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EXCAVATIONS AND RESEARCHES AT SHAHR-I SOKHTA 2

Edited
Seyyed Mansur Seyyed Sajjadi
Enrico Ascalone

پژوهشکده باستان شناسی

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TEHRAN 2022

In the Name of God

Excavations and Researches at Shahr-i Sokhta 2

edited by

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Seyyed Mansur Seyyed Sajjadi



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ERSS ('Excavations and Researches at Shahr-i Sokhta') is a peer-reviewed series dedicated to the researches and excavations in eastern Iran, which gives account of studies of University of Salento and Iranian Center for Archaeological Research (= ICAR).

Front cover: Numerical Clay Tablet. Photo: Media Rahmani.
Back cover: Aerial photo of Workshop No. 26. Photo: Media Rahmani.

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Preface

The beginning of a new era, which allows the overcoming of obsolete approaches and, in the same way, the sterilization of 'Europocentric' concepts, in which the bi-laterality of choices can take place within a guideline to be dictated by the host country, owner of the archaeological and artistic heritage, seems today an inescapable step towards the creation of new paradigms that must overcome neo-colonial approaches, mostly camouflaged, certainly less visible than in the recent past, but persistent.

The conviction, since ever, that every single bilateral project has its strength in overcoming the asymmetric relations that are defined within several research groups of dissimilar origin, represents the priority base from which to start in the development of a multidisciplinary research project that has a strong international vocation.

On the basis of what has been written and what has been done in Iran since 1993, the request I received to work on the field in one of the most important sites of the Middle East represented an indispensable opportunity that, however, had to be recognized, as for my collaborators, in a container of ideas that defined solid theoretical bases, in which the 'recognition' of the host country and its cultural policy was not a mere rhetorical exercise but a metabolized action, unconsciously acquired, without baroque redundancies.

In order to activate a project of this kind, with the theoretical basis just described, without any derogation, I have contracted debts of gratitude with many people and institutions, who have played a fundamental role in the implementation and development of our research, to which I would like to express my deepest thanks.

First of all I have to thank the Research Institute for Cultural Heritage and Tourism (= RICHT), Dr. S.M. Beheshti ans Dr. J. Golshan for their total harmony with our scientific proposals and support to the project started in 2016, and their Offices, well represented by Dr. M. Kholghi and her colleagues Dr. S. Kiani and Dr. M. Ilkhani who, even in the critical issues, have always been able to find solutions that would allow the development of our research ideas. Likewise, I have to remember Dr. H. Choubak, former Director of the Iranian Center for Archaeological Research (= ICAR) until 2018, who played an essential role in the success of the project, and the current Director, Dr. R. Shirazi, who showed the same sensitivity to the commitments made to Shahr-i Sokhta in these early years of research.

On the Italian front, I must extend my due thanks to the Ministry of Foreign Affairs and International Cooperation (= MAECI) for its active contribution to our project, immediately considered a priority in the perspective of bilateral relations between the two countries (Italy and Iran), relations historically determined by the choice of paths of sharing and collaboration. In this perspective, I would like to thank the ambassadors of our country who have followed one another in Iran since 2016, Excellence M. Conciatori and Excellence G. Perrone, and the Cultural Attachés of the Embassy of the last few years, Prof. C. Cereti and Dr. V. Russo Spena, who have always followed our work with interest, promoting it both in Italy and in Iran, allowing us to convey our results within a wider basin of events.

With no less emphasis, I would like to thank the University of Salento, its Dean, Prof. Fabio Pollice, and the Department of Cultural Heritage, in particular Prof. F. Baffi, a key driver for the start of the project, and the Directors of the Department of Cultural Heritage, Prof. Raffaele Casciaro and Prof. G. Tagliamonte, who shared and shares not only work strategies but also ideas of

wider value in a framework oriented towards scientific productivity and sharing common experiences with the Iranian mission of Mansur Sajjadi.

This is the appropriate place to thank all those who develop their research at Shahr-i Sokhta, professors who represent the core of the MAIPS (Prof. G. Ceraudo, Prof. P.F. Fabbri, Prof. Fiorentino, Prof. C. Minniti), those who have contributed to the volume with their own writing (Dr. S. Festuccia, Dr. A. Potenza), those who helped me in the realization of the volume, Dr. V. Cardini, G.A. Minaya, and Dr. R. Rivoltella without which the publication's release times would have expanded worryingly. In these thanks I would also like to thank Dr. A. Leone for having participated in the first two excavation campaigns which are the subject of this volume.

Finally, I would like to thank the organizations and private people who have funded and are, in different and different ways, subsidizing our project, supporting what MAECI, Department of Cultural Heritage of the University of Salento and University of Goettingen have so far allowed to do. In particular, I owe my gratitude to Dr. G. Mancuso, for his willingness and passion put at the service of our excavations in Shahr-i Sokhta, and to the CEFLA company, immediately interested in what we have done and what we will do in the major center of Sistan.

A thought is due to all the members of the Iranian mission directed by Mansur Sajjadi who have never made us feel the hardships of our long stays in such distant regions; to Dr. H. Moradi, Prof. H. Sarhaddi Daddian, Dr. S. Parsaiian, Dr. M. Rahmani, Dr. R. Zarruri, Dr. J. Marhashi and Dr. S. Amini, I want to express all my gratitude for the many days spent together, days spent with the conviction that we were always in the place where we wanted to be.

As is often the case, lastly we would like to thank those who first made possible these years of work in Shahr-i Sokhta; I would like to thank Mansur Sajjadi for his hospitality within the Iranian mission, for sharing the scientific results he collected between 1997 and 2015 and for making possible the realization of an idea, first only conceived, finally realized.

Enrico Ascalone

Excavations at Tel Iblis, Bampur, Yahya, Shahdad, Shahr-i Sokhta and, in more recent years, Konar Sandal has shown the importance of southeastern region of Iran in the archaeological investigations dating to the third millennium BC.

Now more than 20 years have passed since the beginning of the second cycle of excavations at Shahr-i Sokhta. Scholars familiar with Sistani research, are well aware with the background of archaeological studies in this region and I do not think it is necessary to repeat in this regard.

In 1997, the second cycle of excavations at Shahr-i Sokhta began and still goes on. In addition to extensive excavations in the graveyard, that have led to the discovery of more than 900 new tombs from different periods, excavations in the Residential Area, especially in the Central Quarter, have led to new discoveries, including a better understanding of the site during last phases of period III and first phases of period IV. On the basis of these last investigation is now clear that the site was still quite large during these last phases of occupation.

In 2016, with the signing of a memorandum of understanding between RICCHT and University of Salento leaded by Enrico Ascalone, a new page was opened in the research of Shahr-i Sokhta. Iranian Archaeological Expedition has proposed to start a series of collaborations, especially in the field of interdisciplinary research and using the experiences and facilities of Italian colleagues in the field of such research. The history of cooperation in archaeological field group dates back to the 1960's when Italian scholars were active in Sistan and the results of their research were very effective in clarifying the history and culture of Sistan. On these bases, here I must mention the role of Umberto Scerrato and Maurizio Tosi which led to in the past the Italian archaeological research in Sistan.

At the end, I would like to take opportunity to express my gratitude to Seyyed Mohammad Beheshti and Jalil Golshan, the former heads of the RICCHT and their collaborators for their continuous support of Expedition. My personal thanks goes also to the main members of expedition, who have performed their duties in the best possible way during the long years of research and excavations: Rajab Mohammad Zaruri, Hossein Moradi, Hossein Sarhaddi Dadian, Saeed Parsaian,

Media Rahmani, Sare Amini, Zahra Sepiani, Zahra Rajabiyun and M.R. Miri head of Pishinpazhuh Cultural Institute, and our local workers for their kind collaborations during past years.

Seyyed Mansur Seyyed Sajjadi

Part I
Archaeological Field-Works

Excavations at Shahr-i Sokhta: Graveyard 2014-2015

Seyyed Mansur Seyyed Sajjadi
Iranian Center for Archaeological Research

1. Introduction

The 14th season of excavations and surveys in Shahr-i Sokhta began on November 15, 2014, and ended on January 15, 2015. During the excavations, a total of 1200 m^2 of the site was surveyed and excavated. About 750 m^2 of the excavations lay within the residential area, 125 m^2 in five test trenches and 600 m^2 in Workshop 26. In the necropolis only two trenches of approximately 200 m^2 were fully excavated and three older trenches of 120 m^2 were reopened and re-examined, resulting in the discovery of some new graves (Figs. 1-2).

After a series of geo-archaeological surveys, areas with architectural remains were prepared for excavation. The evidence included remnants of walls and architectural complexes such as the traces of rectangular structures seen on the surface. In addition, three 5 × 5 m test trenches were excavated in areas believed to have architectural traces: Test Trench 22 in square NRI, located in the north of the necropolis; Test Trench 23 in square XOE located in the northwest of the Eastern Residential Area; and Test Trench 24 in square YHW, about 100 m north of Test Trench 23. No considerable remnants were found in Workshops 22, 23, 24 and 27, although some architectural structures such as a pavement and east-west oriented walls were found in Workshop 25. The excavations concentrated on Workshop 26 (Fig. 3).

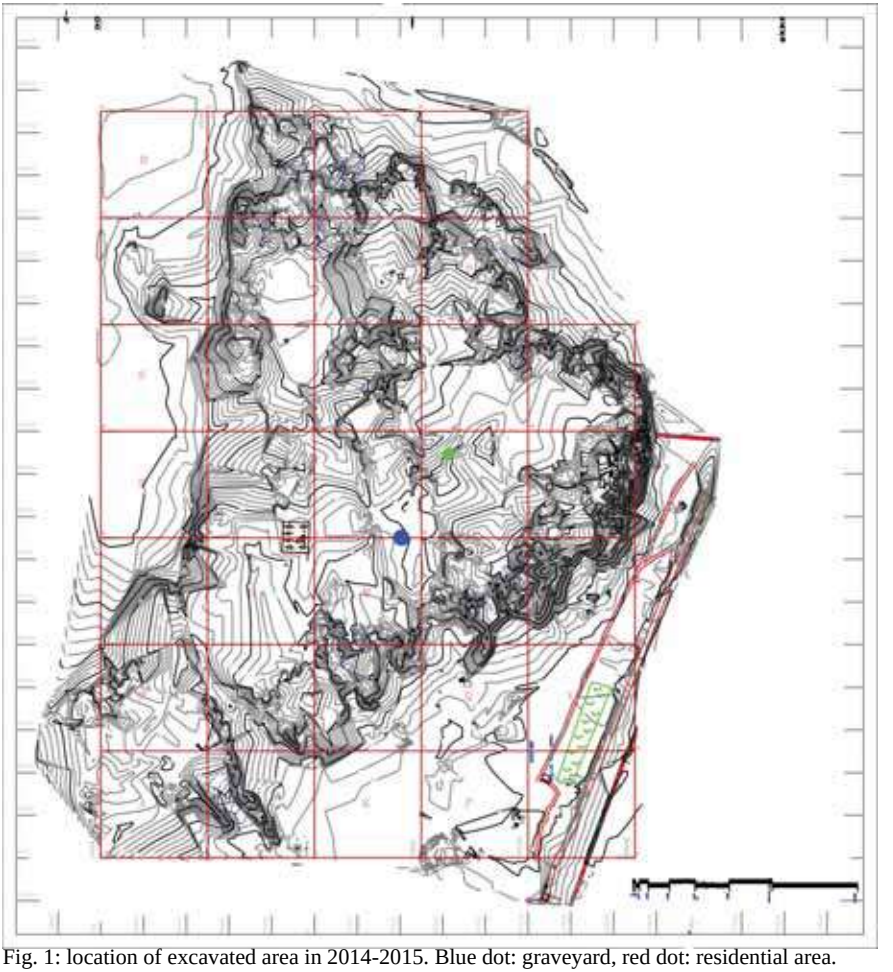

Fig. 1: location of excavated area in 2014-2015. Blue dot: graveyard, red dot: residential area.

This workshop was selected for excavation on the basis of the results of the surface surveys and visual recognition of structures above ground. Overfired black pottery fragments from Period IV were collected on the ground during the surface surveys. Here, the excavation started in nine squares, aiming to find architectural structures from Period IV. During the excavation, Workshop 26 was found to consist of a broad, east-west oriented corridor formed by two parallel walls, each about 1 m thick and 50 m long. Facing each other on the inside of each of these

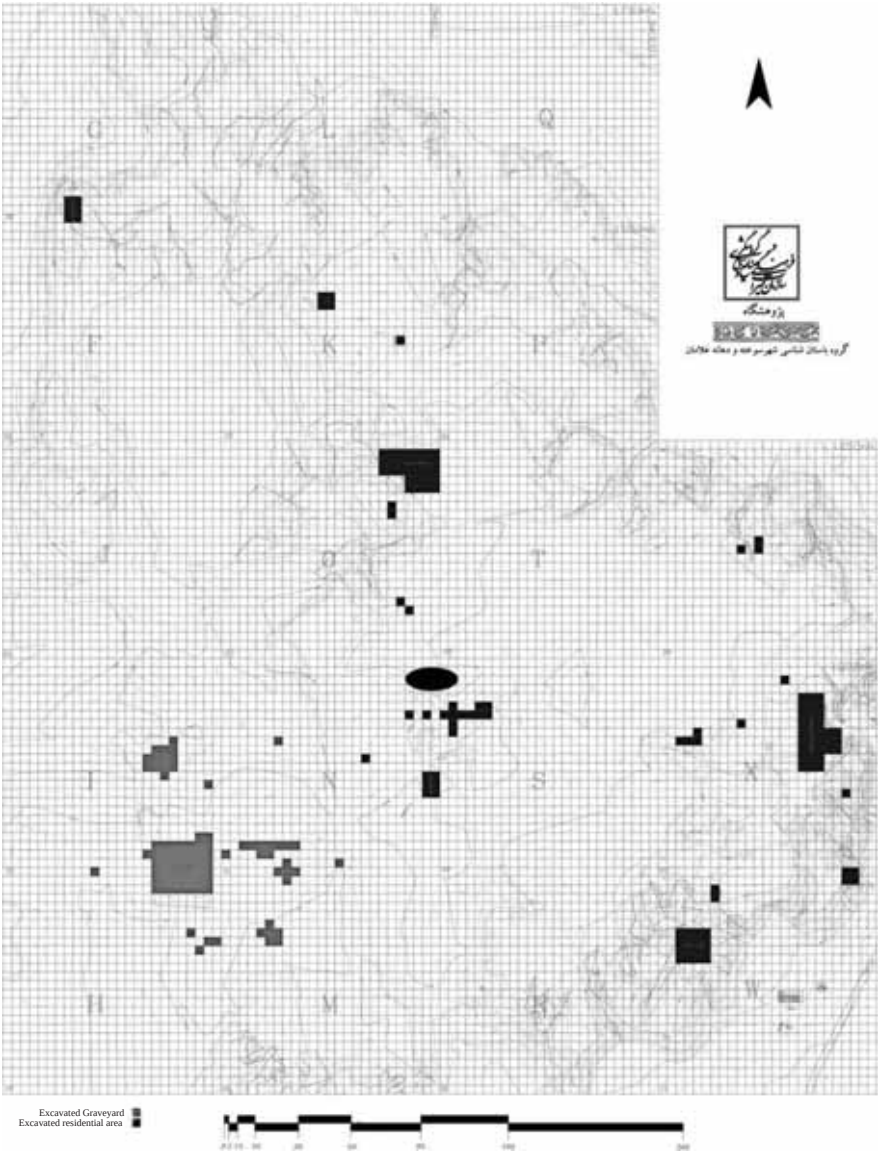

Fig. 2: excavated Trenches. Black: residential area. Gray: Graveyard.

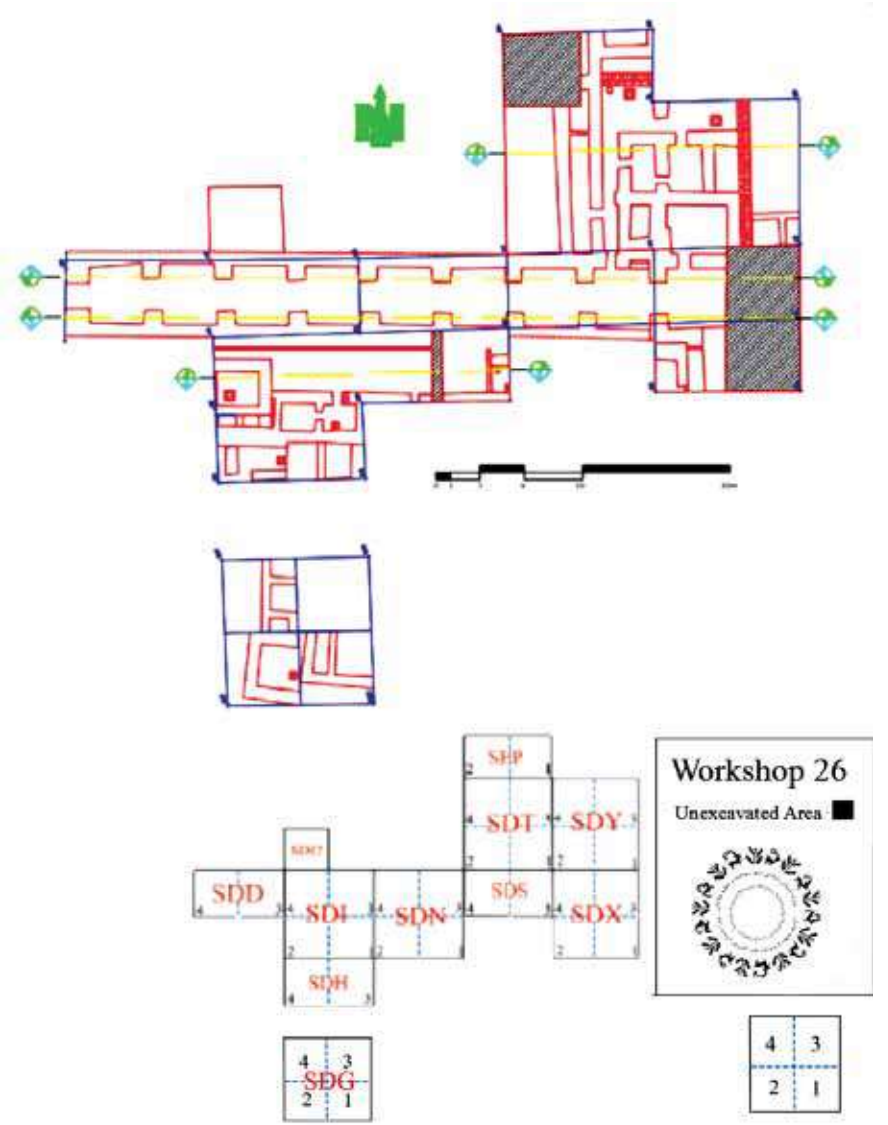

Fig. 3: Workshop No 26. General Plan.

two walls was a series of 9 buttresses measuring 1 × 1 m. Spaced approximately 3.5 m apart, they appeared to function as partitions. Externally, on both the north and south sides of this corridor, there are storage rooms. It is noteworthy that this type of architecture had never been seen before in Shahr-i Sokhta.

2. Excavations in the Necropolis

With an area of 25 hectares, the necropolis of Shahr-i Sokhta is considered one of the largest Bronze Age necropoleis in the Middle East (Fig. 4). For thousands of years, regional watercourses and the changing volume of Hamun lake have affected the western and south-western sections of the site, destroying many graves. It is estimated that the necropolis contains from 37500 to 40000 graves. Although over 1100 graves have been excavated, no grave from the final phases of Period IV or the early phases of Period I have been found, and almost all the excavated graves belong to the phases of Periods II and III. In 2015, excavations were carried out in 5 trenches with an area of 320 square metres in the northern part of the necropolis. (Fig. 5). Trenches NAV, NFF and NFP were 100 square metres each while Trenches MJT and NFK were 10 square metres each. A total of 77 burials were recovered from these trenches. The highest concentration of graves, 35, was found in Trench NFP. (Fig. 6) In structural terms, 54 graves were of the bipartite type, (Fig. 7) 15 were simple pits (Fig. 8), 5 were catacombs (Fig. 9) and 3 were of other or unknown types. (Fig. 10). A total of 84 skeletons of different sexes and ages were recovered, together with 519 grave goods.

The northern and central sections of the necropolis differ in terms of the structure of the graves. In the northern section, two trenches yielded 5 catacomb graves, which is rare in Shahr-i Sokhta. One of them contained over 70 objects and there are believed to have been even more objects made of organic materials that have perished through the ages.

During the excavation of these graves, hundreds of different grave goods were found, among which were marble, ceramic, clay, leather and metal objects. One of the most interesting is a small white marble/gypsum jar of a form unknown in Shahr-i Sokhta, probably an imported item.

The pottery of the northern part of the necropolis also differs from that of the central part. While the vessels of the central part of the necropolis mostly consist of unpainted cylindrical Buff Ware jars, Grey Ware bowls and pear-shaped beakers, in the northern part of the necropolis the vessels consist of large painted flower pots, large painted jars, and medium-sized Buff Ware bowls. In this area the female graves contained a number of polychrome jars with the same forms and motifs as those found in other sections.

The excavations found a type of jar with a lid, which had already been found in previous campaigns. It seems that the function of this type of jar was to keep yeast dough. Analysis of the material inside 3 jars of this type showed the presence of coarse wheat flour or groats, confirming the validity of this theory.

Another significant point is that this type of vessel has probably been produced continually until recent times. A good example is the Khamiru (from the Persian Khamir = dough) vessels in Iranian Baluchistan that were made at least until a few years ago.

Another interesting item found in one of the graves is a painted leather sheet. There are two controversial interpretations of the motif on this artefact, found on the floor of Grave 9034 beneath the skeletons of the buried individuals. According to the first, it shows a row of females wearing V-neck shirts, while the other interpretation considers the design to be a series of geometric triangular forms.

Another group of objects worthy of mention is the incense burners inside the catacomb graves. In previous seasons, examples of these burners were found in the form of fragments of clay items without any indication of their function. The recent campaign unearthed a number of complete samples in catacomb graves consisting of a clay stand or base, a bronze plate, and a small firebox made of raw clay. Inside the cavity of the burner were the remains of very thin burned wooden sticks and ash.

A total of 16 of these objects have been found. Since the bronze plates were placed between the base and the firebox, they remained hidden from view,

becoming visible only as a result of the fracture or wear of the incense burner body.

Six different types of incense burners have been found:

1. Ceramic. Composed of a legged pottery vessel and a fire box. Only one sample of this type has been found.

2. Metal burner with clay firebox.

3. Integrated base and plate. Only one sample of this type has been reported.

4. Cylindrical base, metal plate and firebox. Most of the incense burners found are of this type.

5. Burners with a conical base, very similar to the previous group. It is possible that the conical bases were formed by the erosion of the original cylindrical bases.

6. Integrated burners. In this group, the clay base and firebox, together with the metal plate, together form an integrated burner. This is the only item found in residential areas of the site.

Fig. 4: aerial photo, central part of the graveyard.

