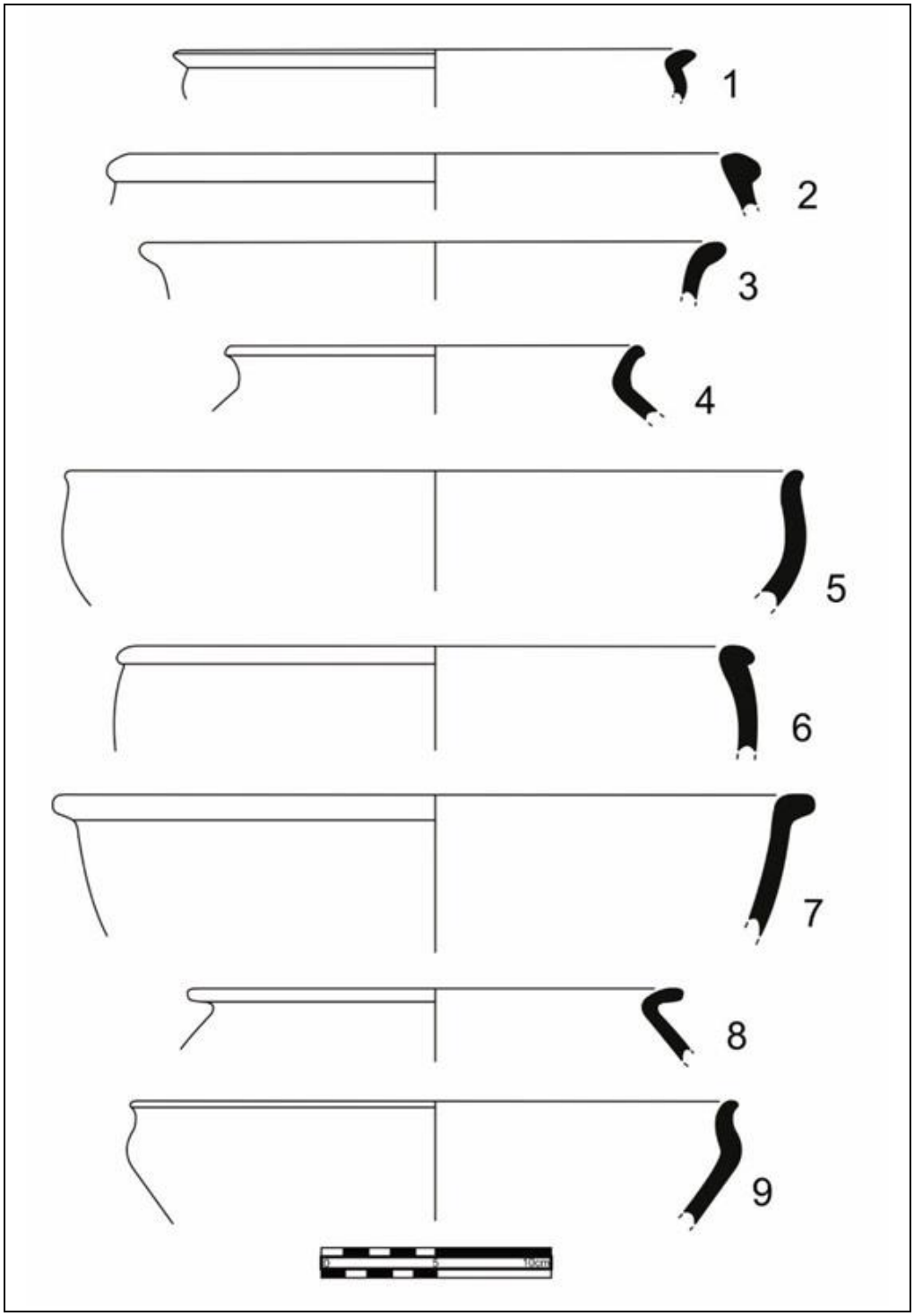

Fig. 10. Pottery drawing of Tape Yal (by H. Kavosh, 2010)

Small findings

During the excavation of the architectural spaces, various small finds including human [Fig. 11.1] and animal figures [Fig. 11.2], raw clay tablets [Fig. 11.3], tokens [Figs. 11.4-5), metal [Fig. 11.6] and bone awl [Fig. 11.7], grand stone [Figs. 11.8-9], clay moulds [Fig. 11.10], vessel [Fig. 11.11] and sling stones in unbaked clay [Fig. 12] were found. grand stones are considered a means for the food production process in the ancient society, and the above grand stones were probably used to grind grains in Tape Yal [Figs. 13.2-3]. One of the important findings of this season of excavation can be considered as a broken piece of a clay tablet, which was also found in the sixth season with several other tablets with counting marks. Such tablets were used in large parts of Iran in the 4th millennium BC, but it seems that the people of the Sistan plain continued to use these tablets in the 3rd millennium BC, whose samples were also obtained from tape Taleb Khan.[39]