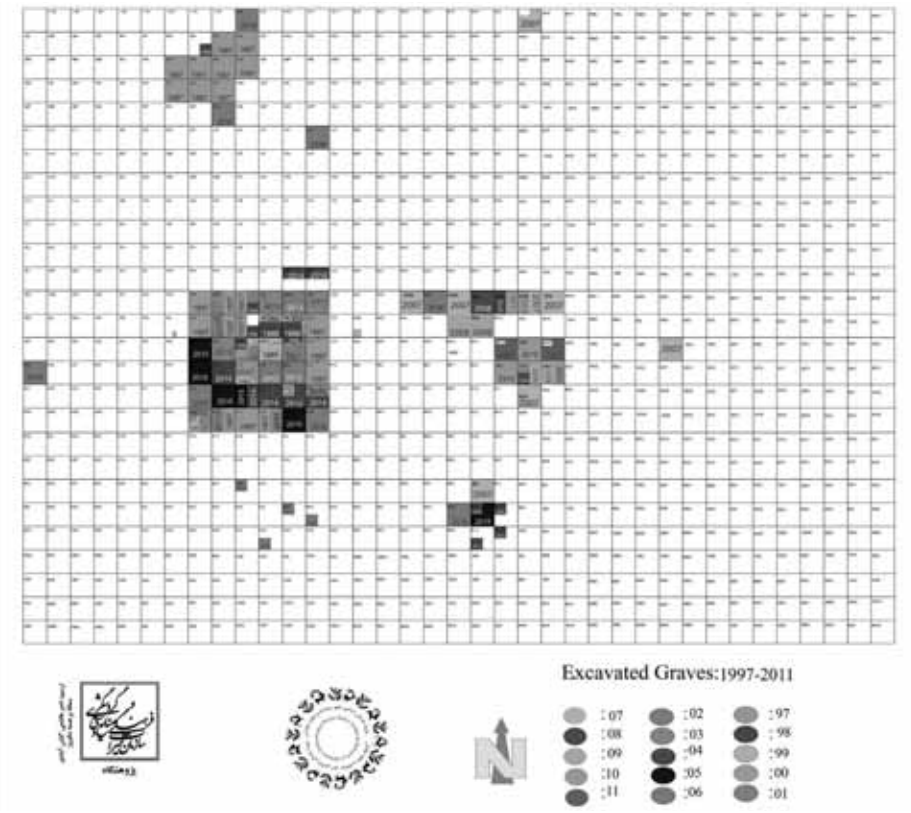

Fig. 5: excavated trenches of graveyard marked by years of excavation (1997-2011).

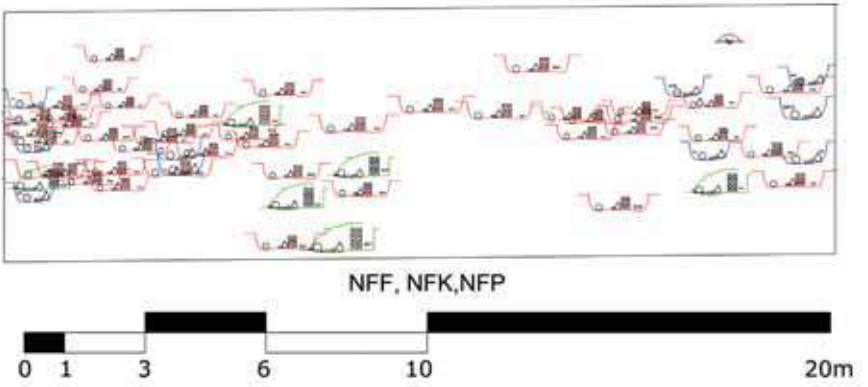

Fig. 6: concentration of the graves in squares NFF, NFK, NFP.

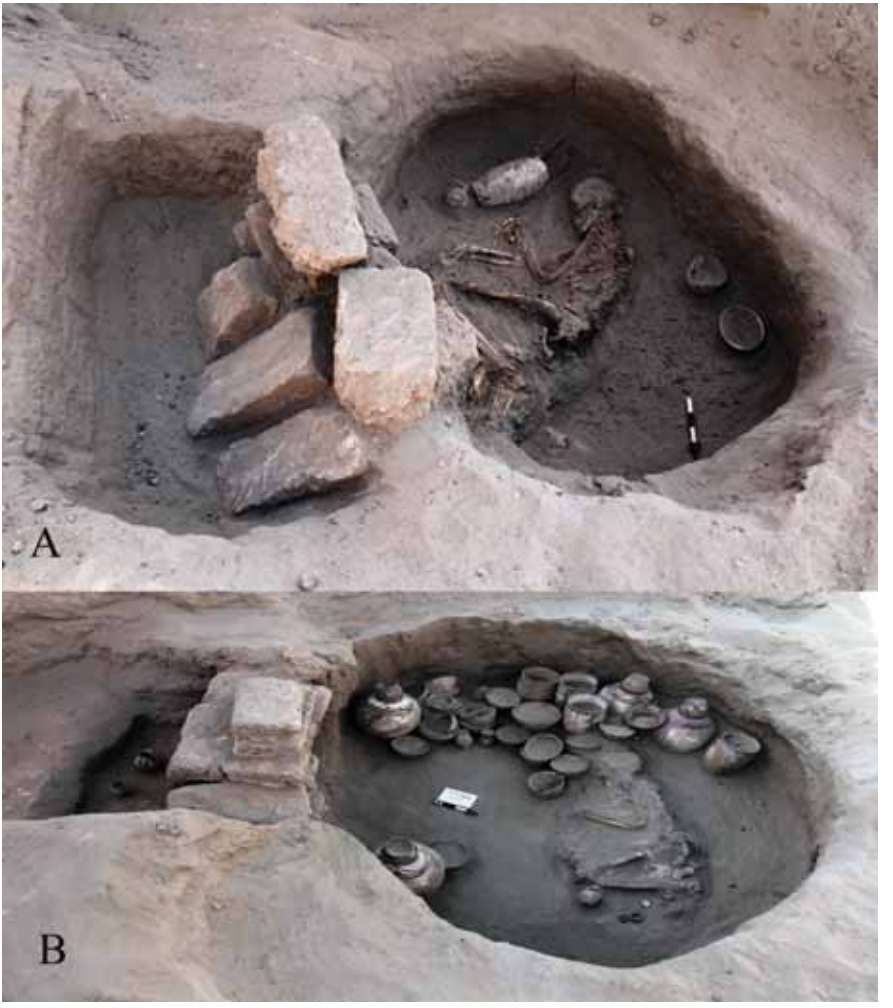

Fig. 7: A: burial No. 9032, an example of bipartite graves. B: bipartite grave No. 9031 (Catacomb grave with a collapsed roof?).

Fig. 8: burial No. 8524, an example of a simple pit.

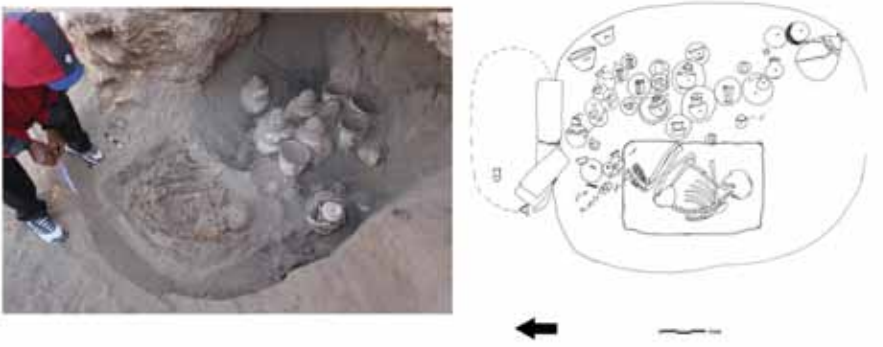

Fig. 9: burial No 9034, an example of a catacomb grave.

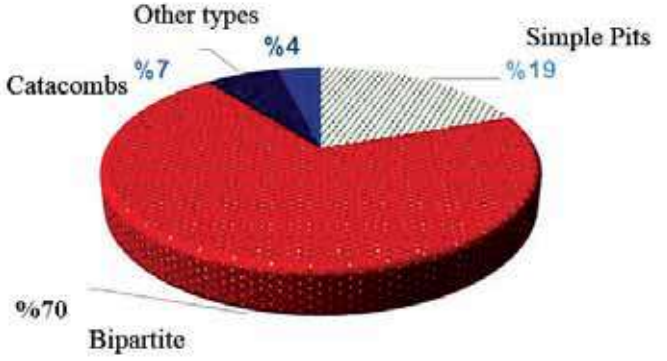

Fig. 10: grave types found during excavations 2014-2015.

Fig. 11: different types of marble vessels: 1. Bowl, Grave NAV 8303/4; 2. Bowl, Grave NEP 9016/2; 3. Mortar, Grave No. NEP 9005/10; 4. Small jar, Grave No. NFF 8906/ 5 (photo M. Rahmani).

Fig. 12: large painted Buff Ware. Cylindrical Jars, Paint color: brown (photo M. Rahmani).

Fig. 13: large painted Buff Ware Jars. Paint color: brown (photo M. Rahmani).

Fig. 14: polychrome lidded *Khamiro* from burial No.9034.

Fig. 15: right: a Khamiru from present-time Baluchistan, left: *Khamiro* from Shahr-i Sokhta (photo M. Rahmani).

Fig. 16: painted leather sheet. G.N.9034 (photo M. Rahmani).

Excavated trenches

Trench NFP

The excavations in trench NFP yielded new cultural data, including new types of graves with mud brick pavements and mud brick dividing walls. New beliefs are reflected in the arrangement of grave goods inside the graves. A total of 35 graves were excavated in this trench (Figs. 21-23).

One of the most interesting burials in this trench is Grave 9034. The individual was buried with a carpet and a rectangular wooden structure lined with plaster similar to an open wooden coffin. One side of the grave was covered with a piece of white and black painted leather (Figs. 9, 16).

Fig. 17: the main components of incense burners. Types of firebox Nos. 1, 2, 3; mirrors Nos. 4, 5, 6; bases, 7, 8, 9 (photo M. Rahmani).

Four catacomb graves were found very close to each other in NFP (Fig. 22), Again, the vessels found in these graves were unlike those found in other parts of the necropolis. Given the great similarity between the objects of these graves, it is believed that the owners of these four catacombs were members of the same family. They included: oval Grave 9025 in the southwest of the trench, containing an adult skeleton and 35 objects (29 ceramic vessels, 2 metal artefacts, 1 stone

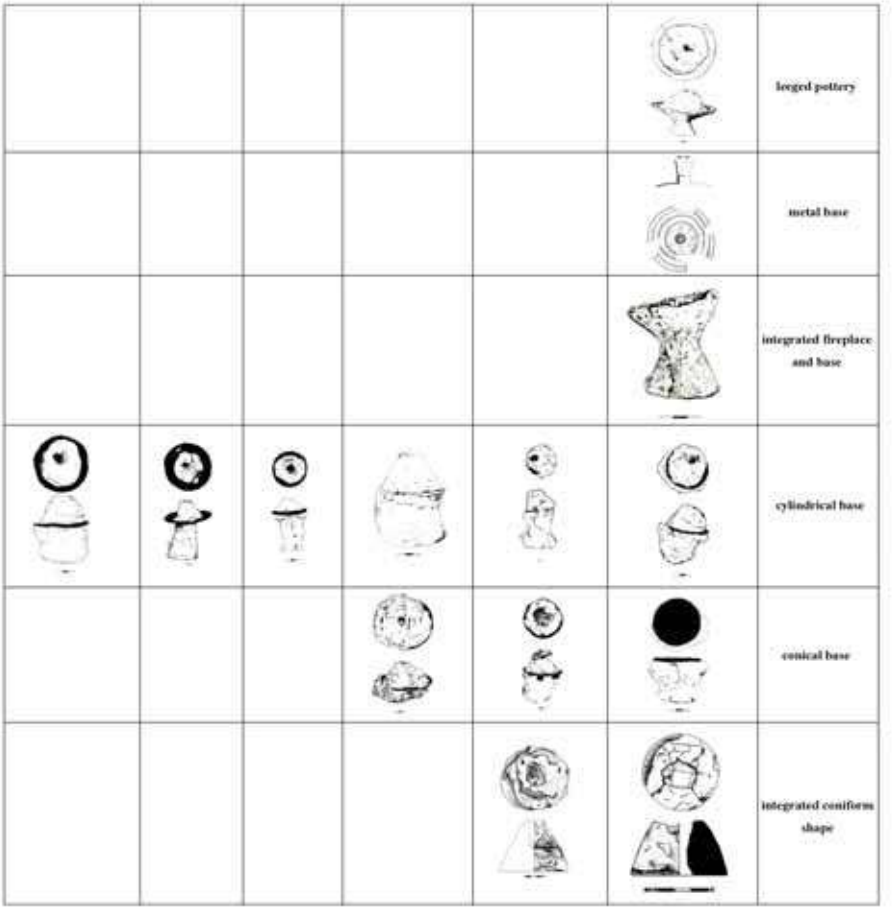

Fig. 18: different typology of incense burners.

artefact, 2 beads), and Grave 9029, in the northeast corner of the trench, which is oval-shaped with a mud brick partition in the southeast corner made out of 6 mud bricks laid in three rows longitudinally. Grave 9029 contained one human skeleton (male) that was laid in a foetal position on the left side with a southeast-northwest orientation and 28 objects. Grave 9031, in the western half of the trench and oval-shaped, was closed by a wall on the south-eastern side with 15 mud bricks laid longitudinally and transversely in 6 rows. This grave had one adult

Fig. 19: incense burners: grave Nos.: 1. G.N 25/9122.; 2. G.N.9130; 3. G.N.8303 (photo M. Rahmani).

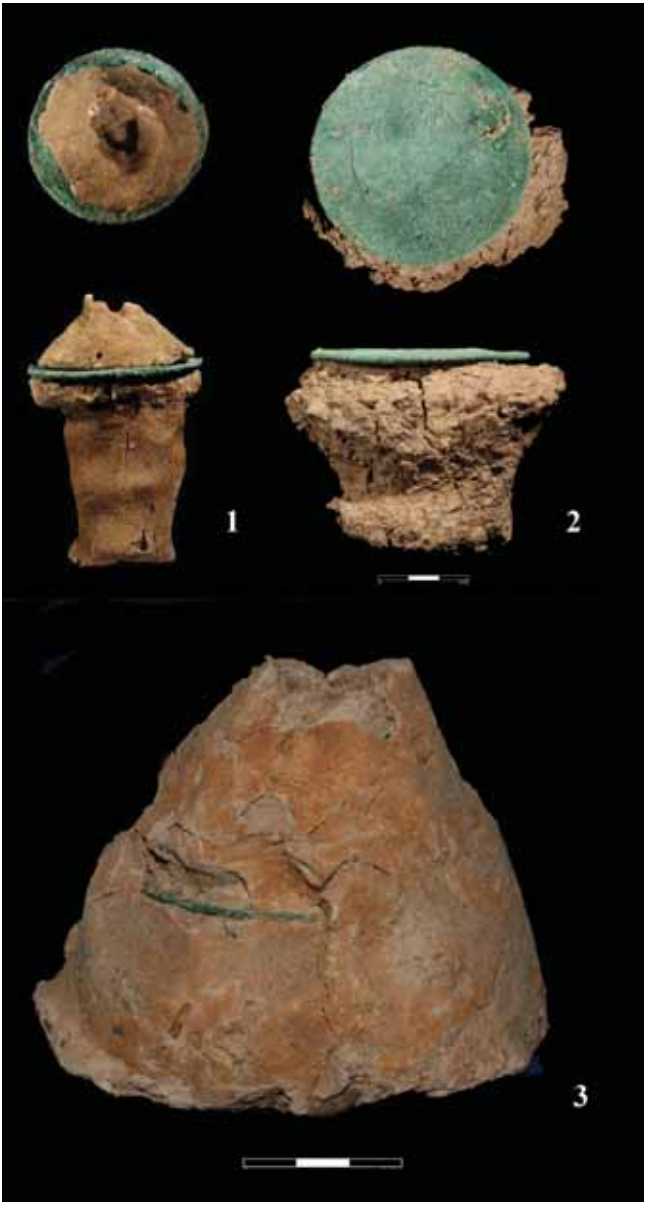

Fig. 20: incense burners: grave Nos: 4. G.N.9024; 5. G.N.9029; 6. G.N.8620 (photo M. Rahmani).

skeleton buried in a foetal position on the left side, with a southeast-northwest orientation. Other than the skeleton, the grave contained 53 objects including 49 ceramic vessels, 1 metal object, 1 stone object and 2 beads. Grave 9034 is located on the eastern side of the trench. The closing wall was installed on the north side of the grave and has 8 rows of mud bricks laid longitudinally (in two lines) and transversely. This grave had one adult skeleton buried in a foetal position on the left side with a south-north orientation. It contained 43 donative objects including 37 ceramic vessels, 2 metal artefacts, 1 stone artefact and 1 bead. A small marble jar or vase with an intricate structure was unearthed in Grave NFF 8906. The object, which was made out of plain white (no veining) marble, is 16.5 cm high and its rim is only 2.5 cm across (Figs. 22-24).

Trench NAV

This 10 × 10 m trench is located approximately 40 m east of the central part of the necropolis. About 90 m2 of this trench had been excavated to a depth of 80 cm in 2013 and the rest was excavated in the 2015 campaign (Fig. 27) According to the records, the trench surface was covered in gravel without vegetation or cultural materials. A total of 12 graves (8404-8414) were found including 4 simple pits and 8 type 2 or bipartite burials (Figs. 28-29). In total, 6 adult and 8 child skeletons plus 32 objects were recovered from these graves (Fig. 30). Most of the grave goods were found in Graves 8403, 8404, 8405 and 8407, the last of which had the most objects. Grave 8411 had the least objects and Graves 8408, 8409, 8410, 8412 and 8413 had no objects. Another aspect of this trench is that there were two graves with headless skeletons buried in no apparent relationship to each other. Due to the existence of a soft upper layer, the preservation of these graves was not good, with the majority of the skeletons severely decayed and powder-like. The trench had no special structural or burial characteristics and was in line with the burial tradition of Shahr-i Sokhta in general. The excavation was continued to a depth of 150 cm.

Trench MJT

This 10 × 10 m trench is located about 80 m east of the Central part of the

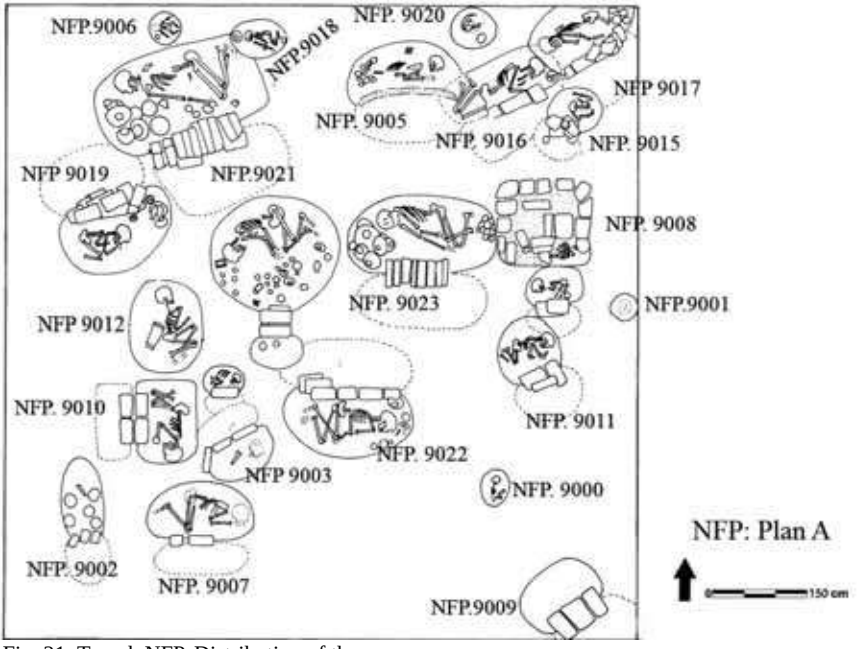

Fig. 21: Trench NFP. Distribution of the graves.

necropolis. The total surface area of this trench had been excavated to a depth of 150 cm in the 2009 season. In the 2015 campaign, 10 m^2 of the trench was re-excavated to a depth of 181 cm and three new bipartite burials (Figs. 31-32) were unearthed. The trench surface was covered with gravel with no vegetation or cultural materials. Two adults and one child skeletons, together with 38 objects, were found in these graves (Figs. 33-35). Due to the existence of a stiff and impermeable layer over the graves, their preservation status was quite good and all the skeletons were intact. The trench had no special characteristics regarding the structure and type of the burials and was in line with the general tradition of Shahr-i Sokhta.

Trench NFK

This 10 × 10 m trench is located about 60 m east of the central part of the necropolis. In previous campaigns 3 graves had been found in this trench. In 2015,

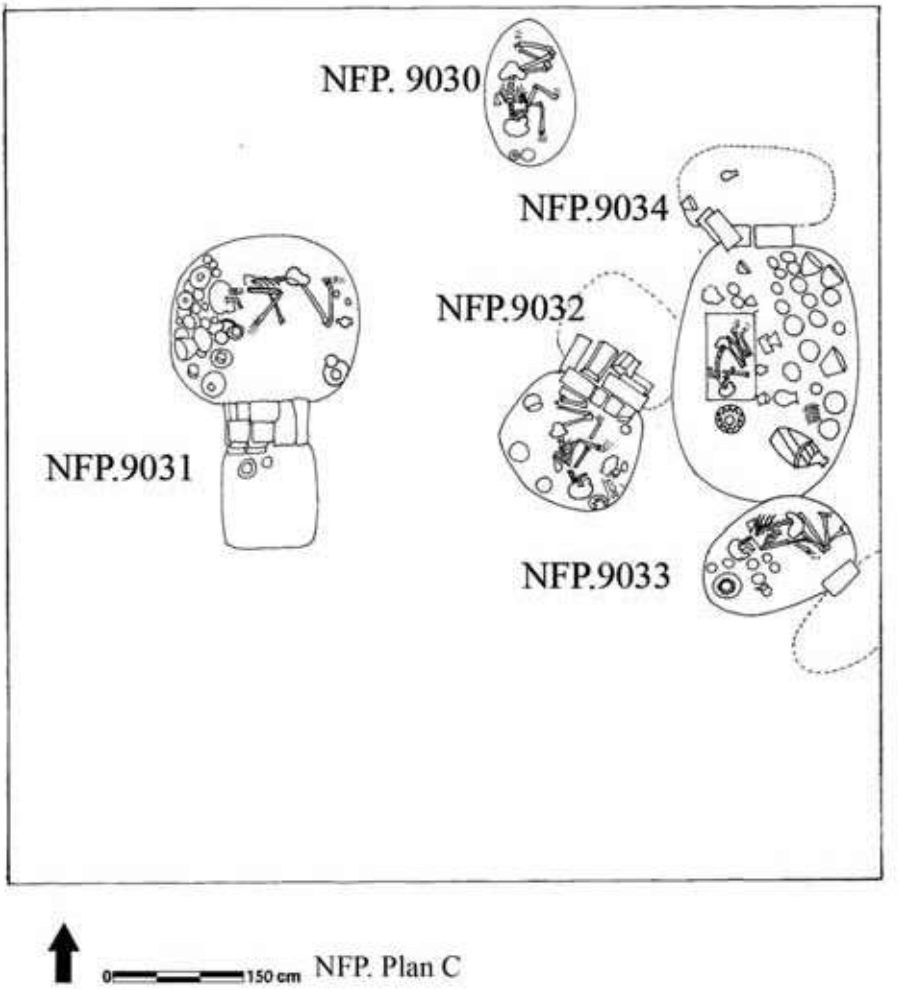

Fig. 22: NFP. Catacomb graves.

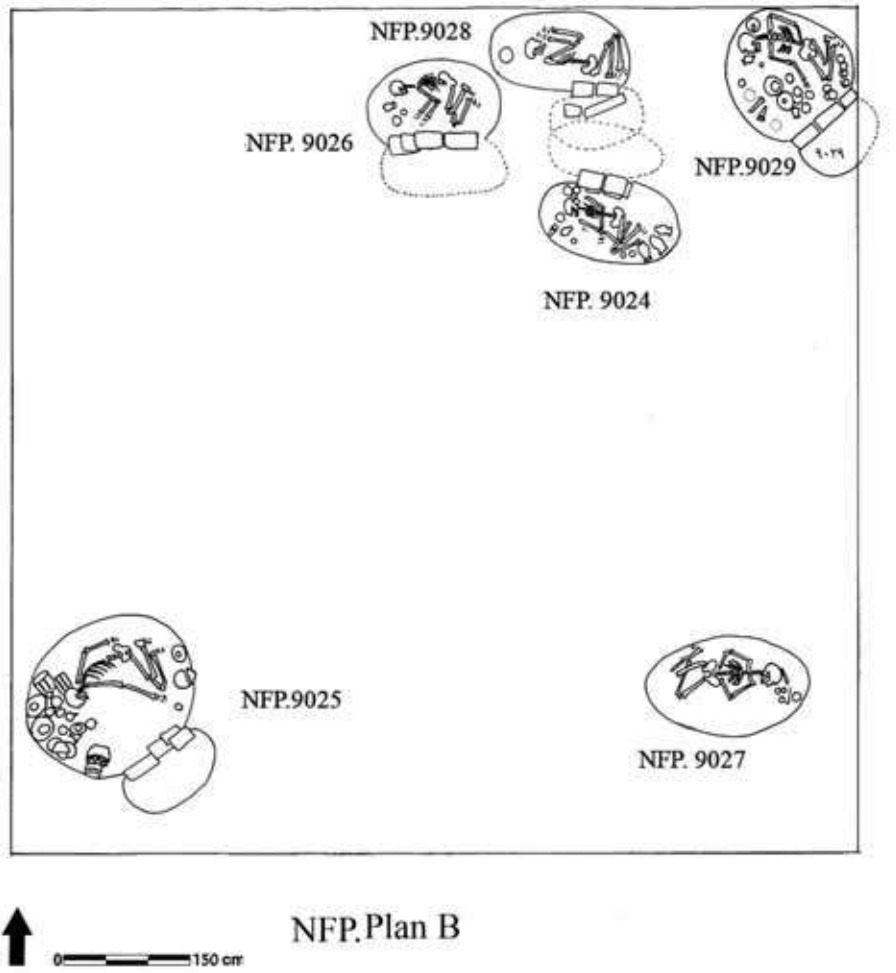

Fig. 23: Trench NFP. Bipartite graves.

Fig. 24: NFP. Grave goods. 1. Painted Buff Ware cylindrical flower vase. Light brown geometric decoration, G.N.9025/22; 2. Painted Buff Ware cylindrical flower vase. Dark brown geometric decoration, G.N.9027/25; 3. Painted Buff Ware bowl. Internal black painted decoration. 4. Alabaster cosmetic bottle, G.N.9032/8; 5. Painted Buff Ware jar. Brown geometric decoration, G.N.9021/1; 6. Painted Buff Ware deep bowl. Red zoomorphic decoration. G.N.9032/1; 7. Marble small bowl. G.N.9005/10; 8. Painted Buff Ware small jar. Black geometric decoration, G.N.9019/20; 9. Plain Buff Ware plate. G.N. 9022/11 (Photo M. Rahmani).

Fig. 25: NFP. Grave goods: 1. Painted Buff Ware jar, brown color combination of geometric and zoomorphic decoration. G.N.9025/30; 2. Painted Buff Ware pear shaped beaker. Brown color geometric decoration. G.N.9019/21; 3. Painted Buff Ware pear shaped beaker. Brown color zoomorphic decoration. G.N.9019/12; 4. Plain Buff Ware twine small jar. G.N. 9023/12; 5. Clay/bronze incense burner. G.N.9029/48; 6. Bronze stamp seal. G.N.9025/35 (photo M. Rahmani).

Fig. 26: NFP. Grave goods. 1. Polychrome jar. Brown-red colour geometric decoration, G.N.9025/30; 2. Painted Red Ware jar. Brown colour geometric decoration. G.N.9018/1; 3. Polychrome bulbous shaped small jar. Red-brown color geometric decoration. G.N. 9005/00; 4. Painted bulbous shaped small jar. Brown color geometric decoration. G.N.9016/3; 5. Painted Grey Ware bowl. Internal/external black color geometric decoration. G.N.9021/10; 6. Painted Buff Ware beaker. Brown color geometric decoration. G.N. 9019/13; 7. Plain Buff Ware bowl. G.N.9005/13 (photo M. Rahmani).

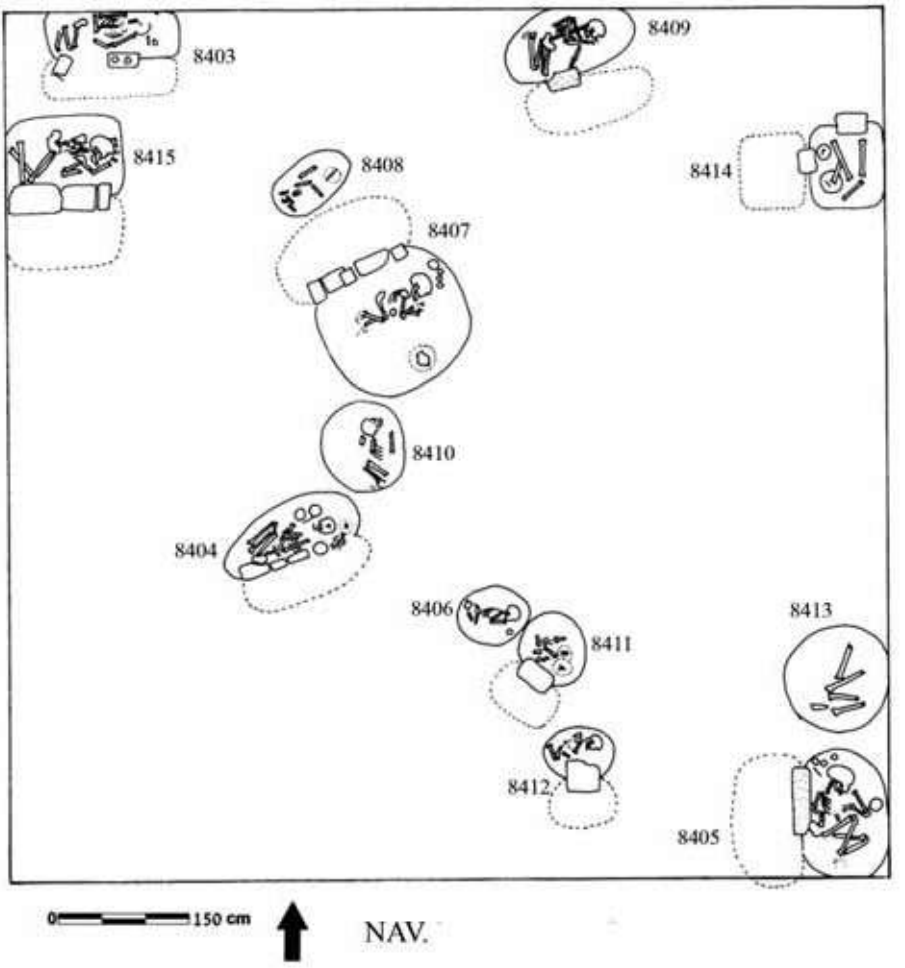

Fig. 27: Trench NAV. Distribution of the graves.

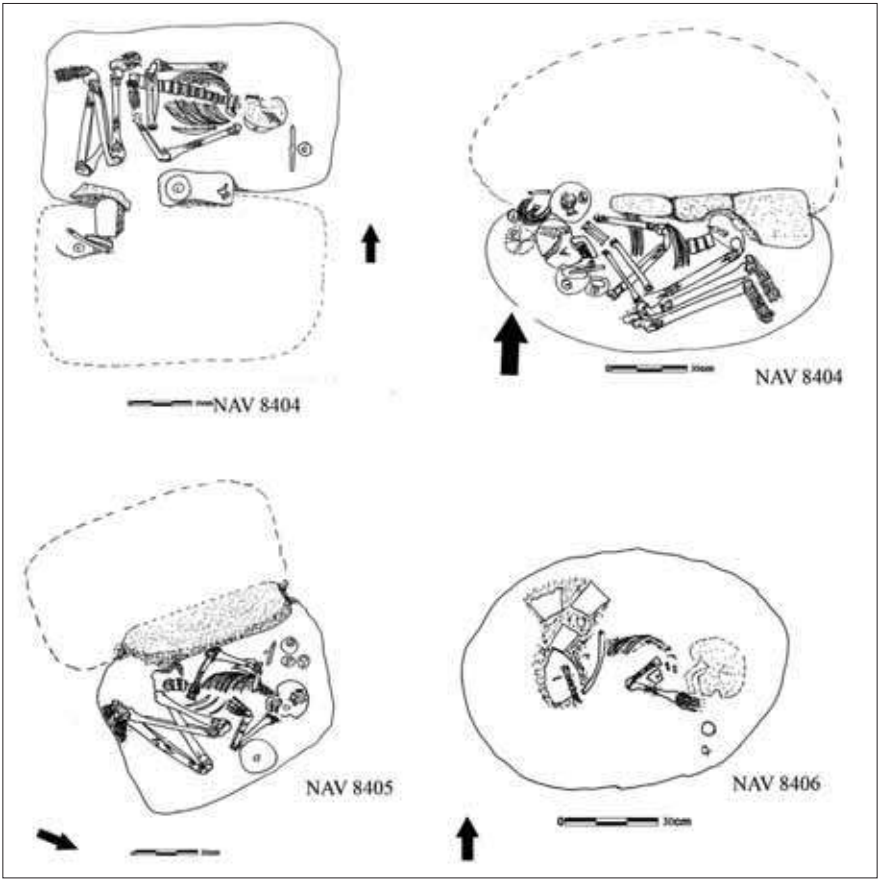

Fig. 28: Trench NAV. Bipartite graves.

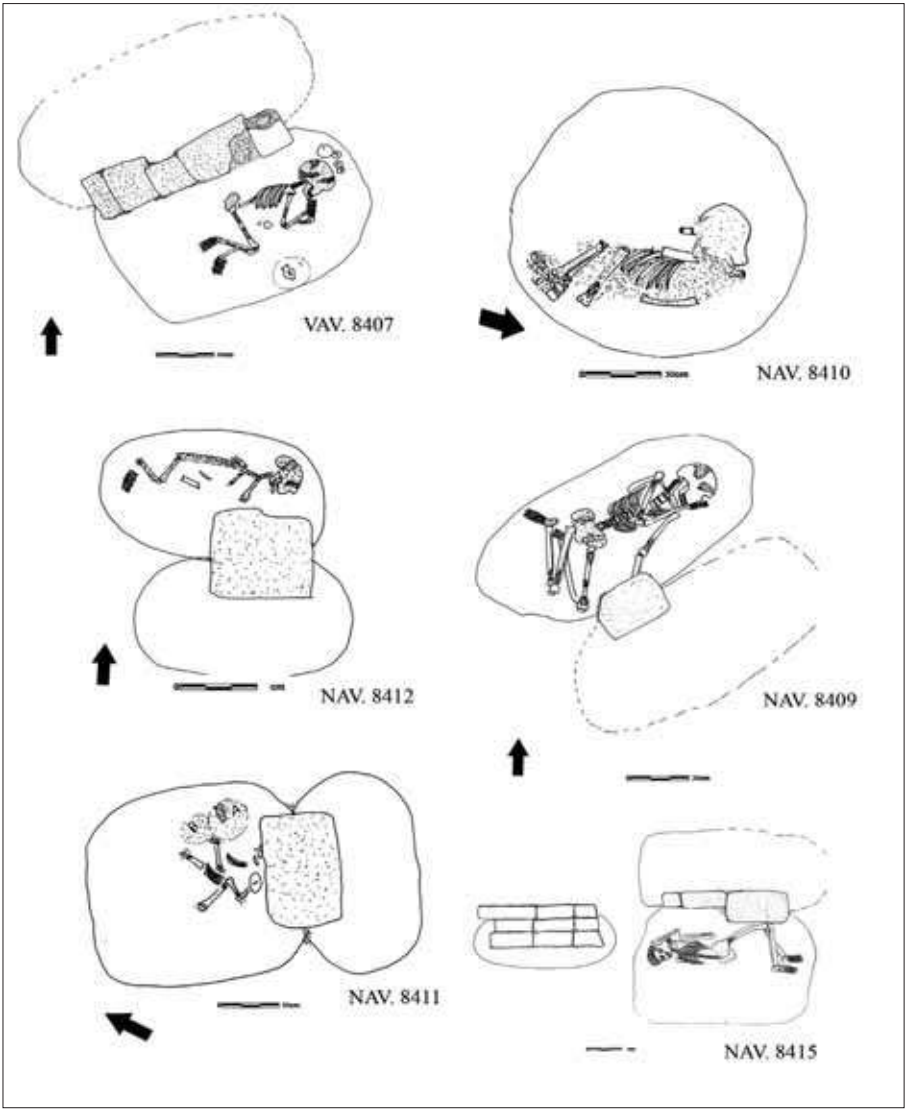

Fig. 29: Trench NAV. Bipartite and simple pit (8406) graves.

Fig. 30: Trench NAV. Grave goods. Plain Buff Ware bowl: 1. G.N.8403/1; 2. G.N.8407/2; 3. G.N.8404/2; painted Buff Ware bowls. Internal brown colour decoration; 4. G.N.8410/1; 5. G.N.8405/5; painted Buff Ware pear shaped beaker. Brown geometric decoration: 6. G.N. 8404/3; painted Buff Ware small jar. Brown geometric decoration; 7. G.N.8405/3; bichrome cylindrical beaker. Light brown and red colour geometric decoration; 8. G.N.8405/1; 9. G.N.8505/4; 10. G.N.8404/5 bronze pins (photo M. Rahmani).

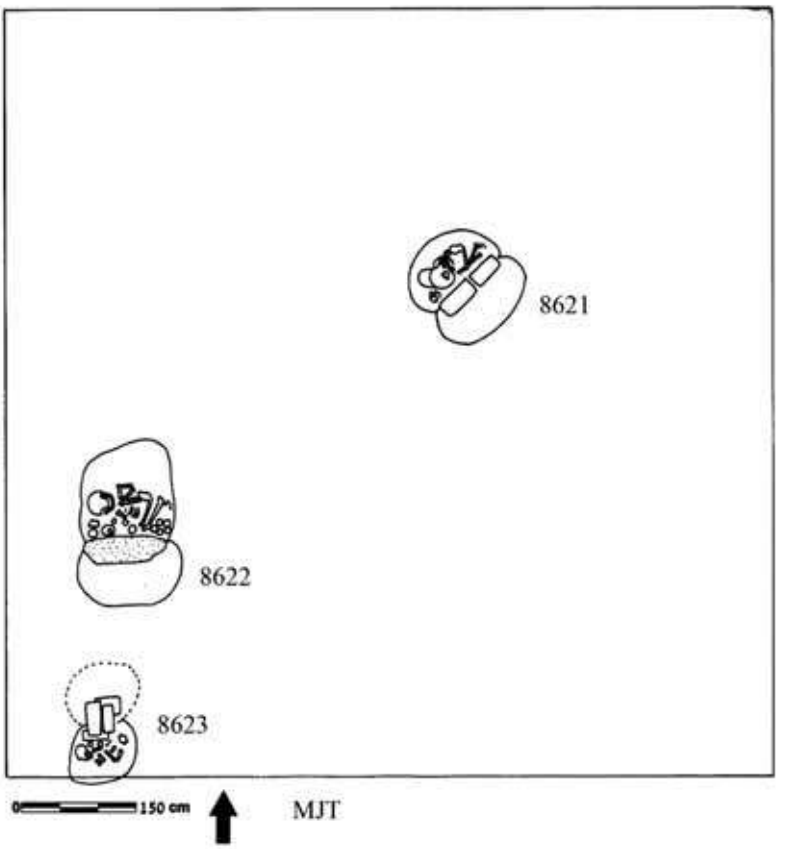

Fig. 31: Trench MJT. Distribution of graves.

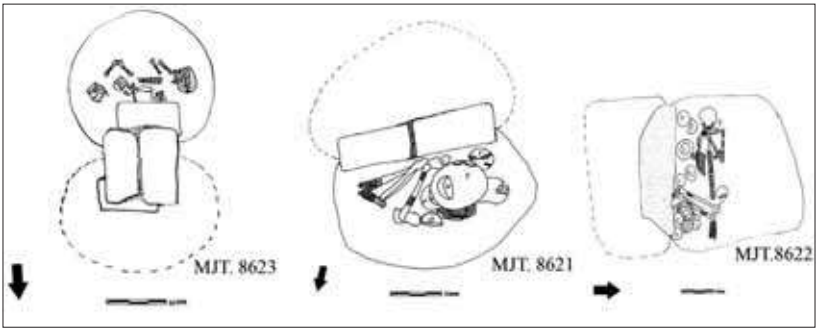

Fig. 32: Trench MJT. Bipartite graves.

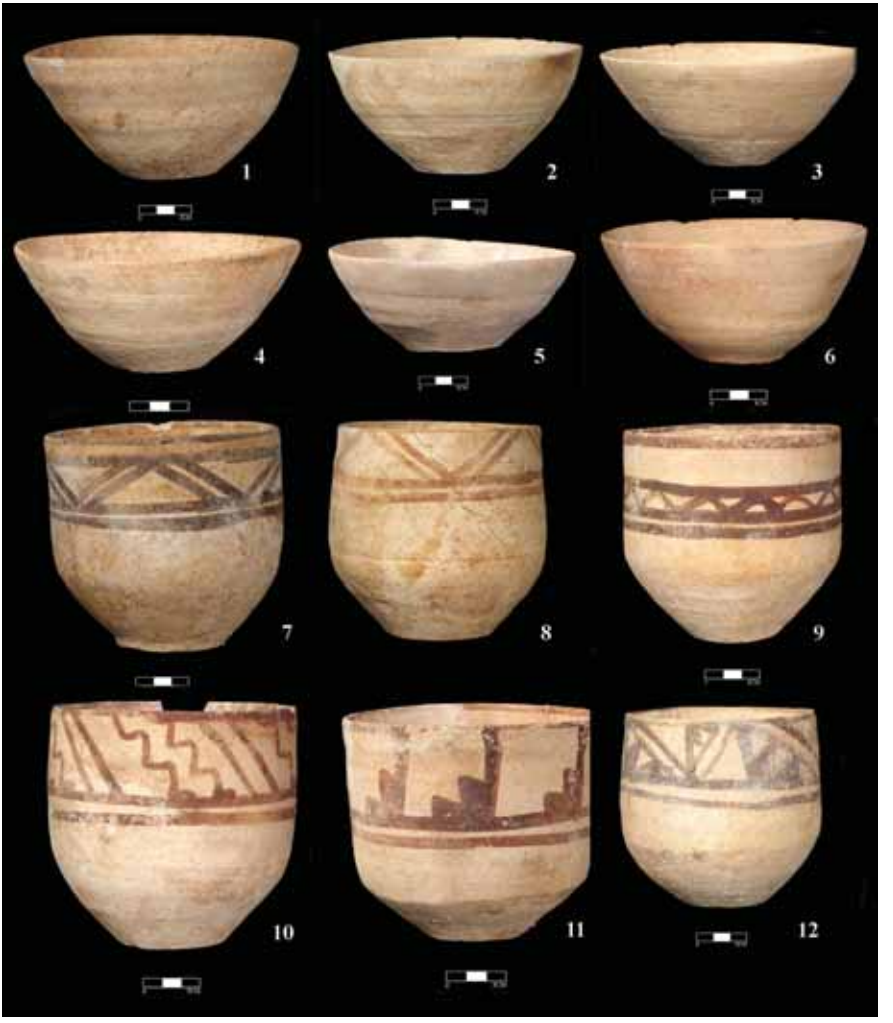

Fig. 33: Trench MJT. Grave pottery. Plain Buff Ware bowls: 1. G.N.8621/5; 2. G.N.8622/2; 3. G.N.8622/5; 4. G.N.8622/9; 5. G.N.8722/18; 6. G.N.8622/25; Painted Buff Ware deep bowls. Light brown-dark brown geometric decoration; 7. G.N.8622/4; 8. G.N.8622/6; 9. G.N.8622/7; 10. G.N.8622/8; 11. G.N.8622/13; 12. G.N.8622/24 (photo M. Rahmani).

Fig. 34: Trench MJT. Grave pottery. 1. G.N.8616/ 1; 2. G.N.8621/1; 3. G.N.8622/15; 4. G.N.8622/19. Painted Buff Ware jars. Paint color light brown (No. 2 light red); 5. G.N. 8623/2; 6. G.N.8623/6; 7. G.N.8623/4. Painted Buff Ware beakers. Paint light brown (photo M. Rahmani).

Fig. 35: Trench MJT. Necklace. 1. G.N.8623/5a. Bone (?) Beads; 2. G.N.8623/5b. Limestone, lapis lazuli, turquoise and cornelian (photo M. Rahmani).

it was re excavated to a depth of 210 cm and four new graves were unearthed (Fig. 36; G.N.8820, 8821, 8822 and 8823). Two of these were type 1, i.e. simple pits, and the other two were type 2 or bipartite (Fig. 37). Three adult and one child skeletons, together with 25 donative objects, were found in these graves (Fig. 38). Grave 8823 was the richest while Grave 8822 was devoid of grave goods. Due to the stiff and impermeable layer over the graves, their preservation status was quite good and the skeletons were intact. The trench had no particular characteristics regarding the structure and type of the burials and was in line with the general tradition of Shahr-i Sokhta.

Trench NFF

This 10 × 10 m trench is located about 50 m east of the central part of the necropolis. It was excavated to a depth of 180 cm. The trench surface was covered with gravel and had no vegetation or cultural materials. During the excavations a total of 19 graves were unearthed, numbered 8900-8918 (Fig. 39). Structurally, one grave is type 1/simple pit (G.N. 8912. Fig.40); 16 type 2/bipartite (Figs. 40-41); one type10/pottery grave (G.N. 8904) and one type 4/catacomb (Figs. 41-42) A total of 25 skeletons and 137 objects were found in these graves. Grave 8913, with a total of 73 objects (69 pottery vessels; 1 metal artefact, 1 bead and 2 stone artefacts) was the richest grave, while Graves 8901, 8902 and 8907 were devoid of grave goods. Rarely for Shahr-i Sokhta, this bipartite grave was reopened on separate occasions to bury 6 individuals. Due to the existence of a soft upper layer, the preservation of these graves was not good, with the majority of the skeletons severely decayed and powder-like.

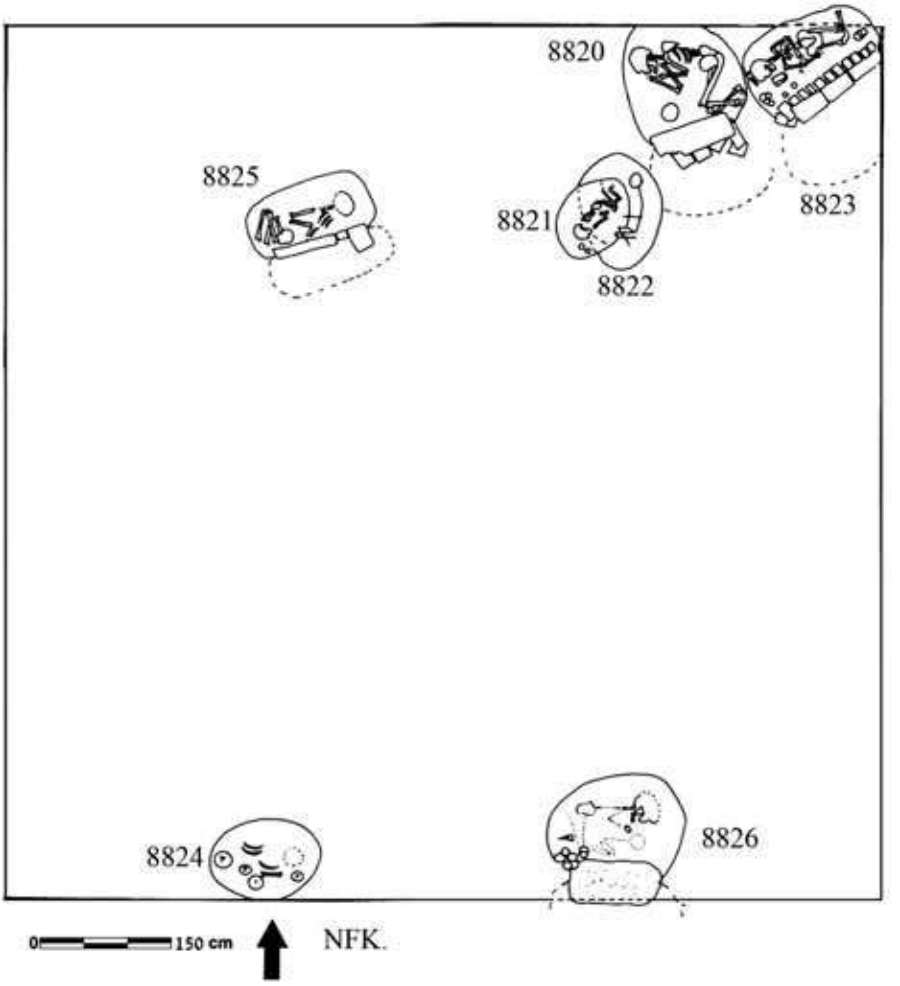

Fig. 36: Trench NFK. Distribution of the graves.