Also, a stone token [Fig. 14.1], a stone pendant [Fig. 14.2], several stone beads in different shapes [Figs. 14.3-7], semi-precious stones [Figs. 14.8-11] and some chipped stone arrowheads [Figs. 14.11-16], all of which are tools for huntting, were found from the surface. These stone tools were probably used for hunting. stone token was also obtained from Taleb Khan.[40] According to the geographical location and the cultural findings obtained from the cultural area of south-eastern Iran, archaeologists always acknowledge the key and important role of this area in the Bronze Age as part of a large transregional trade and exchange network.[41] A lapis lazuli bead [Fig. 14.3] was found on the surface of the site, since during various archaeological researches it has been determined that raw lapis lazuli stone was supplied from Badakhshan in the Bronze Age,[42] so this bead also shows that was probably brought from Badakhshan (as raw material or final product) to the Sistan plain through inter-regional exchanges.

[39] Kavosh, 2012.
[40] Kavosh, 2012.
[41] Lamberg-Karlovsky, 1972; Kohl, 1975; Potts, 2009.
[42] Sarianidi, 1971; Majidzadeh, 1982; Casanova, 2013; Casanova, *et al*., 2015.

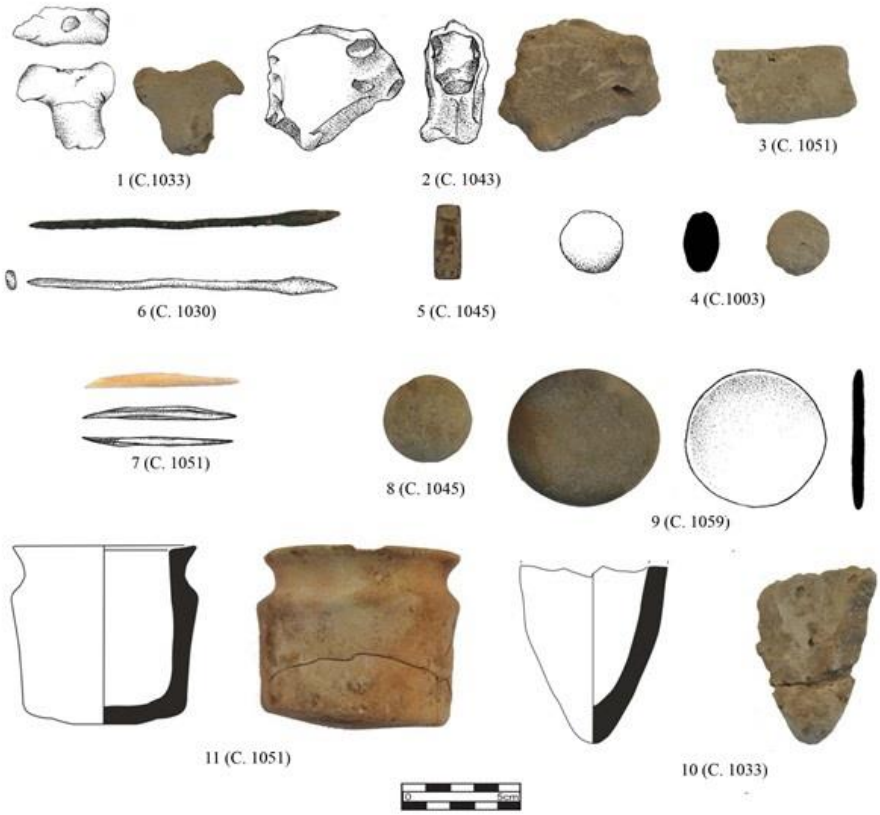

Fig. 11. Small objects from trench 1 (by H. Kavosh, 2010)