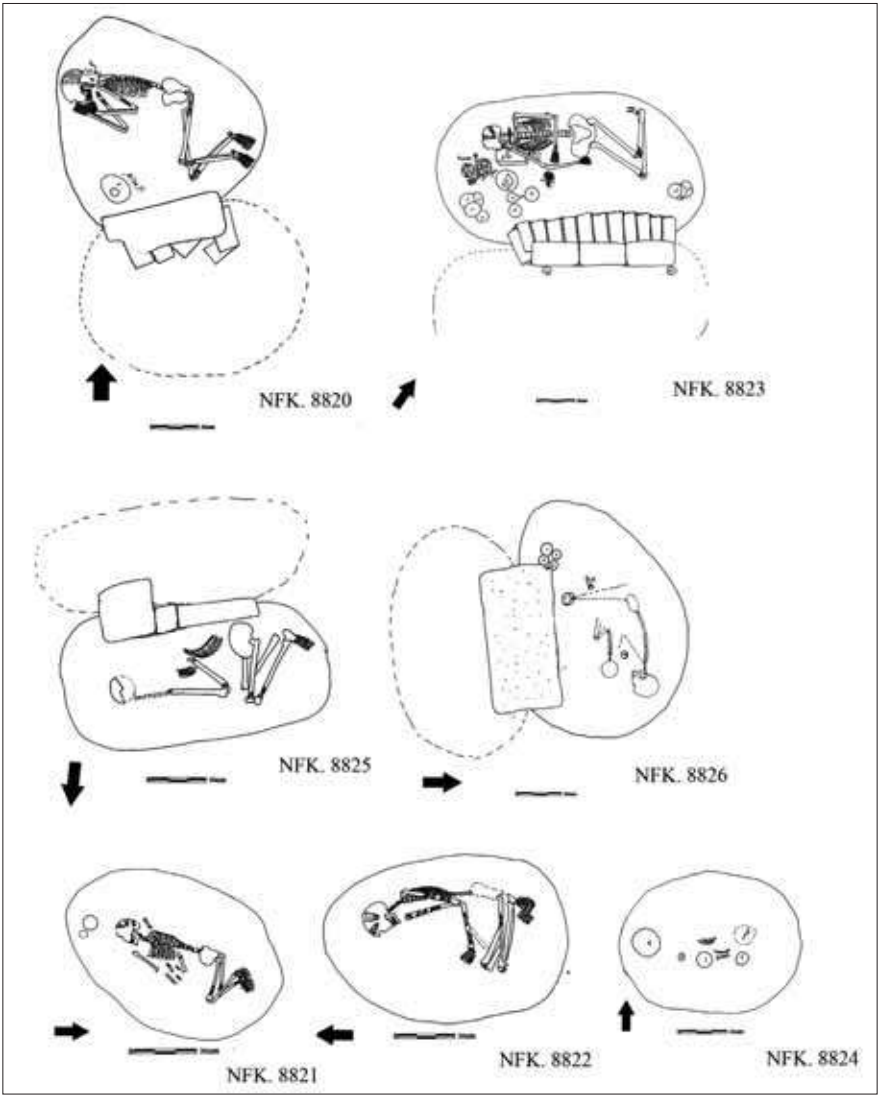

Fig. 37: Trench NFK. Bipartite and simple graves.

Fig. 38: trench NFK. Grave good. 1. G.N.8825. Marble mortar; 2. G.N.8823. Marble bowl; 3. G.N. 8823, Plain Buff Ware tea pot; 4. G.N.8826. Marble cosmetic bottle; 5. G.N.8823. Bronze tool; 6. G.N. 8823. Bronze tool warped inside a mat fragment (photo M. Rahmani).

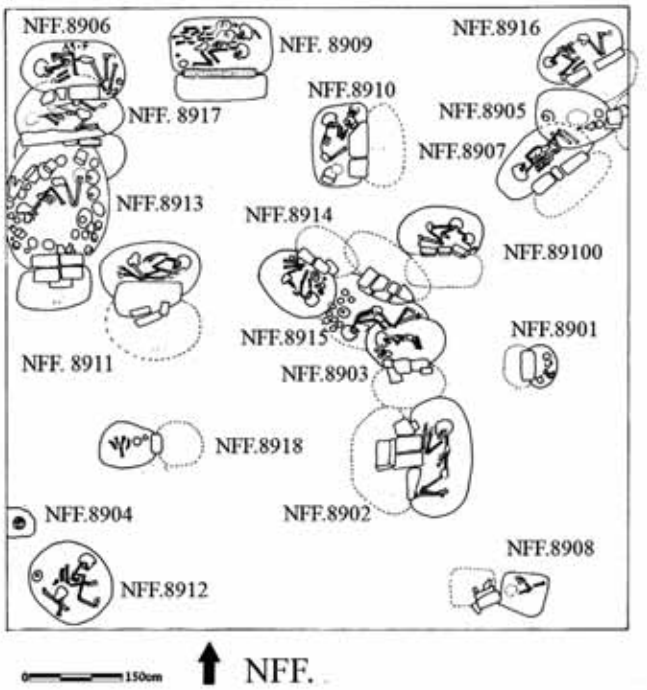

Fig. 39: Trench NFF. Distribution of graves.

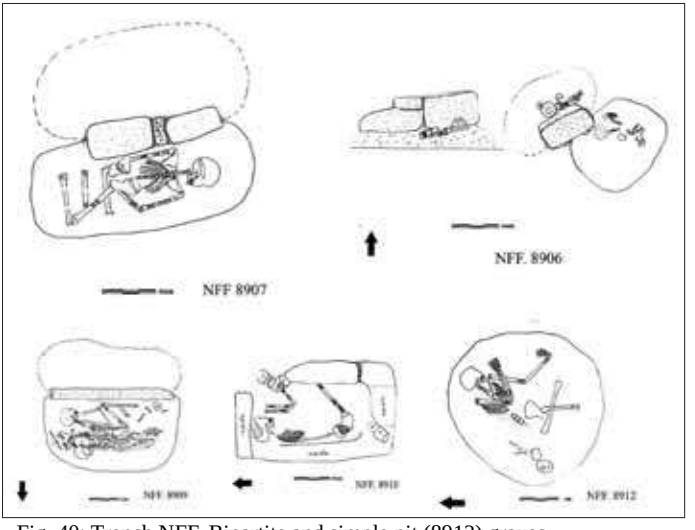

Fig. 40: Trench NFF. Bipartite and simple pit (8912) graves.

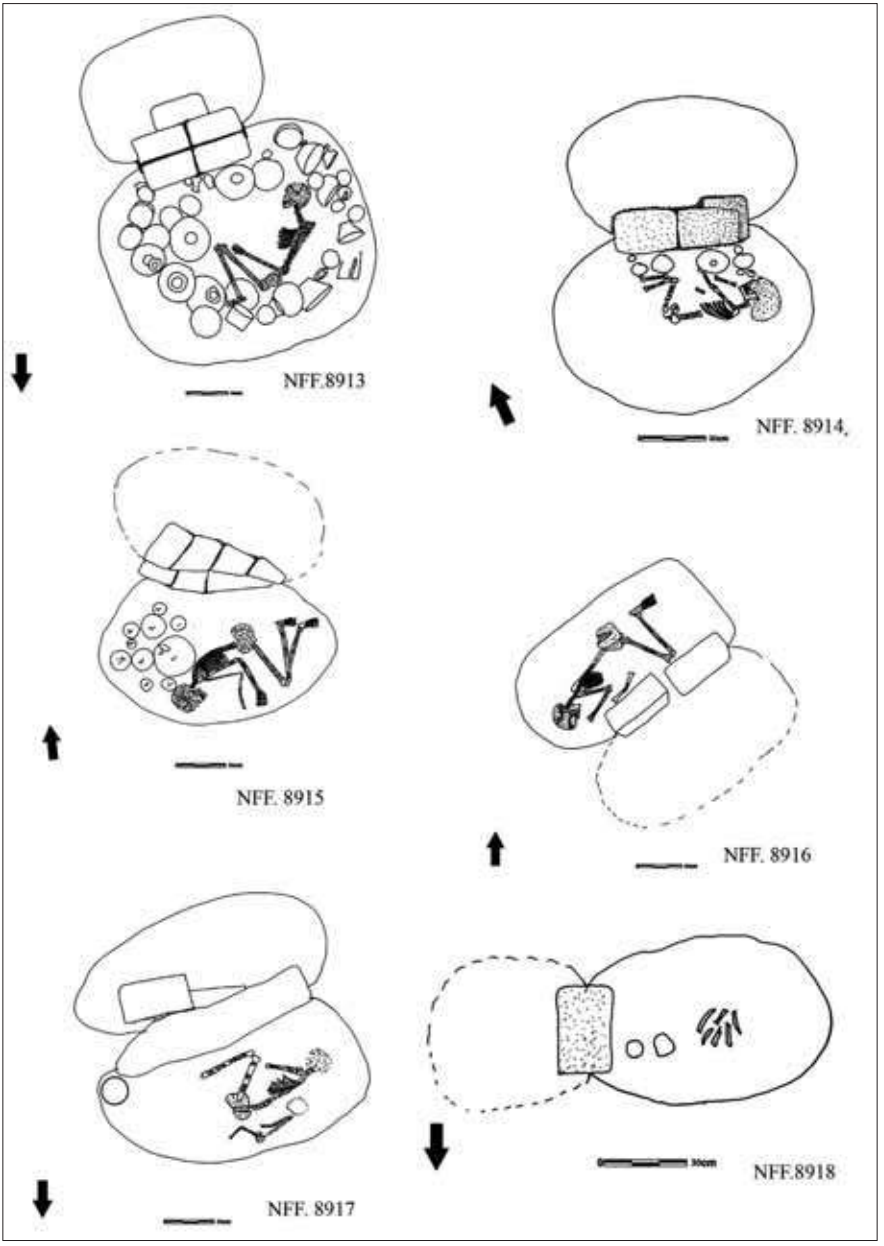

Fig. 41: Trench NFF. Bipartite and catacomb type (8913) graves.

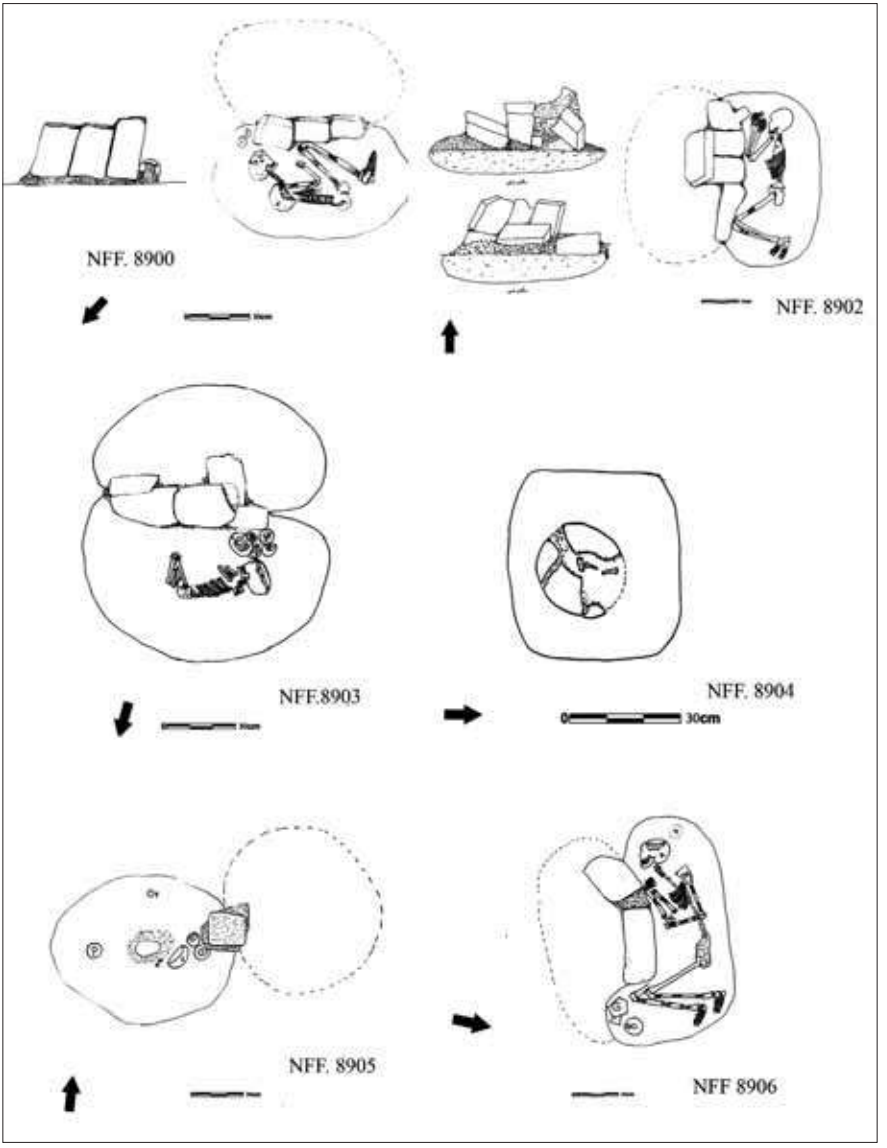

Fig. 42: Trench NFF. Bipartite and pottery type (8904) graves.

Fig. 43: Trench NFF. G.N.8913. Pottery vessels (photo M. Rahmani).

Fig. 44: Trench NFF. Painted Buff Ware cylindrical and pear shaped beakers; 1. G.N.8913/6; 2. G.N.8913/45; 3. G.N.8913/28: 4. G.N.8903/1; 5. G.N.8918/1; 6. G.N.8914/6; 7. G.N.8915/5; 8. G.N.8914/4; 9. G.N.8908/2 (photo M. Rahmani).

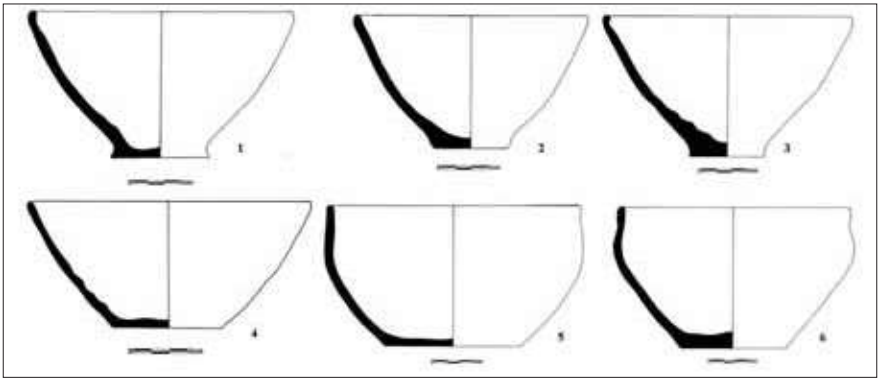

Fig. 45: Buff Ware plain bowl: conical shaped body, exterior extended flat base; 1. 9029/17; 2. G.N.9029/22; 3. G.N.9029/33; truncated-conical bowl with convex wall and flat base; 4. 9032/1; cylindrical-conical bowl with straight rim and flat base; 5. 9029/20; cylindrical-conical bowl with slightly flared rim and flat base; 6. G.N.9029/1.

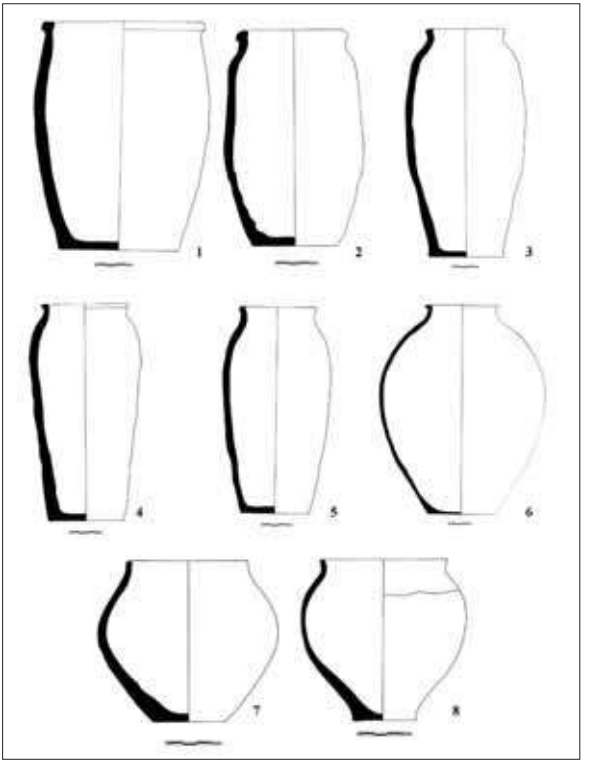

Fig. 46: plain Buff Ware jars: ogival shaped jar with thickened rim and low sub-cylindrical neck flat base: 1. G.N.9029/3; ogival shaped jar with thickened rim flat base; 2. G.N.9014/5; cigar-shaped jar with flaring rim: 3. G.N.9014/3; 4. G.N.9024/4; 5. G.N.9032/3; globular jars with flaring very low neck and flat base; 7. G.N.9031/25; 8. G.N.9034/4; globular large jar with flaring low neck and flat base 9. G.N.9021/1.

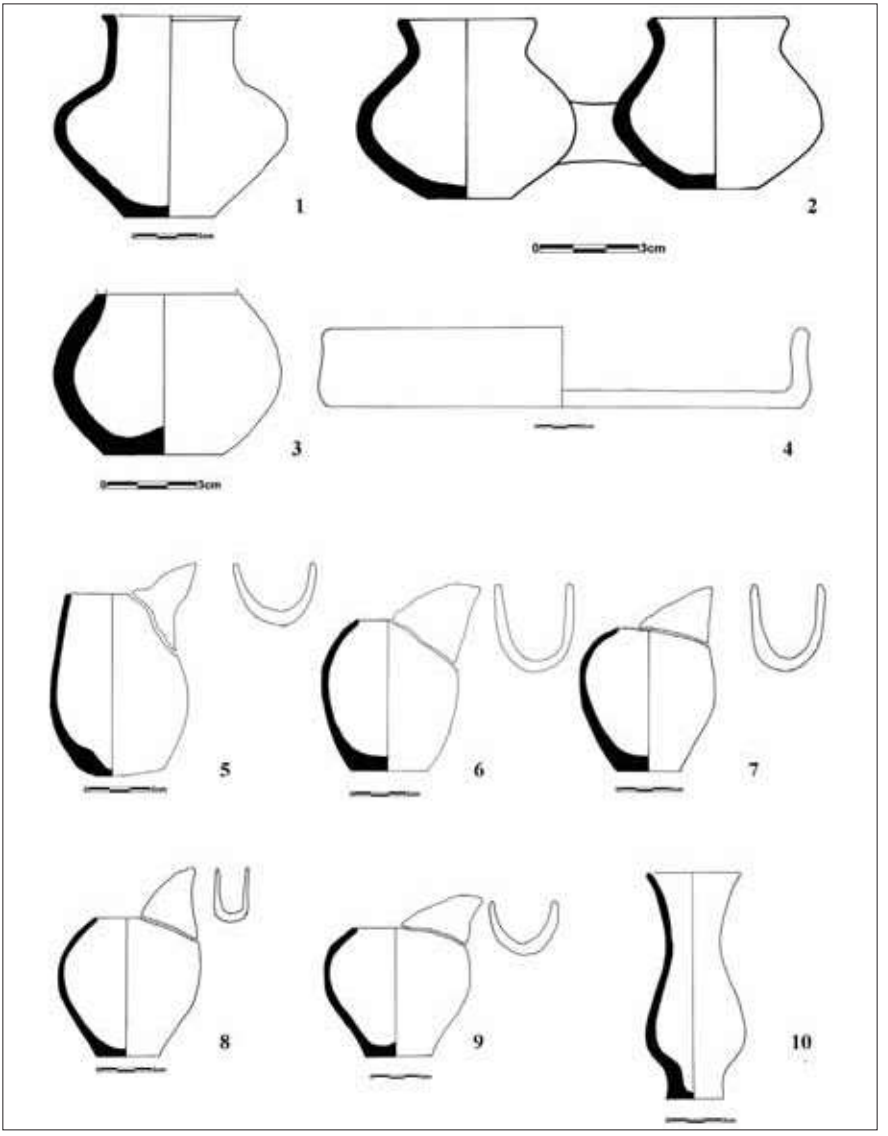

Fig. 47: plain Buff Ware small jars and beakers: small jar with long neck and flaring rim; 1. G.N.9023/15; small twin jar with short neck and flaring rim; 2. G.N.9023/12: small pot, close mouth; 3. G.N.9019/2; medium size circular shape tray; 4. G.N.9022/11: spouted cylinder-conical beaker with flat base; 5. G.N.9034/37; 6. G.N.9034/6; 7. G.N.9031/50; 8. G.N.9025/15); 9. G.N.9031/20; pear shaped beaker with flaring rim and raised cylindrical foot: 10. G.N.9023/12.

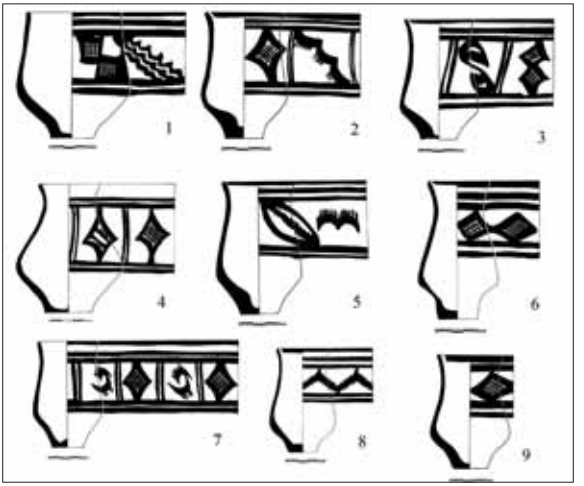

Fig. 48: painted Buff Ware: pear shaped beaker with flaring rim and raised foot. Brown painted decoration: 1. G.N.9034/19; 2. G.N.9032/5; 3. G.N.9031/5; 4. G.N.9031/19; 5. G.N.9025/4; 6. G.N.9012/2; 7. G.N.9019/3; 8. G.N.9016/4; 9. G.N.9012/2.

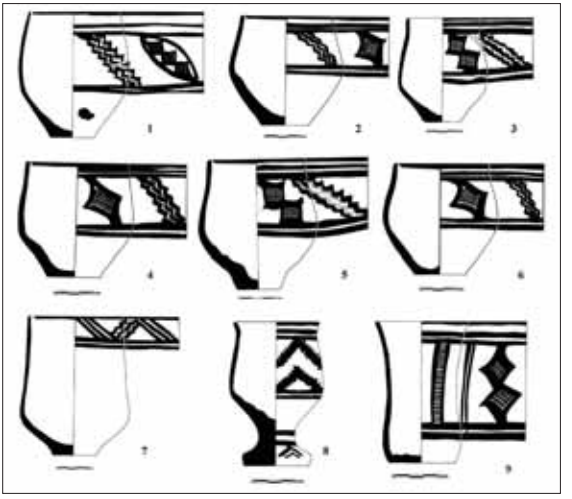

Fig. 49: painted Buff Ware: pear shaped beaker with flaring rim and raised foot. Brown painted decoration; 1. G.N.9016/6; 2. G.N.9031/22; 3. G.N.9034/35; 4. G.N.9031/1; 5. G.N.9034/13; 6. G.N.9031/27; G.N.9026/1; cylinder-conical cup on low truncated-conical stand. Brown painted decoration; 8. G.N.9031/1; cylindrical beaker with slightly flaring rim and flat base. Brown painted decoration; 9. G.N.9024/10.

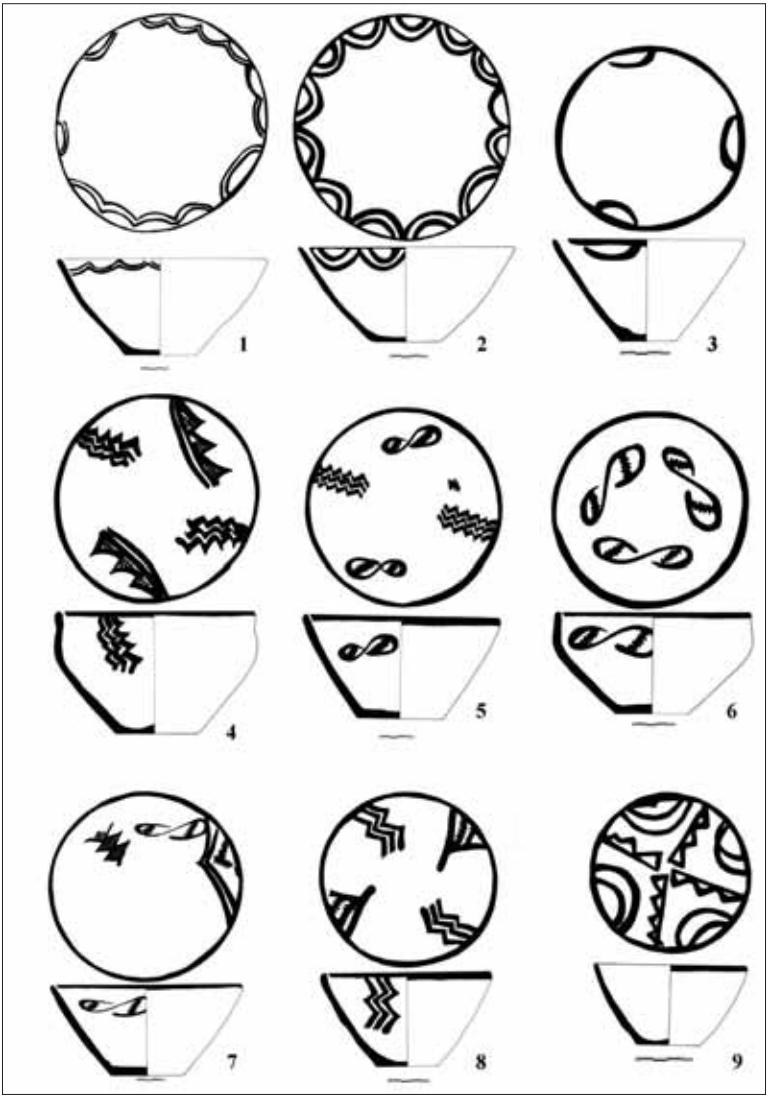

Fig. 50: painted Buff Ware bowls: truncated-conical bowl with slightly thickened rim, strait wall and flat base. Light brown painted decoration on the interior: 1. G.N.8904/1; 2. G.N.9023/6; 3. G.N.9015/1, 4, 6. Cylinder-conical bowl with flaring rim and flat base. Light brown painted decoration on both inside and outside; 4. G.N.9024/5; 6. G.N.9031/8; truncated-conical bowl with slightly thickened rim, strait wall and flat base. Light brown painted decoration inside and outside: 5. G.N.9031/23; 7. G.N.8915/2; 8. G.N.9031/3; 9. G.N.9027/1.

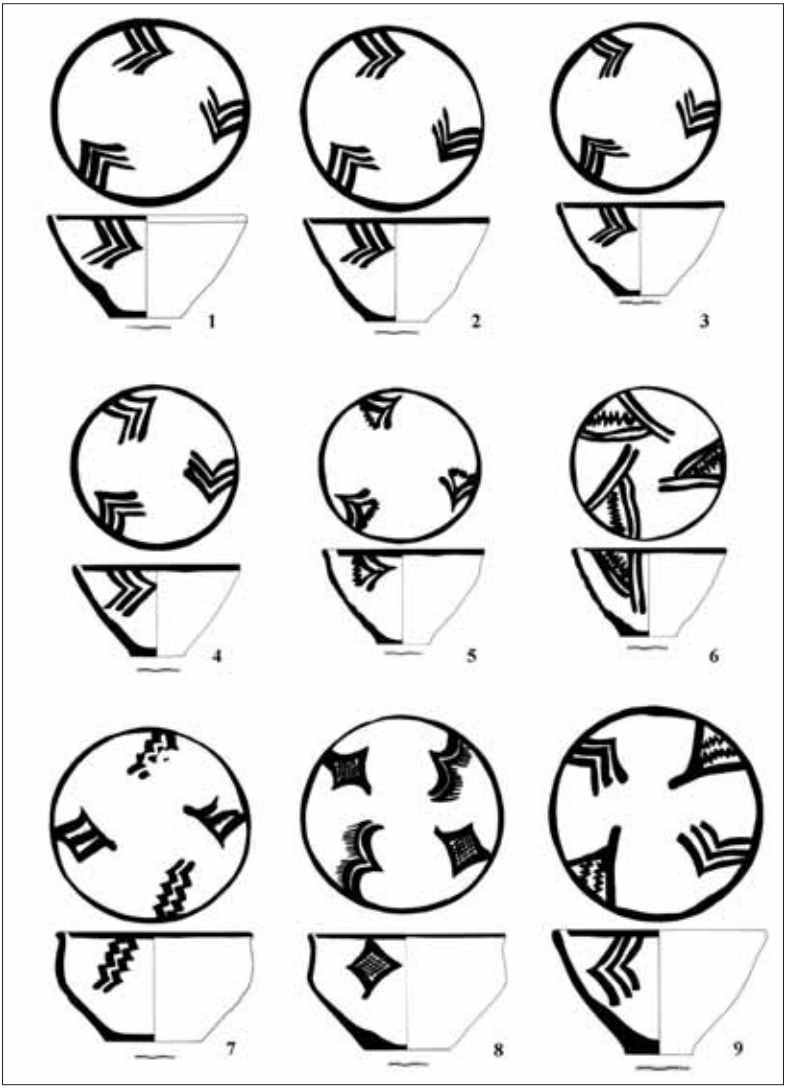

Fig. 51: painted Buff Ware bowls: truncated-conical bowl with slightly thickened rim, strait wall and flat base. Light brown painted decoration on the interior: 1. G.N.9025/19; 9. G.N.9031/33; truncated-conical bowl with slightly thickened rim, strait wall and flat base. Light brown painted decoration inside and outside 2. G.N.9025/5; 3. G.N.9025-9; 4. G.N.9031/1; 5. G.N.9034/18; 6. G.N.9034/16; cylinder-conical bowl with flaring rim and flat base. Light painted decoration on both inside and outside; 7. G.N.8405/1; 8. G.N.9024/16.

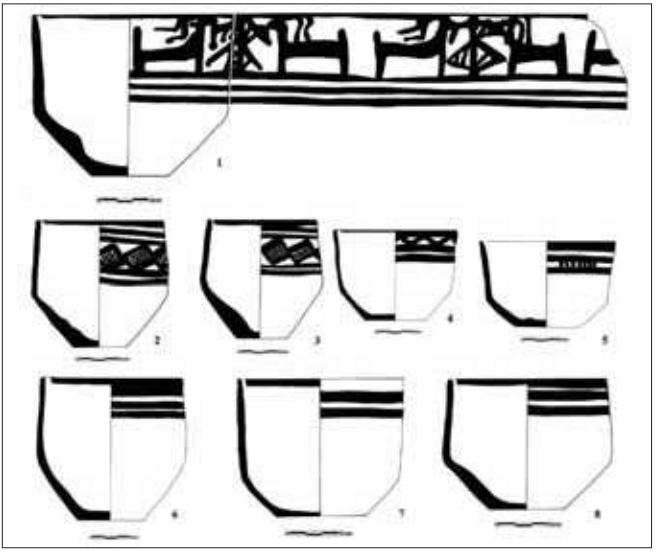

Fig. 52: painted Buff Ware bowls: deep bowls, conical shape, flat base. Light brown paint inside and outside: 1. G.N.9032/1; 2. G.N.9025/13; 3. G.N.9015/1; 4. G.N.9002/8; 6. G.N.9002/1; 7. G.N.9013/1; 8. G.N.9023/11; Deep bowls, conical shape, flat base. Light brown paint outside: G.N.9021/6.

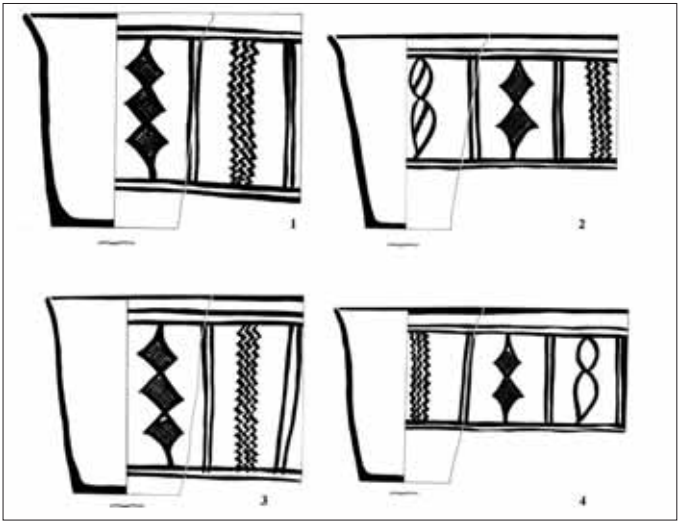

Fig. 53: painted Buff ware flower vase: cylindrical shaped body with flaring rim. Brown paint: 1. G.N.9029/26; 2. G.N.9029/25; 3. G.N.9029/6; 4. G.N.9029/5.

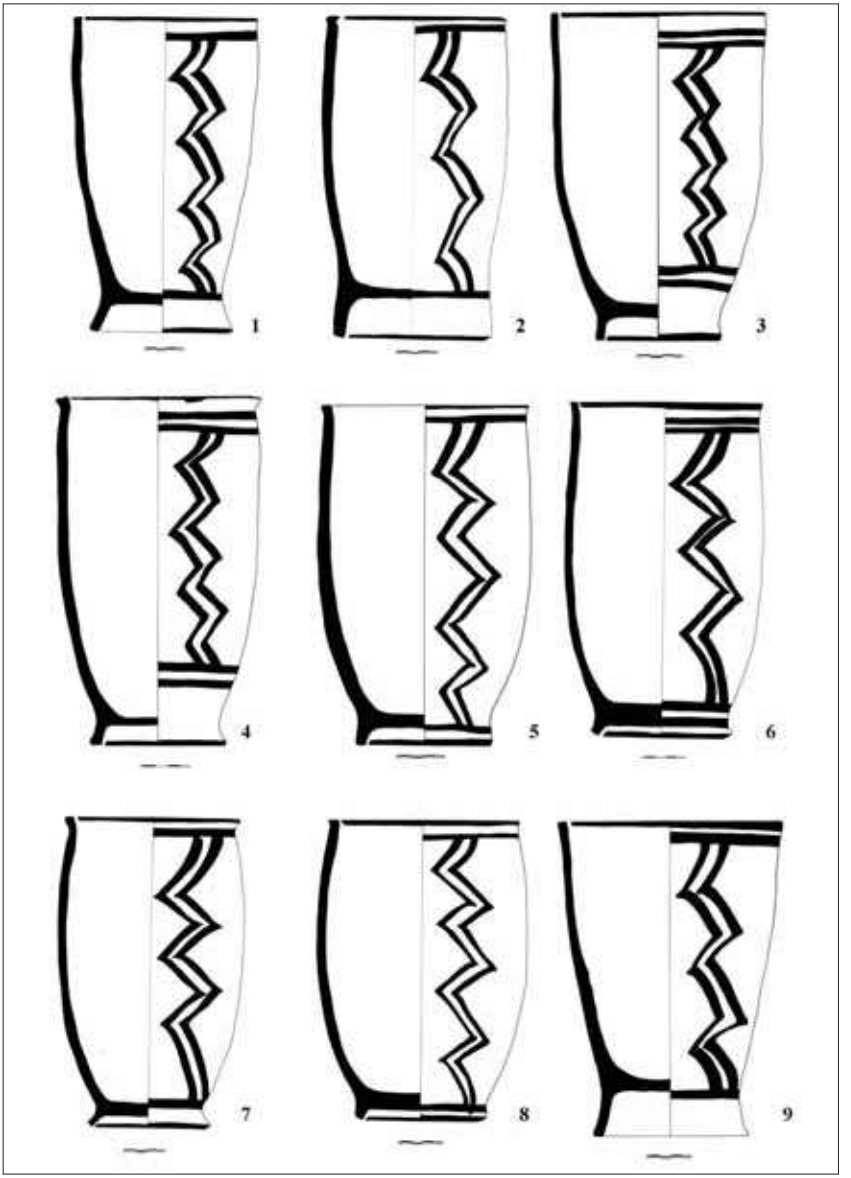

Fig. 54: painted Buff Ware jars: cylindrical shaped body. Low extended flat base. Brown paint outside: 1. G.N.9034/30; 2. G.N.9034/23; 3. G.N.9025/16; 4. G.N.9026/26; 5. G.N.9031/26; 6. G.N.9031/39; 7. G.N.9031/40; 8. G.N.9031/49; 9. G.N.9034/9.

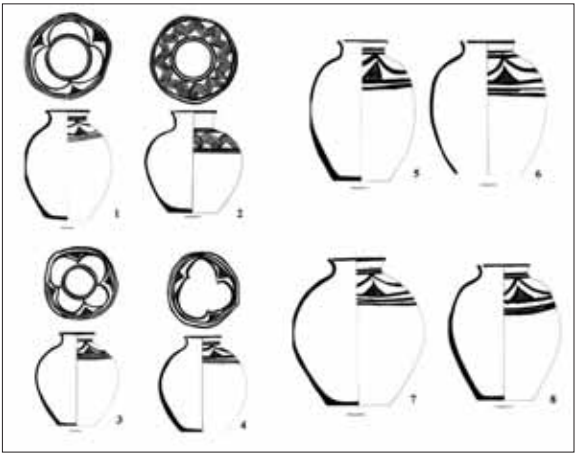

Fig. 55: painted Buff Ware (lightly green) jars: globular large jars with flaring low neck and flat base. Brown paint decoration: 1. G.N.9031/16; 2. G.N.9029/1; 3. G.N.9025/24; 4. G.N.9031/41; 5. G.N.9034/20; 6. G.N.9034/14; 7. G.N.9031/41; 8. G.N.9034/36.

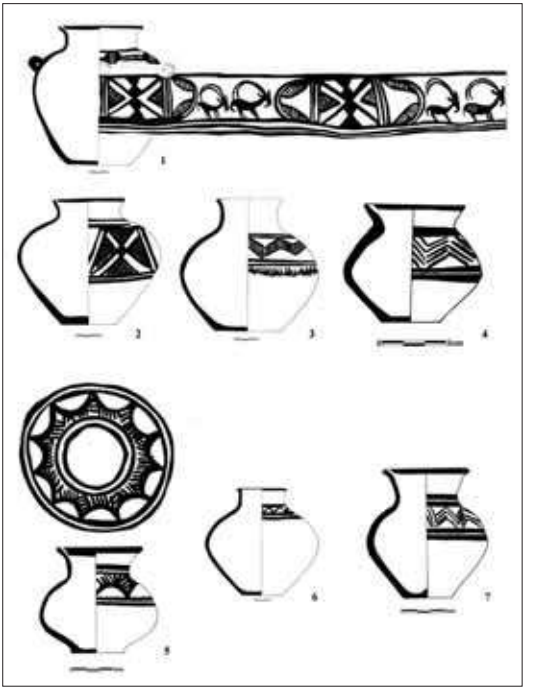

Fig. 56: painted Buff Ware vessels: globular small jar with flaring rim on low cylindrical neck and flat base. Black decoration: 1. G.N.9025/30: globular small jar with flaring rim on low cylindrical neck and flat base. Brown decoration; 2. G.N.8621/1; 4. G.N.9025/31; globular small jar with flaring rim on low cylindrical neck and flat base. Brown decoration: 3. G.N.8914/1; 5. G.N.9016/3; 6. G.N.9021/9; 7. G.N.9031/4.

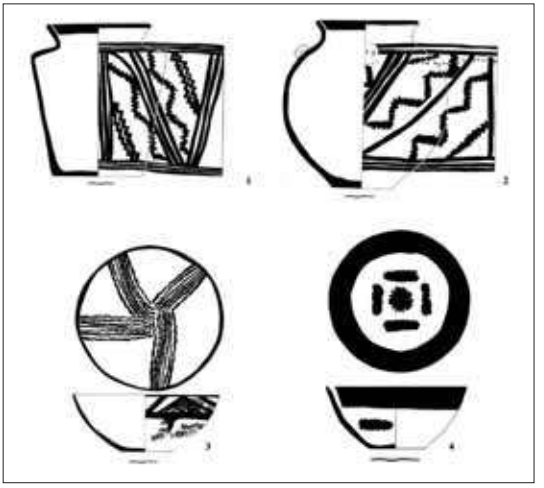

Fig. 57: polychrome and painted Grey Ware vessels: cylindrical shaped polychrome jar: globular shaped polychrome jar, red and light brown paint: 1. G.N.9019/1; biconical polychrome jar, flared rim, slightly raised base. Green, brown and light brown paint G.N.9034/2; truncated–conical grey ware bowl with convex wall and flat base. Black painted decoration both inside and outside: 3. G.N.8621/3; 4. G.N.9031/10.

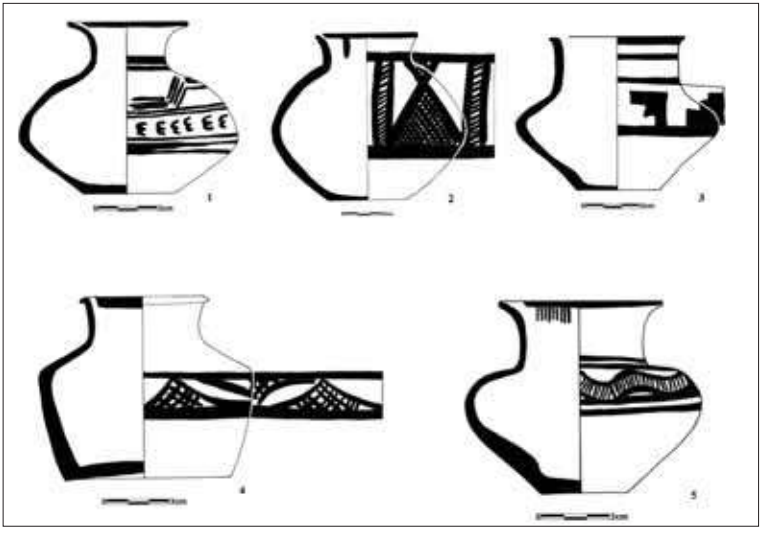

Fig. 58: painted Red Ware vessels: biconical small jar, flared rim, flat base, black painted decoration; G.N.9034/5; G.N.9021/13; biconical small jar, distinct shoulder, cylindrical high neck, flared rim, flat base. Black painted decoration: 3. G.N.9021/11; 4. G.N.9025/32; biconical small jar, distinct shoulder, cylindrical high neck, flared rim, flat base. Black painted decoration 5. G.N.9018/12.

The Catacomb Graves of Shahr-i Sokhta

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Today, after 27 seasons of excavations, 9 conducted by the Italian IsMEO (Tosi 1984) and 18 by the ICAR, we know that the site of Shahr-i Sokhta was a large and powerful urban settlement that controlled a vast area from Kandahar in central Afghanistan to the shores of the Makran Sea in southern Iran. It does not seem that the site was ruled and controlled by a centralized administrative system. On the contrary, at least during the later phases of Period III, it was a confederation of different clans and tribes, each ruled by different chiefs who lived in accordance with their own traditions and practices. The model of the City-State therefore cannot be applied to the Hirmand Valley and eastern Iran more generally.

The adoption of other criteria to define Shahr-i Sokhta is not an option either, given the shortage of data from the archaeological surveys and excavations in the south-eastern Iranian plateau. However, in the vast area that covers territories from Kerman to the most eastern point of the regions under the influence of the Hirmand Civilization, and from the northern boundaries of Khorasan in present-day Turkmenistan to the shores of the Makran Sea, there are no places or sites that

can be defined as "City States". None of the known third-millennium BC sites in the area, such as Tal-i-Iblis (Caldwell 1967), Tepe Yahya (Lamberg-Karlovsky 1970) or Bampur (de Cardi 1970; Tosi 1974), could be defined as "Cities"; they are simply large urban areas, or, in the case of some sites such as Tepe Yahya, large villages. Other sites in the region such as Damen or Khurab (Stein 1928; Tosi 1970) are only graveyards with no substantial trace of a settlement that could be considered a small town or a city.

Exceptions to this rule include some sites in the Jiroft area and the Shahdad necropolis. The latter is a large necropolis in the Kerman area and has been excavated over fourteen campaigns by Iranian archaeologists (Hakemi 1997; Kaboli 1990). However, despite the excavation of the necropolis, a craftsmen's area and a very small portion of the residential area, we do not have enough data regarding the social structures of the site, because it seems that wind has eroded the residential area of the site.

Although the excavations at Konar Sandal in the Jiroft area are still at an early stage, (Madjidzadeh 2003), what has been published so far suggests that this is the only site in south-eastern Iran that corresponds to the City State model on the basis of the Mesopotamian and Khuzestan criteria.

Shahr-i Sokhta is a familiar name in the archaeological literature of Eastern Iran. Archaeologically presented for the first time in the first few decades of the last century by Stein (Stein 1928), it was the object of extensive investigations almost 50 years later by Italian archaeologists (Tosi 1969; 1983). Since 1997, it has been extensively investigated by an Iranian archaeological team (Sajjadi 2003; 2009).

The site is divided into three main areas: the *Residential Area*, the *Craftsmen's Area* and the Necropolis .The *Residential Area* in turn is subdivided into 3 sections: the *Eastern Residential Area*, the *Central Quarters* and the *Monumental Area* (Fig. 1).