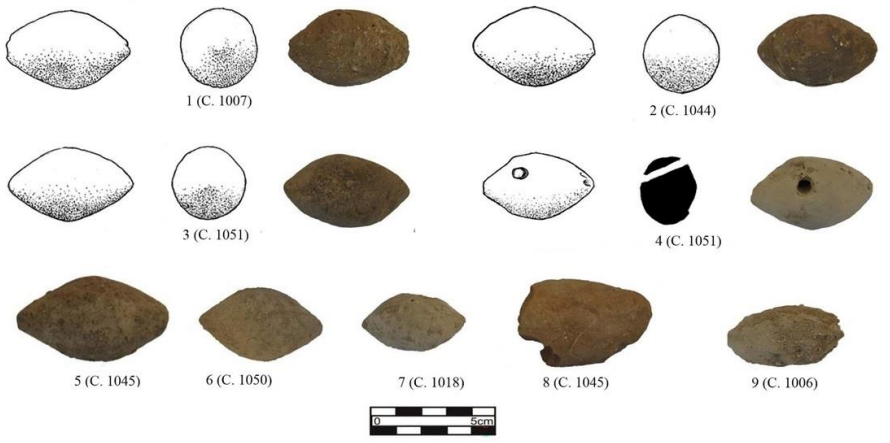

Fig. 12. Sling stones in unbaked clay (by H. Kavosh, 2010)

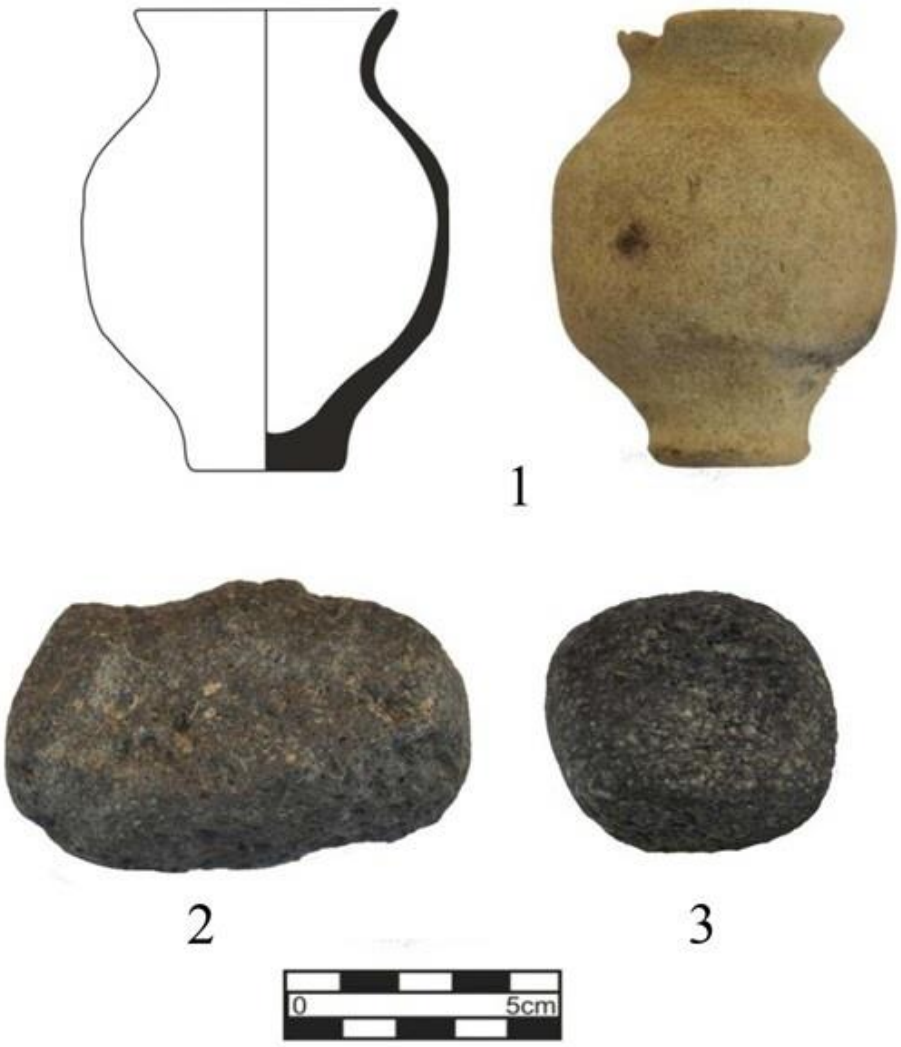

Fig. 13. Vessel and grand stone from tape Yal (by H. Kavosh, 2010)