Archaeological surveys and investigations in the Necropolis have shown that an estimated 18,000 (Bonora *et al.* 2000) to 375,000 (Sajjadi 2007) graves are distributed across an area of almost 20-25 hectares (Figs. 2-3). This is one of the

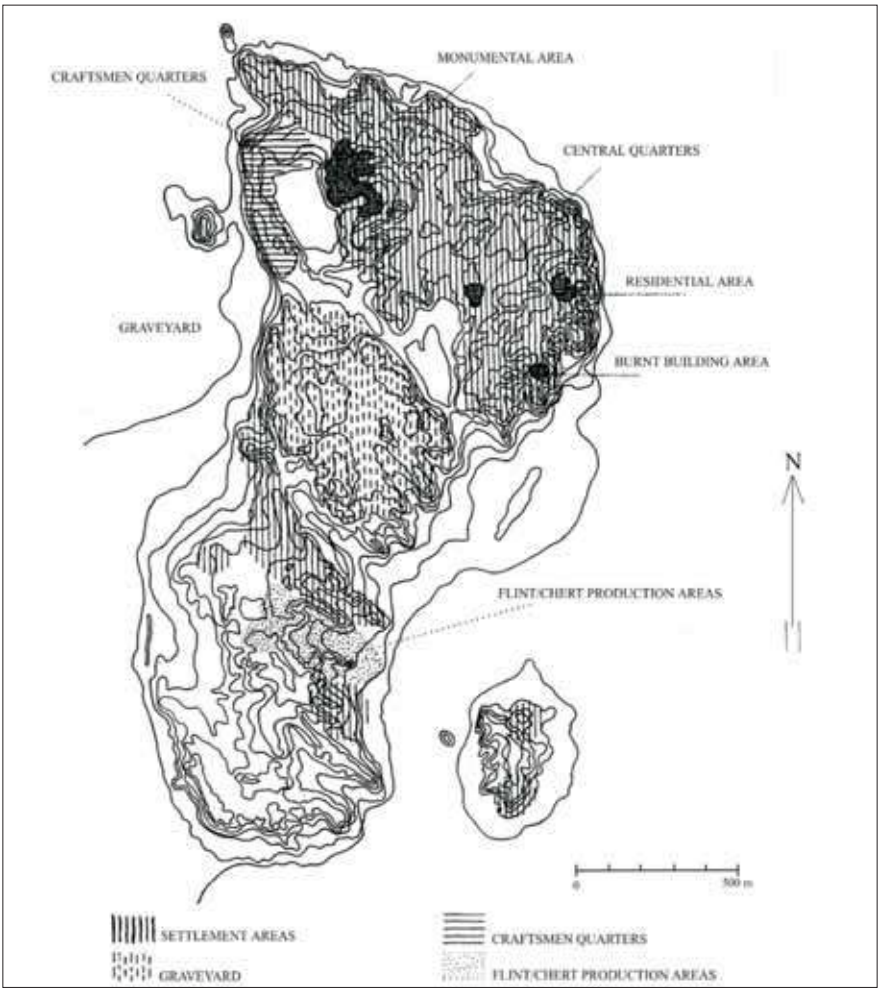

Fig. 1: main functional area of Shahr-i Sokhta in phase 3-4 (2600-2450 BC) (Mariani 1989: fig. 6).

largest necropoleis in southwest Asia in the entire proto-historical period (Figs. 4-5) However, even this large number of graves does not seem high enough for a city occupying almost 150 hectares and persisting for more than twelve centuries, which for at least 1000 years was the main point of trade and political control over the vast territory of the Hirmand Civilization. On the other hand, we do not know if any other necropolis lies in the vicinity, for example in the surrounding hills.

The western and south-western edges of the site were for a long time in direct contact with the Hamun Lake, as shown by traces of water erosion visible in parts of the Necropolis, leading to the exposure of graves and human bones.

The graves of Shahr-i Sokhta differ from each other in terms of distribution, form, style, funerary traditions and structure. In the early excavation campaigns in the necropolis only 5 types of grave structure were found (Piperno - Tosi 1975). However, as excavations were extended to new areas of the necropolis, the number of types increased to 8.

During more recent excavations two more grave structures were found. However, the 10 different grave types' occurrence and spatial distribution is very uneven, with fewer graves of types 5 to 9: only three of type 6 and one each of types 5, 7 and 8 were reported by the Italian mission (Piperno - Salvatori 2007), in addition to three of type 9 and two of type 10 reported by the Iranian team (Sajjadi 2007; 2009).

During the new cycle of excavations by the Iranian team, only three grave types out of the eight recognized by the Italian mission (simple pits, bipartite burials and catacombs) were found. The same research showed that the most common grave structures in Shahr-i Sokhta are type 2 (bipartite burials), type 1 (simple pits) and types 3 and 4 (catacombs/pseudo-catacombs), which account for 42 of 1150 excavated graves. Most of the catacomb types reported by the Italian archaeologists are to be categorized as type 3, or pseudo-catacombs; this category of grave was not found during the excavations by the Iranian team.

Fig. 2: central part of graveyard (photo Iranian Archaeological Expedition).

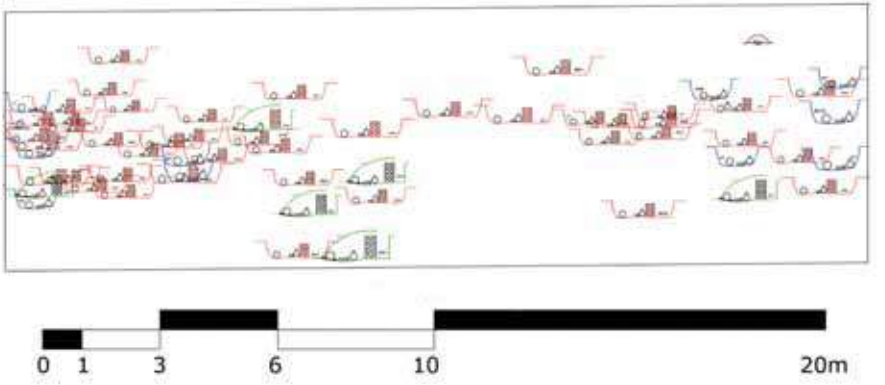

Fig. 3: interference of different type of graves of different periods in trenches NFF, NFK, NFP.

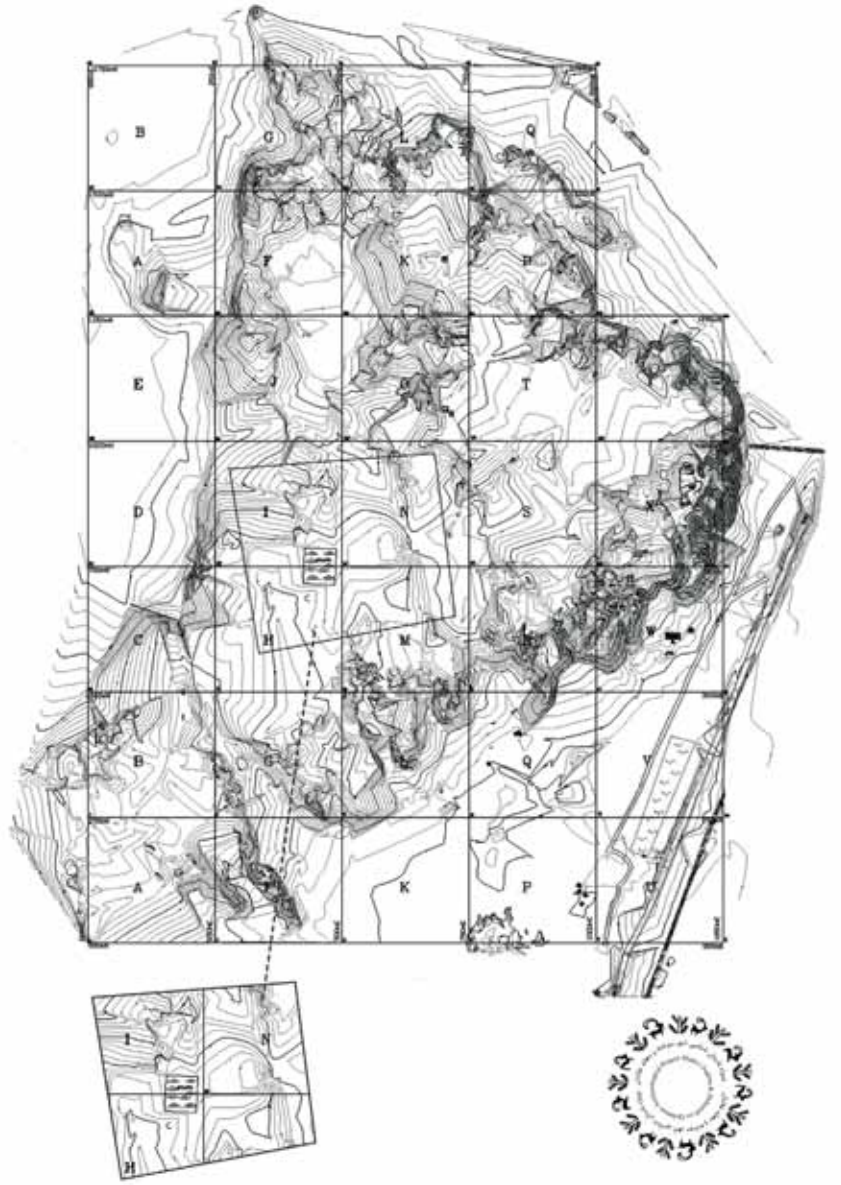

Fig. 4: Shahr-i Sokhta: approximate area of graveyard.

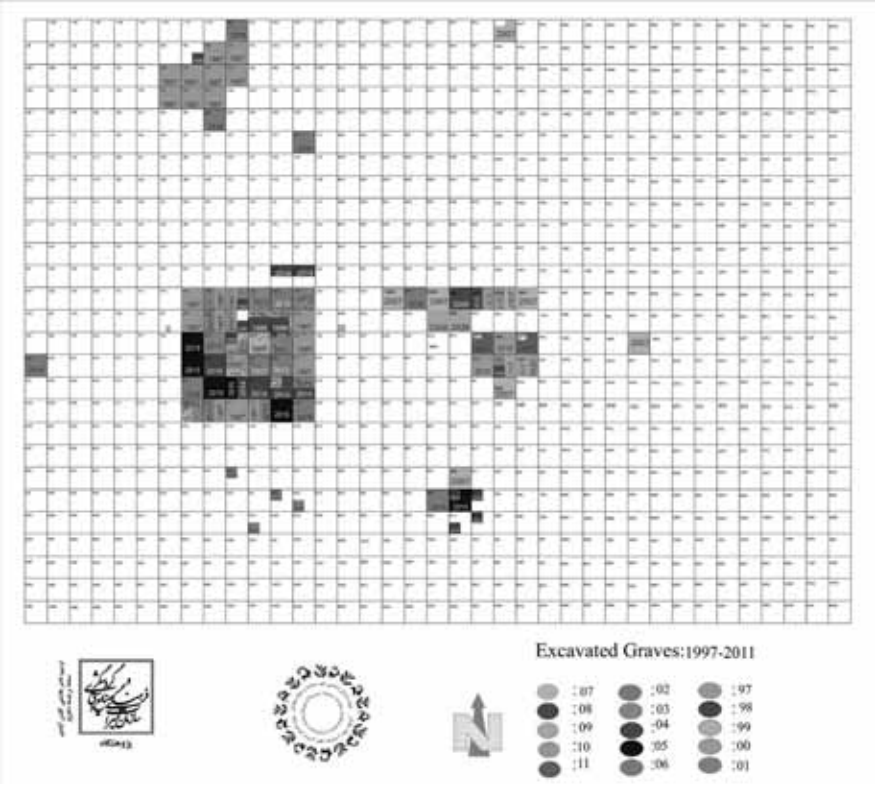

Fig. 5: Shahr-i Sokhta: excavated graves 1997-2011 (photo Iranian Archaeological Expedition).

The structure of the graves is usually very simple and, except for a few cases, for example Grave 2700, with the traces of plaster on the walls, the only material recovered is mud bricks of various shapes, arrangement and size.

The grave structure types are as follows (Fig. 6):

Type 1. Simple Pits. These grave structures have rectangular, circular and oval shapes, but often there is no real distinguishable shape.

Type 2. Bipartite Pits. This grave type is similar to the previous one, the main difference being the presence of a mud brick wall consisting of one to eight rows of mud bricks which divide the pit into two different parts.

Type 3. Pseudo-catacombs (see below).

Type 4. Catacombs (see below).

Type 5. Rectangular mud brick tombs. These are rectangular graves made of four mud brick walls. This kind of grave structure is extremely rare.

Type 6. Square mud brick tombs. This type differs from the previous one only by its geometrical shape. Only two examples of this type were found by the Italian mission, and one by the Iranian team.

Type 7. Square tombs with two mud brick walls.

Type 8. Circular mud brick structures. Only one grave of this type has been discovered.

Type 9. Circular mud brick structures with closed entrances. This type was first found by the Iranian team. It consists of a circular pit, similar to the simple pits, but contains a mud brick wall that closes the entrance of the burial chamber.

Type 10. Pottery tombs (Bowl/Jar). This type was also first found by the Iranian mission. It consists of a large Buff Ware Bowl covering a new born human being or foetus. So far only three samples of this grave structure have been found in Shahr-i Sokhta.

The first type of grave, the simple pit, has been described as irregular in shape. Sometimes however, the pits were dug with a geometrical shape: oval, rectangular, square or circular (Fig. 7; 1-3). The inhumed body and the grave goods were placed inside the burial in a variety of positions. In this case, because of the body's direct contact with the earth and chemical agents, decomposition was very fast and even after a very short time the body and the corruptible materials had decomposed and almost vanished. In the bipartite graves, type 2 (Fig. 7: 4-6), there were no determined rules on how to bury the human body and grave goods: they were buried sometimes in the northern and sometimes in the southern section of the grave, and in some exceptional cases the body and grave goods were placed in both sections of the grave (Fig. 8).

The catacombs are composed of two separate sections: a vertical shaft and an underground chamber where inhumed bodies and grave goods were deposited. Here, the bodies and grave goods remained for thousands of years without any direct contact with air, dirt, soil, natural agents and other chemical materials,

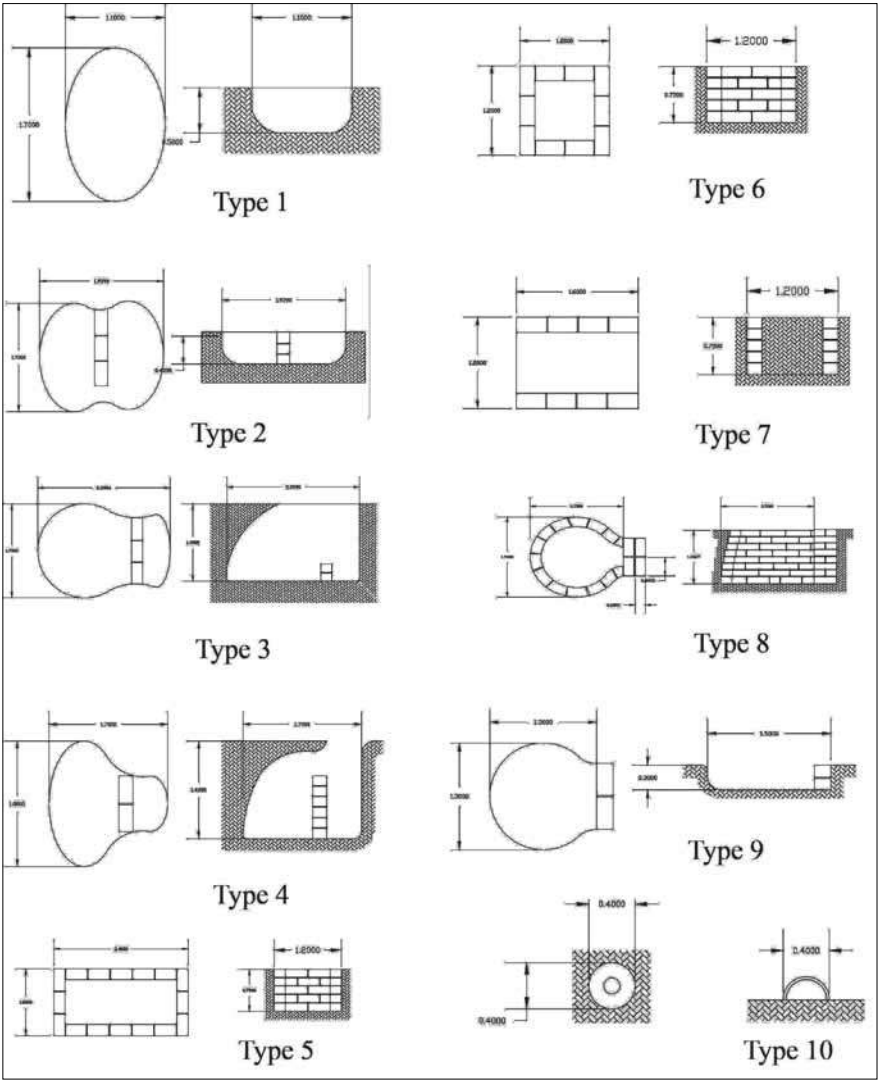

Fig. 6: ten types of grave structures.

ensuring that the decomposition of the skeletons and the decay of the corruptible materials were very slow. Thus, they were recovered in better condition than in other grave types. Catacomb graves very similar to those of Shahr-i Sokhta have been seen in Central Asia and ancient sites in southern Uzbekistan, in the valleys around Amu Darya and sites such as Sappally Tepe, Jarkutan and others (Fig. 9), all of the Bronze Age (Litvinsky - Pyankova 1992: fig. 3). In addition, at least one example of this grave type has been reported for Velikent in the Caucasus (Fig. 10), suggesting that the use of this kind of grave structure is typical not just of Central Asia and south-eastern Iran (Kohl 2004). 23 catacombs and pseudo-catacombs were found by the Italian mission and 19 by the Iranian team, with a total of 64 human remains.

The mud bricks used in the catacombs and pseudo-catacombs are more or less the same size as those used in the residential areas of the site. The smallest measure 20 × 20 × 10 cm. and the largest 50 × 25 × 10 cm. while a common size is 40 × 20 × l0 cm. In most graves only one size of mud brick is used, although in Graves 2700 and 2701 two different sizes are used (Figs. 11-13).

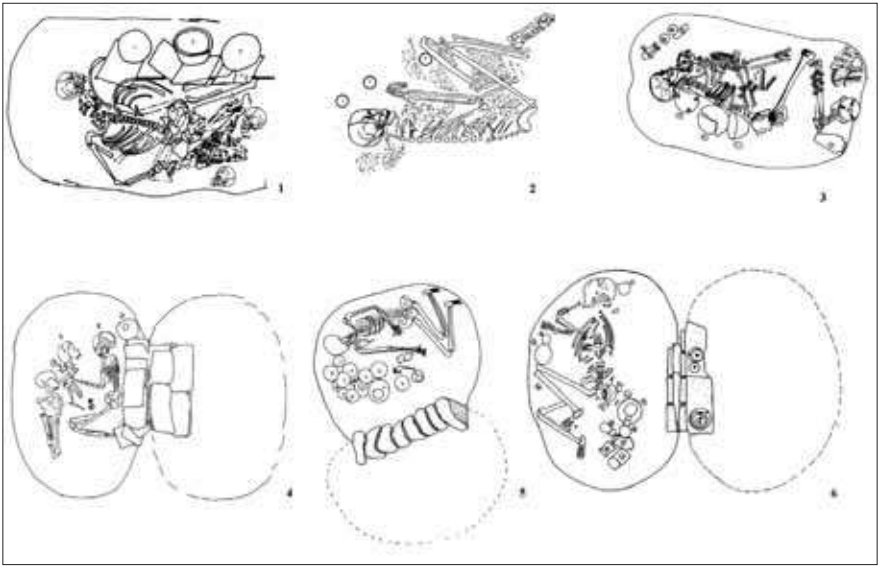

Fig. 7: graves type 1 (Simple pit), 1. G.N.1512; 2. G.N.1610; 3. G.N.6704; Graves type 2 (Bipartite); 4. G.N.8516; 5. G.N.8600; 6. G.N.8315.

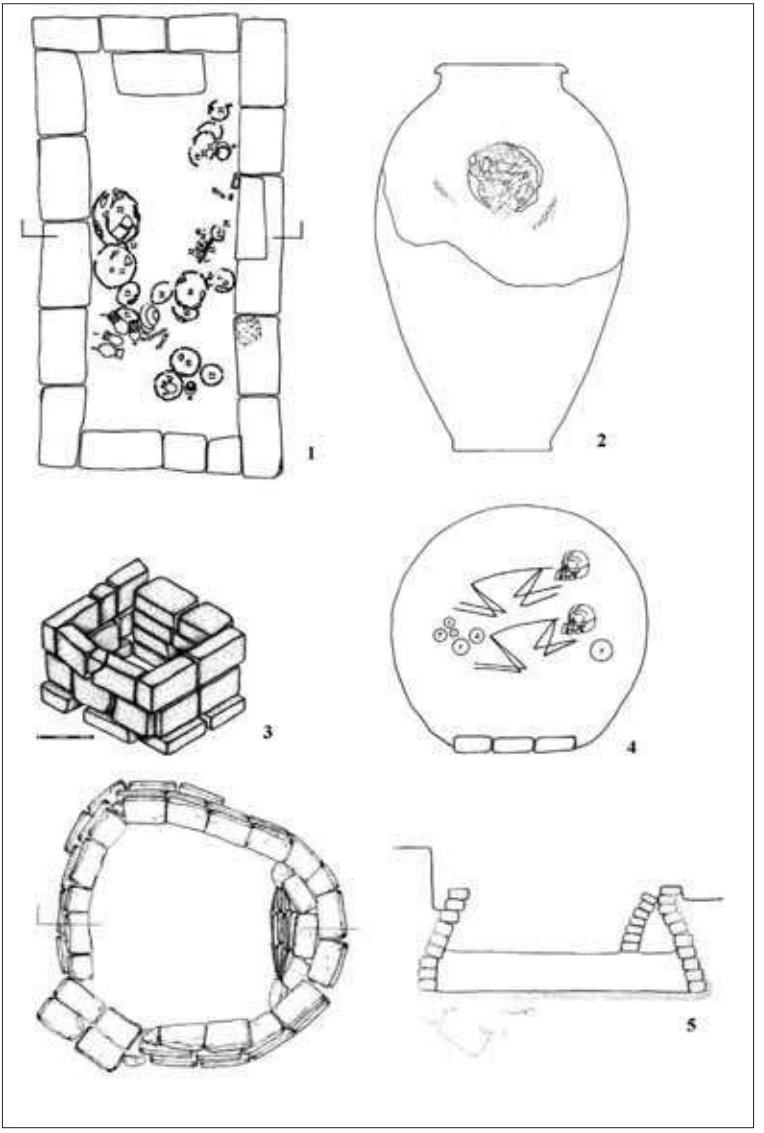

Fig. 8: other types: 1. Type 5 (rectangular structure), G.N.12; 2. Type 10 (pottery tombs (bowl/Jar), G.N.7803; 3. Type 6 (square shaped, mud brick structure), G.N.8314; 4. Type 9 (circular mud brick structures with closed entrance) G.N.1403; 5. Type 8 (circular mud brick structures), G.N.1003.

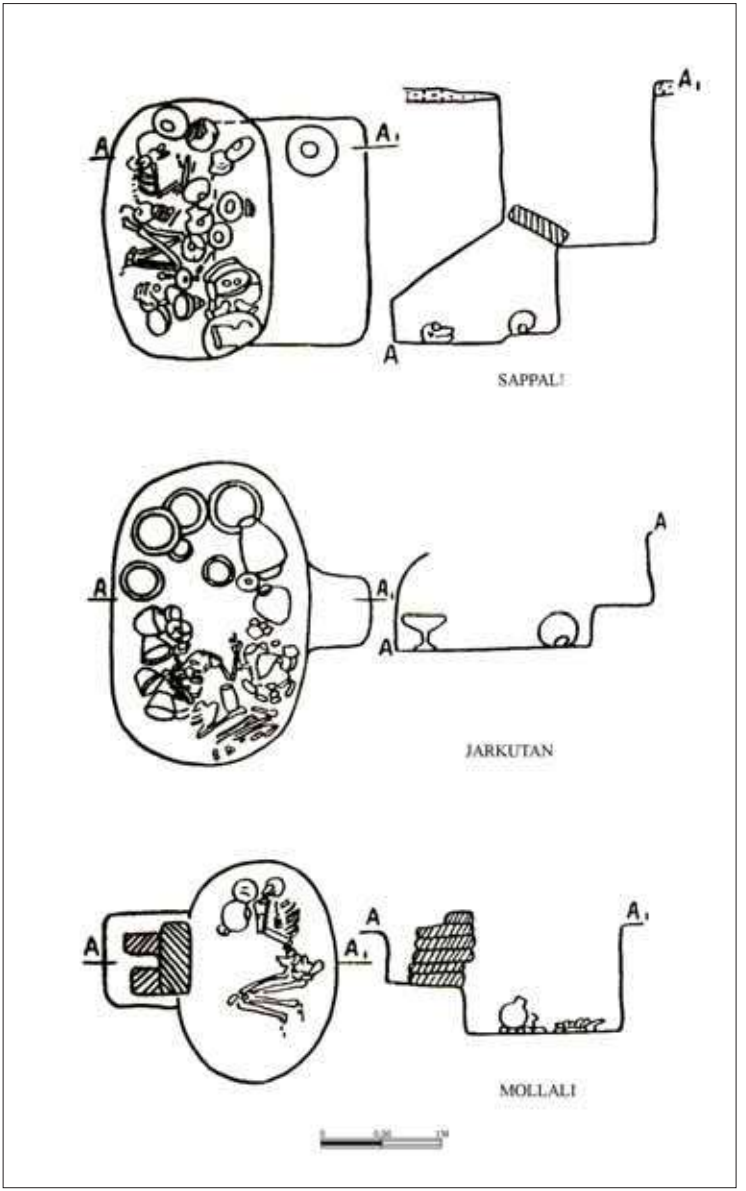

Fig. 9: catacombs of Sappalli Culture, Southern Uzbekistan: a. Sappalli Phase; b. Jarkutan Phase; c. Mollaali Phase (Litvinsky - Pyankova 1992: fig. 3).

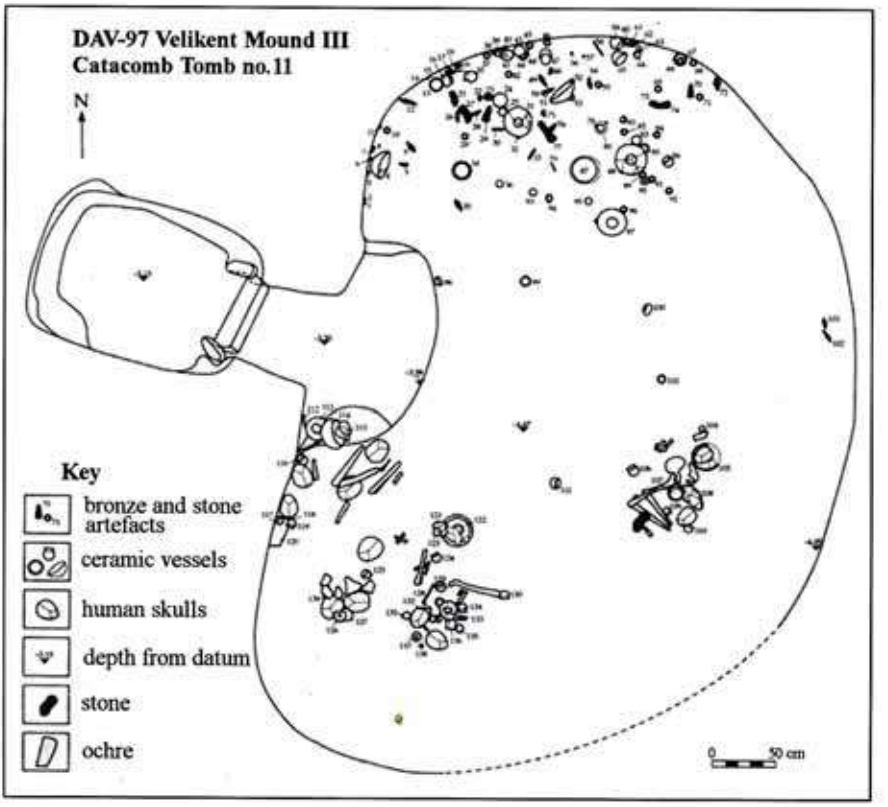

Fig. 10: catacomb of Velikent in Caucasus Kohl (2004).

Pseudo-catacombs: this grave structure is extremely similar to the catacombs of type 4 (Figs. 14-15). The main difference between the two types is the height of the closing wall between the vertical shaft and the burial chamber. While in type 4, the entrance and passage from the vertical shaft to the burial chamber is completely closed by a mud brick wall, in the pseudo-catacombs, this passage remains open and the shaft and burial chamber are divided by a low wall of mud bricks. In many cases the pseudo-catacombs are not regular and do not follow the typical plan and cross-section of this type of grave. For example, in Graves 303 and 307 , no traces of a dividing wall or even mud bricks are visible (Piperno - Salvatori 2007: 198). It is worth mentioning Grave 307 in particular, of which

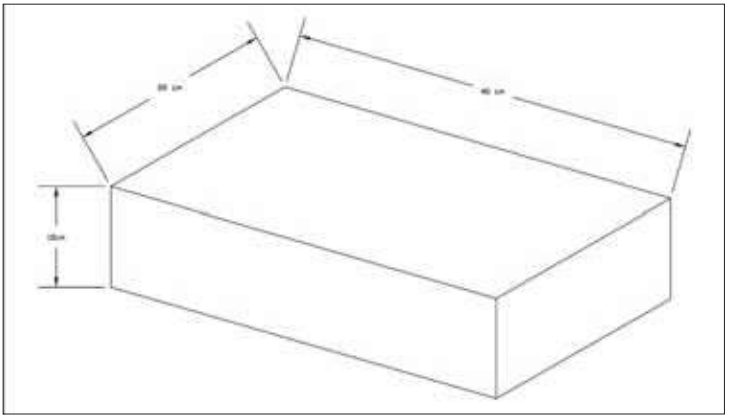

Fig. 11: standard measure of mudbricks.

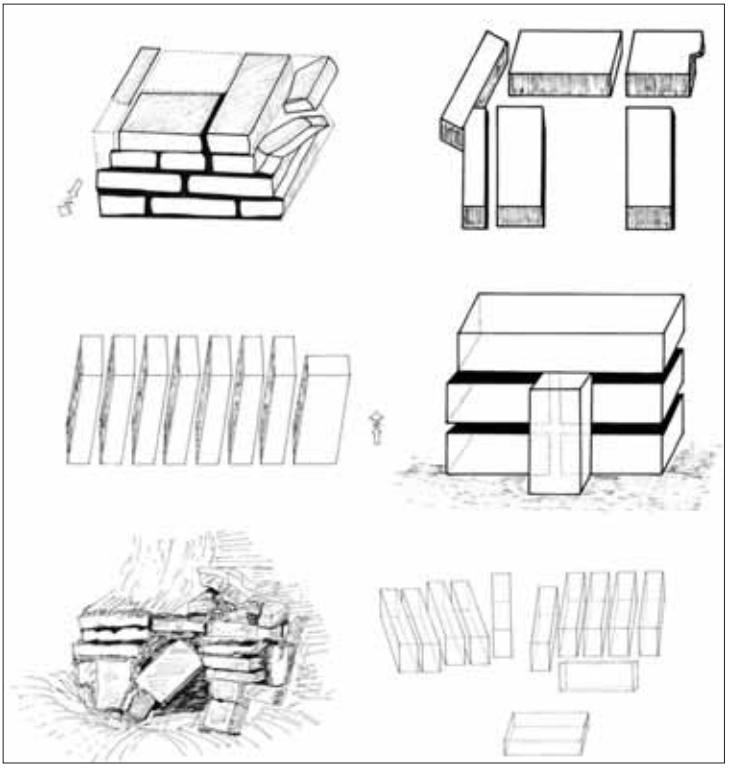

Fig. 12: mud brick layout of the grave structures.

Fig. 13: layout of mudbricks of dividing walls of graves (photo Iranian Archaeological Expedition).

only two deep holes are visible (Piperno - Salvatori 2007: 201): it is divided with a wall composed of the original earth. Another significant difference between catacombs and pseudo-catacombs is the quality and quantity of objects. During excavations of these types of grave, a total of 1240 grave goods, 1079 monochrome pottery vessels and 15 polychrome vessels were recovered (Fig. 16). The number of objects in pseudo-catacombs ranges from a minimum of 2 pottery vessels in Grave 308, belonging to an individual of indeterminate gender, to a maximum of 81 objects in Grave 725, belonging to a male individual. In the catacombs, the number ranges from a minimum of 7 objects in Grave 3912, belonging to a female individual, to a maximum of 117 in Grave 8725, also belonging to a female individual. In other words, the average number of objects in each pseudo-catacomb is 15, but each catacomb has 54.9 objects. Another difference is the quality of the objects. Given the negligible structural difference between the two types of grave, the question arises as to whether these differences are a sign of the lower social importance of those inhumed in type 3, or merely the manifestation of an ideological/ritual issue.

One of the problems in identifying catacombs and pseudo-catacombs and distinguishing them from bipartite graves is related to the roofing. It is possible that some of the tombs classified as type 3 or 4 were originally bipartite graves whose roofs and walls later collapsed, impeding their identification and classification. Two examples are Graves 6805 and 6809, whose attribution to either of the catacomb groups is doubtful. Similarly, the opposite may also be true, i.e. that some of the tombs were originally catacombs but were mistakenly classified as bipartite tombs due to the collapse of the roof and walls. Mostly however, based on excavations, the roofs of most burial chambers, including Graves 1400, 1405 and 5005, have been found complete (Tab. 1).

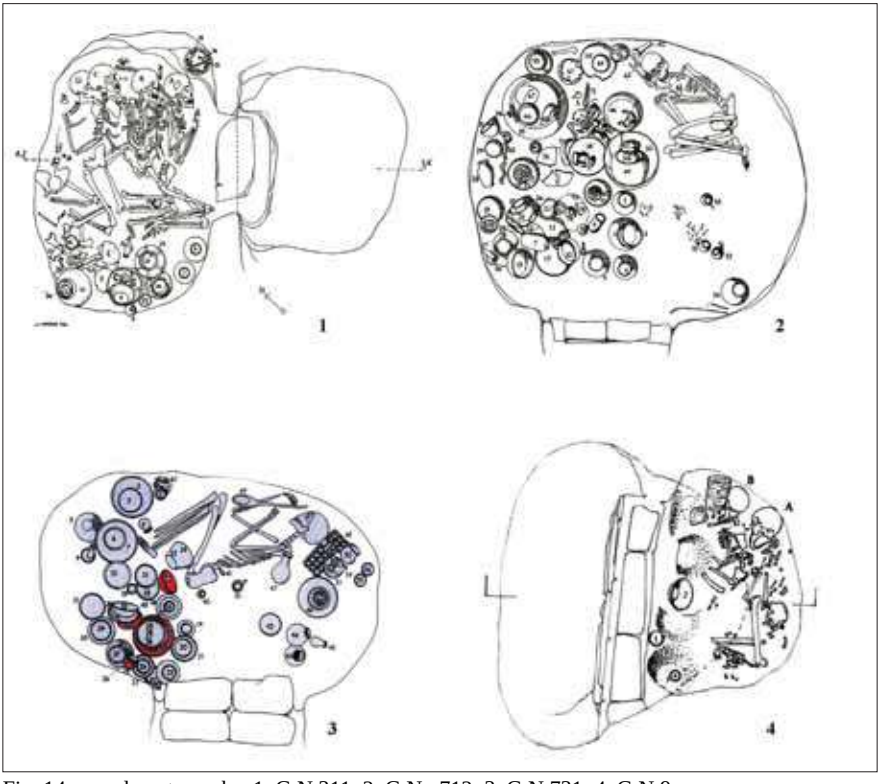

Fig. 14: pseudo-catacombs; 1. G.N.311; 2. G.No.712; 3. G.N.731; 4. G.N.9.

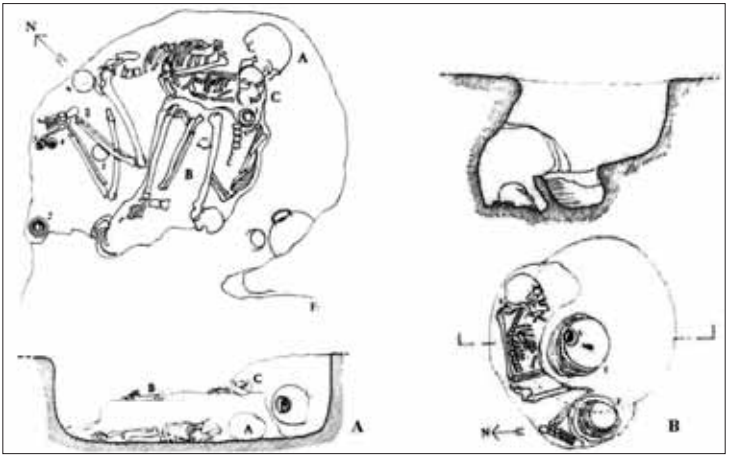

Fig. 15: irregular pseudo-catacombs; A. G.N.303; B. G.N.307.

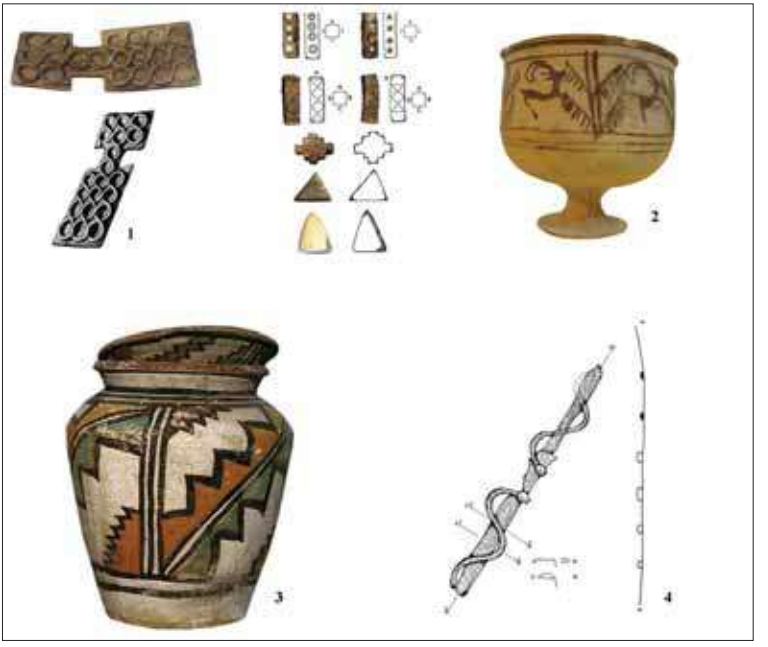

Fig: 16. pseudo catacomb. Samples of grave goods; 1. Wooden game board, dice and pawns, G.N.731; 2. Cylindrical cup with flared rim on low sub-cylindrical flaring stand. buff ware black paint, G.N.731; 3. Polychrome jar. G.N.712; 4. Long wooden tabular stick with high-relief carved facing snakes, G.N.725.

Catacomb/type 4 (Figs. 17-20) like the previous type, has a vertical, rectangular shaft of varying depth and an elliptical chamber that opens onto one of the long sides of the vertical shaft (Fig. 21) .The floor of the chamber is lower than the floor of the vertical shaft. After the inhumation, the entrance to the underground chamber was closed by a mud brick wall, and the vertical shaft was filled in. This grave type was used for both individual and multiple burials. According to M. Piperno (1986), this type of grave was mainly built for family groups but further excavations and research have shown that they might have also had another function, to which we will return. While the passage connecting the shaft and chamber of the pseudo-catacombs (type 3) is marked by a few rows of mud bricks, the entrance doors of the catacombs (type 4) are completely closed. It seems that this more imposing type of grave could well have belonged to persons of high social status and their families, as indicated by the grave structure and the quality and quantity of grave goods. Although some of these tombs may have been used more than once, they did not appear to have been originally built for repeated use. In fact, the data show that catacomb burials were not built to be reused, or even to be family tombs. Rather, their construction reflects ideological considerations or, more probably, their occupant had special social status in that society. Re-using the catacombs as a family crypt or for collective burials, as in some cases, does not mean that they were originally built for this purpose. It is not known whether all individuals in multiple graves were inhumed on a single occasion or at different times. The theory of burial at different times is supported in at least in one case, Grave 1400, which was used at four different times for four separate inhumations: two men, a woman and one child. The remains of the first inhumation, in the form of fragments of human bones, which were not anatomically complete, together with associated objects, were piled up in one corner of the grave very near to the closed entrance. On almost the opposite side were the remains of another incomplete human skeleton. In the centre of the grave was a young male skeleton covered by a rug together with grave goods. On top of the carpet was the skeleton of a young female, 18-21 years old, and her grave goods consisting of 63 items (Sajjadi 2007).

N°	Grave n°	N° of skeletons	Gender				Approx. Age	N° of objects		
			M	F	Child	?		Total	Pottery	Other
1	2	1				*	20	32	21	99 flint blades; alabaster bead; bracelet (49 lapis-lazuli and turquoise beads); bracelet (18 stone beads); necklace (62 alabaster and turquoise beads); necklace (188 lapis lazuli and turquoise beads)
2	4	1		*			25	9	1 polychrome jar	1 bone seal; 1 cornelian bead; 1 textile bag; 1 bronze shaft; 1 stone vessel; 1 marble bowl; 1 die; 1 rod
3	9	2	*			*	25+?	4	3	1 alabaster bead; 5 woven vegetable basket
4	17	2		*	*		25+3/4	7	3	1 cylinder seal; 3 alabaster beads
5	19	2		**			20-25+ 25	8	4	1 chlorite cylinder seal; 2 alabaster beads; 1 basket; 1 bracelet (13 stone beads)
6	23	1	*				20	6	4	Traces of a basket; 1 alabaster bowl; 1 turquoise bead
7	36	3	*	*	*		3 0 + 2 5 - 3 0 + 2	21	14	1 alabaster bowl; 8 turquoise beads; 1 lapis-lazuli bead; 1 green stone; 1 wooden comb
8	44	4	*	**	*		1 2 + 1 6 + 1 6 + 2 0	13	8	1 alabaster bowl; 1 chlorite flacon; 1 stamp seal; 1 alabaster bead
9	53	1				*	6	4	2	2 alabaster beads
10	75	1	*				60-65	23	22	1 limestone bead
10	80	1		*			30	4	3	1 bracelet (14 stone beads)
11	301	1	*				35	4	2 (1 Polychrome)	1 alabaster bowl; 1 alabaster bead
12	303	3	*			**	45+?+7-8 months	7	5	1 basket; 1 alabaster bowls
13	307	1		*			20+25	10	1	1 basket; 2 alabaster beads; 2 carnelian beads; 1 alabaster bead

14	308	1				*	9/10	2	1	1 turquoise bead
15	309	1				*	?	4	1	1 alabaster bowl; 1 turquoise bead; 1 carnelian bead
16	311	6	***	***			3 0 + 3 0 + 3 5 + 4 5 + 3 5 + 3 0	34	21 (2 polychrome)	1 pouring stick bone; 1 bone stamp seal; 1 bronze stamp seal; 2 lapis lazuli stamp seals; 3 chalcedony beads;1 alabaster lamp; 2 alabaster bowls; l limestone polisher
17	402	1				*	?	7	6 (1 polychrome)	1 alabaster lamp
18	712	1	*				25	25	15 (2 polychrome)	1 alabaster beaker; 1 flacon; 1 small basket; 1 leather basket; 1 metal bead; 1 metal blade; 2 metal rods; 1 seal; 1 bracelet (26 turquoise, calcite and lapis-lazuli beads); 1 small clay vessel
19	725 inf.	1	*				30-35	81	60	1 goat kid; 4 alabaster vessels; 1 metal seal; 4 gold barrel-shaped beads; 137 beads (quartz; turquoise; lapis-lazuli; chalcedony; calcite); 1 silver plaque; 1 basket; 1 mortar; 1 bone stick; 1 turquoise bead; 1 stone scraper; 1 basket; wooden button; 20 beads (chalcedony; turquoise); 1 blade; 1 stone item
20	728	1	*				25-30	10	9	1 wooden comb
21	731	1	*				25-30	61	52	1 alabaster bowl; 1 mortar; 1 pestle, 1 calcite bead; 1 bronze stamp seal; 1 rectangular wooden board + dice and pawns; 1 ovoid spoon.
22	749inf	1		*			35-40	17	8 (1 Polychrome)	2 Calcite vessels; 1 Calcite spindle- whorl; 24 beads (10 lapis lazuli, 4 turquoise, 5 cornelian, 5 gold); 1 limestone cylinder seal; 8 green stones; 1 bronze quatrefoil-shaped stamp seal; 1 silver stud; 1 shell valve

Tab. 1: characteristics of pseudo-catacombs.

Of the total of 42 catacomb graves reported, a total of 31 contain one skeleton: they contained 10 males, 11 females, 2 children and 8 indeterminate individuals. Fewer than 30% are collective graves, with dual burials in 50% of cases. With the dual burials there is no way to differentiate between a single burial event of two people or two successive burials of one person, although for Grave 1404 with 2 human skeletons, one male and one child, the inhumation probably took place only once. A total of 5 graves contains 2 skeletons: the male and child; two females; a male and an indeterminate individual; and two graves each with one female and one child. Three graves contain three skeletons: a female and two children; one female, one male and one child; and one male and two indeterminate individuals. Two graves have four skeletons: one male, one female and two children; two male, one female and one child. Lastly, one multiple grave contains three females and three males. The oldest in this grave (Grave 75) is a male individual 60-65 years old.Grave 311, another catacomb, contained the bone remains of three males and three females, all over 30 years old. It seems this grave was used at least twice, first for two individuals whose remains were piled up among the grave objects when the other four bodies were buried. These later bodies are still anatomically complete (Piperno - Salvatori 2007) (Fig. 22) (Tab. 2).

Research into the graves of Shahr-i Sokhta shows that there is no correlation between the grave type and the age or gender of the inhumed individuals, but rather between grave type and the individuals' religious belief, social status and probably land of origin. This point is confirmed by the type and number of grave goods that were found (Fig. 23). In three cases the inhumed were over 50 years old: 65 years with 6 grave goods; 50-65 years with 25 grave goods; 50-55 years with 63 grave goods. The other inhumed individuals were of various ages but mostly 20-30. Among the 8 inhumed children, only two were buried alone, and these had the least grave goods: a six-year-old child in Grave 53 with three pottery vessels and two alabaster beads; an 8-10-year-old child in Grave 308 with one bead and one pottery beaker. Other children were buried together with adult individuals. The graves containing children were not particularly rich, with the exception of Grave 1404, of a male individual and a child, with 101 grave goods.

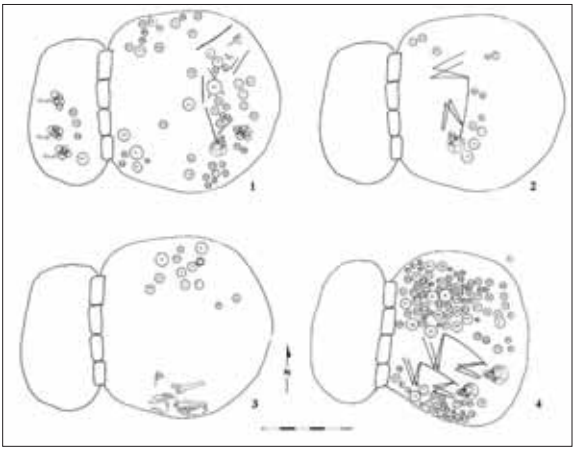

Fig. 17: G.N.1400. Distribution of grave goods and position of skeletons: 1. Latest inhumation; 2. Intermediate inhumation; 3. Earliest inhumations; 4. G.N.1404: distribution of grave goods and position of skeletons.