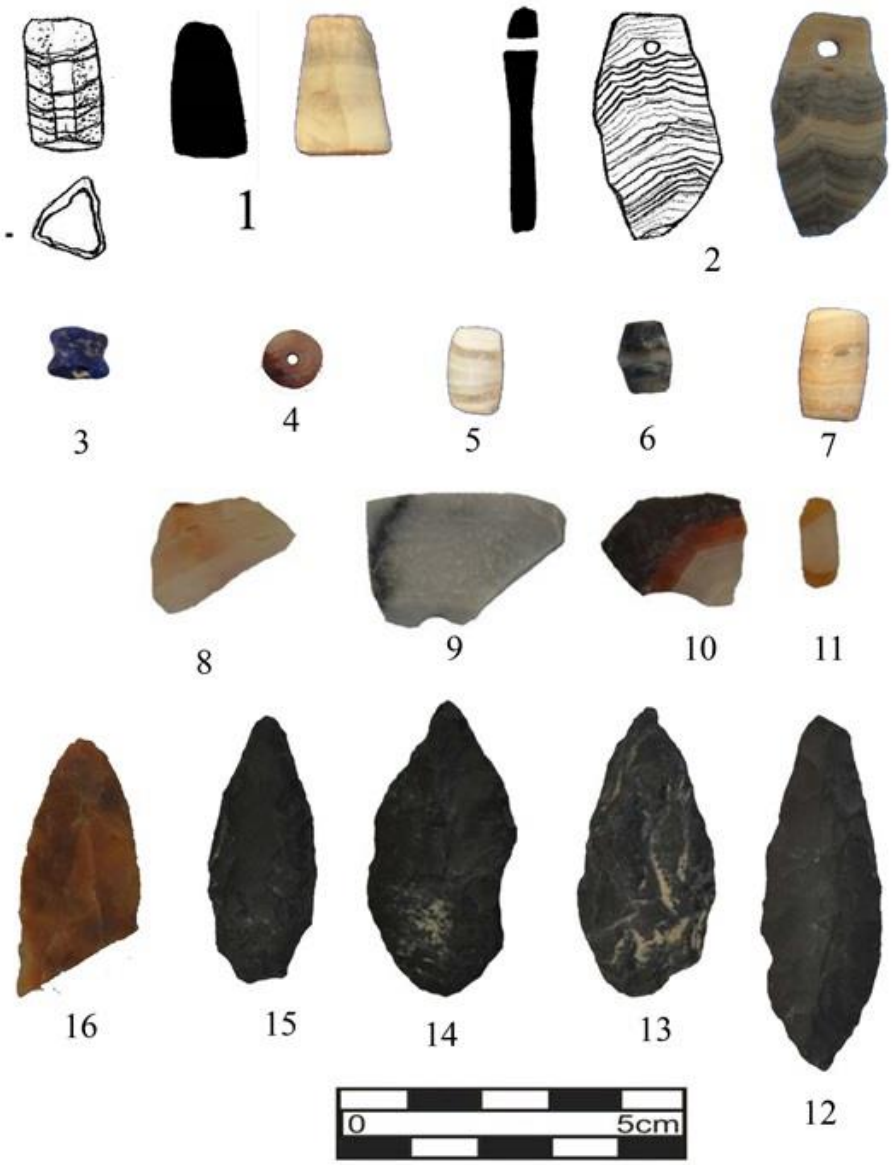

Fig. 14. Small objects from surface site (by H. Kavosh, 2010)

Conclusions

During six seasons of archaeological excavation in Tape Yal, architectural remains and numerous archaeological findings such as pottery, metal objects, seals, tokens, counting clay tablets, figurines were obtained, which can be considered as three residential and administrative parts, including a storage and a workshop. Considering the importance of studying residential architecture in archaeological studies and spatial analysis, in this article, the results of trenches 1 and 3 were analysed. As a result of the excavation, different architectural spaces were identified, which according to the type of spaces and archaeological findings, can be considered as a residential use for this part of the site.

The above-mentioned architecture includes right corner buildings with mud brick and mud-coated materials, and their floors are also made of compressed clay. The architecture of Trench 1 includes two phases, and in the newer phase, the spaces have become smaller by creating walls. Also, the presence of hearths in the architectural spaces is one of the characteristics of this site. During the excavations of Shahr-i Sokhta, Tape Taleb Khan and Graziani, examples of it were obtained, which have two types of plans, the interior spaces are all circular, but the outside is square in some and circular in others. In accordance with pottery finds and C14 results, this architecture was contemporaneous with Shahr-i Sokhta IV during the 2500 to 2300 BC time period. Therefore, the separation of residential and workshop spaces, the presence of hearths in the rooms can be considered as architectural features of Sistan's Bronze Age sites.

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