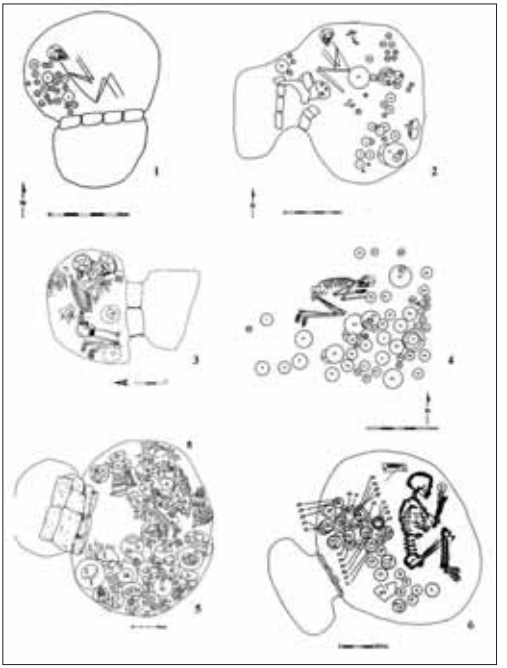

Fig. 18: catacombs; 1. G.N.1405; 2. G.N.1615; 3. G.N.6905; 4. G.N.1705; 5. G.N.8725; 6. G.N.5005.

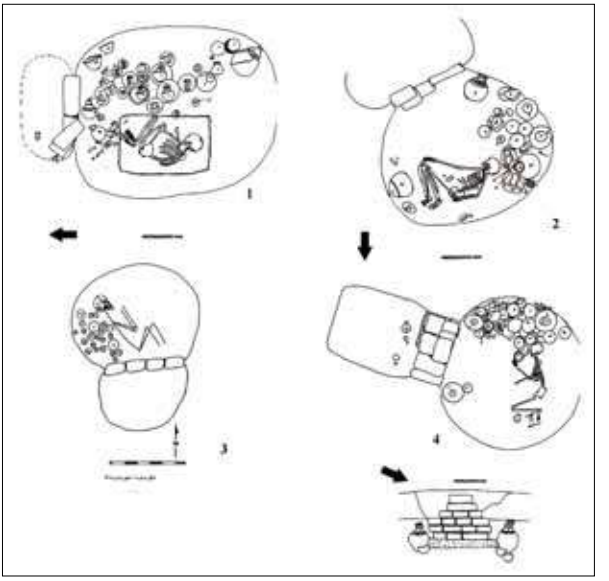

Fig. 19: catacombs; 1. G.N.6805; 2. G.N.9209; 3. G.N.9417; 4. G.N.8913.

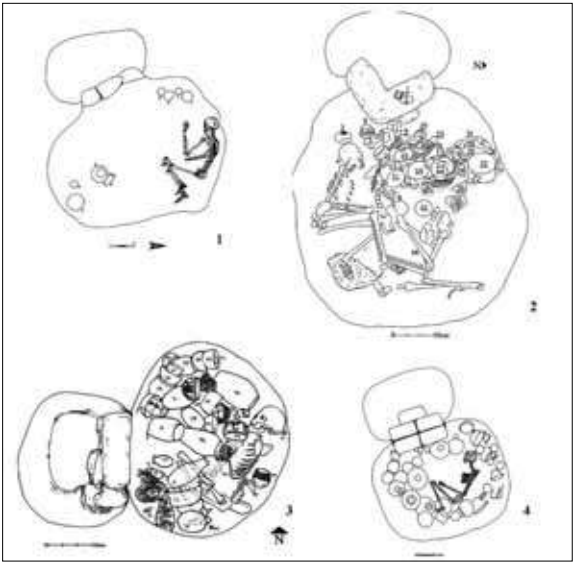

Fig. 20: catacombs; 1. G.N.9034; 2. G.N.9025; 3. G.N.4301; 4. G.N.9031.

Fig. 21: two model of vertical shafts (Photo: Iranian Archaeological Expedition).

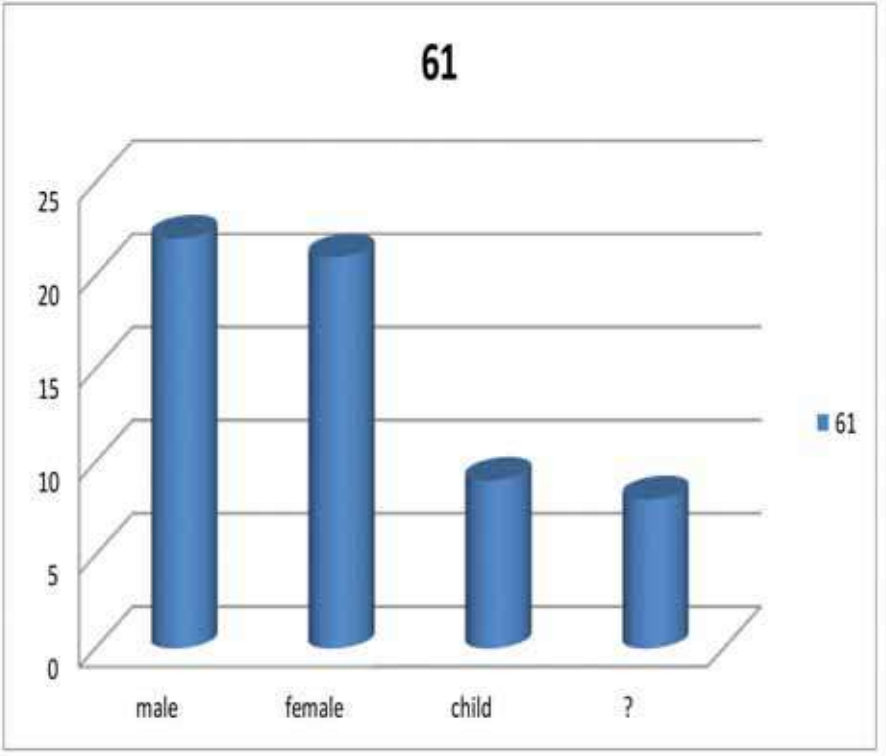

Fig. 22: number and percentage of skeleton genders in the catacomb-type grave.

No.	G.No.	No. Skeletons	Gender				App. Age	No. Objects		
			M	F	Child	?		Total	Pottery	Other Obj.
1	1400	4	**	*	*		/18+45/50+ 50/60+child	88	74 (2 polychrome)	1 alabaster mortar; 1 wooden ladle;4 basket; 1 alabaster flacon; 1 wooden box; 1 metal mirror; 1 metal pin; 1 wooden comb; 1 wooden 1 spindle; 1 mat carpet
2	1404	2	*		*		45/50+child	101	93 (2 bichrome)	1 wooden bead; 5 basket; 1 wooden comb
3	1405	1	*				45/50	24	18	4 basket; 1 alabaster flacon; 1 metal pin
4	1615	1	*				25/30	57	52	1 alabaster mortar; 1 alabaster flacon; 1 metal shaft; 1 cornelian bead; 1 jade bead
5	1705	1		*			40-45	65	61(1 polychrome)	1 metal pin; 1 pottery flacon; textile fragments
6	2804	1		*			35/40	20	19	textile fragments
7	3912	1		*			50/55	7	6	l stone bowl
8	4301	1		*			45/50	29	29	-
9	5005	1	*				50/55	63	58	1 goat kid; 2 alabaster mortar 1 metal shaft; 1alabaster flacon; 1 mobile mud brick stove
10	6805	1				*	?	11	8	3 lapis-lazuli, calcite beads
11	6905	2		*	*		30/35 +3/4	11	2	1 alabaster bowl; l metal shaft; l stamp seal;2 shells; 1 large bead; 1 stone item
12	8725	1		*			38-42	117	101	2 small clay vessels; 1 stone item; 2 alabaster flacon; 3 alabaster mortar; 1 metal mirror; 2 metal wand; 1 bone item; 2 lapis lazuli beads; 1 stone bead; 1 metal item

13	8913	1			*		adult	73	69	1 metal mirror; 1 alabaster bowl; 1 lapis-lazuli bead; 1 basket
14	9025	1			*		adult	35	29	1 metal mirror; 1 metal stamp seal; 1 bracelet (lapis lazuli turquoise beads; 2 clay ball
15	9029	1	*				adult	28	19	1 alabaster bowl; 1 small clay vessel; 1 incenses burner, pottery and metal fragments.
16	9031	1				*	adult	57	49	1 stone tool; 2 beads; 2 clay items;1 metal mirror; 1 alabaster vessel; 1 incenses burner
17	9034	1				*	adult	43	37	1 stone bowl; 1 metal mirror; 1 bead; 1 leather bag; 1 basket; 1 incenses burner
18	9209	3	*	**			30/35+32/36+?	45	43	1 alabaster bowl; an alabaster flacon
19	9417	1		*			27/33	41	33	2 mat baskets; 1 alabaster flacon; 1 bronze wand; 1 bronze stamp seal, 1 wooden whorl spindle; 2 fragments of mat carpet

Tab. 2: main characteristics of catacomb graves.

The grave goods are distributed as follows: of a total of 1248 grave goods found in the catacomb graves, 1107 are ceramic items. 938 objects were found in the individual graves and the rest in the collective graves. The female Grave 8725 is considered the "richest" in the necropolis. Quantitatively (Fig. 24).

- 15 graves have fewer than 10 objects: 4 males (Graves 9; 23; 301; 728); 4 females (Graves 4; 80; 307; 3912); 3 multiples (Graves 17; 19; 43); 4 indeterminate (Graves 53; 308; 309; 402);

- 5 graves have 10-19 objects: 2 females (Graves 749; 2804); 2 multiples (Graves 44; 6905); 1 indeterminate (Grave 6805).

- 6 graves have 20-30 objects: 4 males (Graves 75; 712; 1405; 9029); 1 female (Grave 4301); 1 multiple (Grave 36), - 4 graves have 30-40 objects: 1 male (Grave 725); 1 child (Grave 9025); 1 multiple (Grave 311); 1 indeterminate (Grave 2). - 3 graves have 40-50 objects: 1 female (Grave 9417); 1 indeterminate (Grave 9034); 1 multiple (Grave 9209).

- 7 graves have 50-100 objects: 3 males (Graves 731, 1615, 5005); 1 female (Grave 1705); 1 child (Grave 8913); 1 indeterminate (Grave 9031); 1 multiple (Grave 1400) - 2 graves have more than 101 objects: 1 multiple (Grave 1404); 1 female (Grave 8725). Qualitatively, the objects from graves containing fewer than 10 objects consist of pottery vessels and a smaller number of metal, stone and bone artefacts. Due to its variety of objects, Grave 4 (belonging to a female individual) is an interesting example of this group. The presence of a polychrome jar (Fig. 64: 5) and a circular bone stamp seal, typical of female graves, together with stone and alabaster bowls, a metal pin and a calcite spindle-whorl, suggests that the inhumed individual had relatively high economic status. The same could also be said for Grave 19, where a cylinder seal, alabaster and chlorite beads and a basket were found. The other graves contain much more common objects. Grave 17 in this group contains one female, one indeterminate individual and a collection of 7 grave goods. In this grave, besides three pottery vessels, there are three alabaster bowls and one cylinder seal. The last in this group is Grave 3912, female, with 7 grave goods: six pottery vessels and one stone bowl (Tab. 3).

Among the graves containing 10 to 20 objects is female Grave 749, which, in addition to the typical pottery vessels and a polychrome jar, contained several

Fig. 23: Grave 5005. A rich male grave.

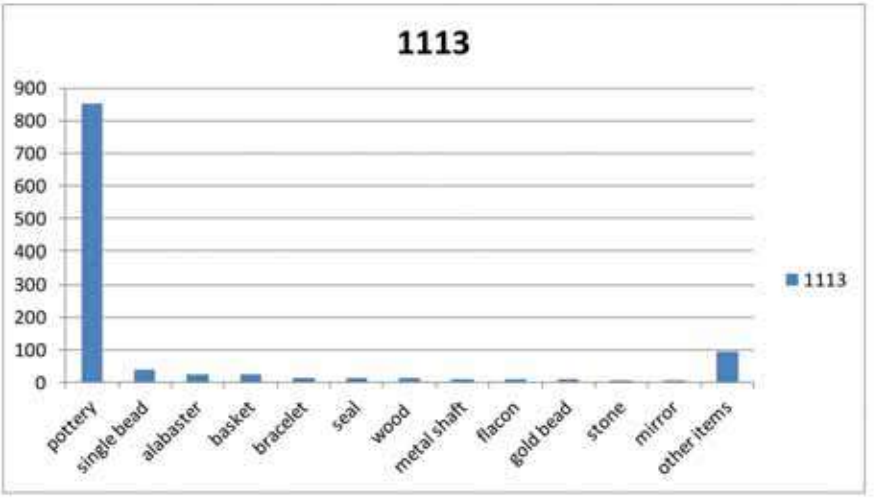

Fig. 24: Number and percentage of grave Goods in the catacomb-type grave.

other items indicating that the woman was part of an elite family. These include a necklace composed of 24 lapis lazuli, turquoise, carnelian and gold beads, a limestone cylinder seal, a bronze stamp seal and a hemispherical silver stud. Also worth mentioning is collective Grave 44, where two females, one male and one child are buried. This grave yielded a collection of 13 grave goods: 8 pottery vessels, one stamp seal made of bone, one large alabaster bead, one stone flacon and one stone bowl. Other graves in this group have yielded a number of common objects and textile fragments. Grave 6805, of an indeterminate individual, contains 11 grave goods: 8 pottery vessels and 3 beads (Fig. 25). The last grave in the group is Grave 6905, belonging to a female and a child, which contains 11 objects: two pottery vessels, one metal pin; one alabaster bowl, 1 stamp seal, 2 shells and 1 stone bead (Fig. 26).

The catacombs in Shahr-i Sokhta typically have 20-30 objects. They include Grave 75 with 22 pottery vessels and three beads, and Grave 1405 with 18 pottery vessels, one metal shaft, one alabaster flacon, and 4 baskets (Fig. 27). Another in this group is Grave 9029, belonging to an adult male with 28 grave goods: 19 pottery vessels, one alabaster bowl, 1 small clay vessel, one incense burner (Fig. 28) and metal and pottery fragments.

Catacombs				Pseudo-catacombs	
Material/object	No. of Items	Type of objects		No. of Items	Type of objects
Alabaster	13	mortar; flacon;bowl		10	bowl; lamp, flacon; beaker; mortar; pestle
Wood	7	ladle; comb, spindle, box, bead		5	comb; whorl spindle; rectangular board; spoon
Metal	15	mirror; wand		4	wand; stick; blade
Mat	16	3 carpet fragments/ 13 basket		2	2 carpet fragments/ 13 basket
Beads	27	cornelian; jade; lapis-lazuli, calcite		577	alabaster lapis-lazuli; turquoise; cornelian; stone; quartz; chalcedony; calcite
Pottery	1	Flacon		-	-
Textile	2	Fragment		1	bag
Stone	6	bowl, different items;		5	Vessel; polisher; scraper; spindle- whorl
Clay	7	mobile mud brick stove, small vessel; ball; different items		1	Small vessel
Seal	3	stamp seal		11	9 Stamp seal/ 2 cylindrical seal
Shell	1	-		1	-
Bone		Item		2	pouring stick
Clay/bronze	3	incenses burner			
Leather 1	1	Bag		1	basket
Flint	-	-		99	blade
Chlorite	-	-		1	flacon
Silver	-	-		2	Plaque; stud
Gold	-	-		9	beads
Total	108			51+99+577	
Pottery	803	monochrome		261	monochrome
Pottery	5	Polychrome		10	polychrome
	916			324	

Tab. 3: comparison between material and grave goods obtained from catacombs and pseudo-catacombs.

The most interesting burial in this group is without doubt Grave 712, belonging to a male individual, in which a collection of 25 grave goods was found. Apart from the presence of a polychrome jar, unexpected in a male grave, and 13 common pottery vessels, other interesting items include an alabaster beaker, a calcite lamp, the remains of a small basket woven from vegetable fibre, fragments of a small polychrome leather bag, a bronze disc, a bronze knife blade, two large metal pins, fragments of an unbaked clay vase, a seal and a bracelet consisting of 26 turquoise, limestone and lapis lazuli beads. Graves 2 and 311 contain respectively 32 and 34 objects. Grave 2 belongs to an indeterminate 20-year-old individual. It contains 21 pottery vessels, a goat kid, 99 small triangular flint blades inside a .pear-shaped beaker, an alabaster bead, stone implements and a number of lapis lazuli and turquoise beads inside another beaker. However, what distinguishes

Fig. 25: G.N.6805; 1. Painted Buff Ware jar; 2. Painted Buff Ware bowl; 3-6. Painted Buff Ware beakers (photo Iranian Archaeological Expedition).

Fig. 26: G.N.6905; 1. Painted Buff Ware jar; 2. Alabaster beaker; 3. Alabaster large bead; 4. Shells; 6. Bronze pin; 7. Lapis lazuli stamp seal (photo Iranian Archaeological Expedition).

this grave from all others is the recovery of two bracelets and two necklaces. The first bracelet is composed of 49 cylindrical beads: 3 Lapis lazuli and 46 turquoise, while the second is composed of 18 lozenges and cylindrical shaped beads of an unknown stone. The first necklace is composed of 60 beads, 59 turquoise and one alabaster, and the second is composed of 179 beads, of which 109 are lapis lazuli, 69 turquoise and one alabaster.

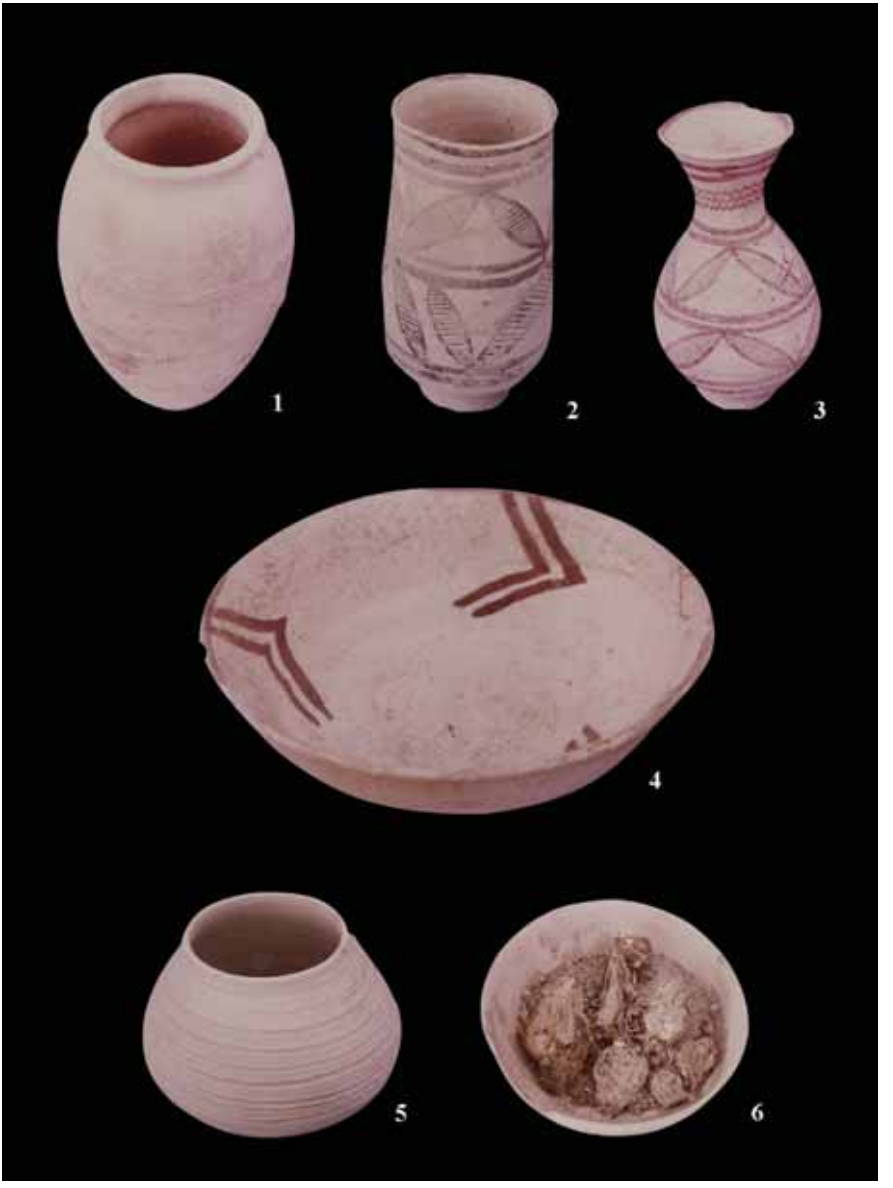

Fig. 27: G.N.1405; 1. Unpainted Buff Ware jar; 2. Painted Buff Ware beaker; 3. Painted Buff Ware pear shaped beaker; 4. Painted Buff Ware bowl; 5. Unpainted Buff Ware jar; 6. Unpainted Buff Ware jar (photo Iranian Archaeological Expedition).

Fig. 28: G.N.9029; 1-2. Painted globular buff ware jar; 3-6. Painted cylindrical shape deep beakers; 7. Painted Buff Ware bowl; 8-9. Painted pear shaped beakers (photo M. Rahmani).

Considering the value of semi-precious stones such as lapis lazuli and turquoise during the proto-historical period, the presence of a large number of worked beads in this grave is a clear sign of the special position of the inhumed individual within the society of that time.

Grave 311 is a multiple grave with 6 skeletons, 3 males and 3 females aged 30 to 45, with 34 grave goods. In this case again the presence of 2 polychrome jars, a limestone polisher, 3 chalcedony beads, four stamp seals made of lapis lazuli, bronze and bone and other grave goods highlights the high position of the inhumed female individuals in this grave. Female Grave 9025 had 35 grave goods: 29 pottery vessels, one metal mirror, one metal stamp seal, one bracelet (lapis lazuli and turquoise beads) and 2 clay balls (Figs. 29-31).

Three graves contain 40 to 50 grave goods. The first in this group is Grave 9034 containing one indeterminate adult individual, which yielded 37 pottery vessels, one stone bowl, one metal mirror, one stone bead, one leather bag, one basket and one incense burner (Figs. 32-33). The second in this group is female Grave 9417 , with 41 grave goods including 33 pottery vessels, 2 baskets, one alabaster flacon, one bronze rod, one bronze stamp seal, one wooden spindle whorl and two fragments of carpet (Figs. 34-36). The last in this group is multiple Grave 9209, belonging to two females and one male, which contained 46 objects: 44 pottery vessels, one alabaster bowl and one alabaster flacon (Figs. 37-39).

The seven graves containing 50 to 100 objects differ considerably with respect to the other graves in terms of both quantity and quality. One of the most interesting graves in this group and the whole necropolis of Shahr-i Sokhta is Grave 731, which contained a 25-30-year-old male individual. This grave contains a total of 61 objects including 52 pottery vessels; an alabaster bowl; a mortar; a pestle, a calcite bead; a bronze stamp seal; and an ovoid spoon. Besides these objects, this grave contains two other exceptional items. The first is a painted Buff Ware chalice (Piperno - Salvatori 2007: 290). On the outer surface of this vessel is a representation of a goat in five different positions, shown moving toward a bush, and feeding from its leaves (Fig. 40). This scene, together with another one from the necropolis of Keshik in Baluchistan (Sedghi

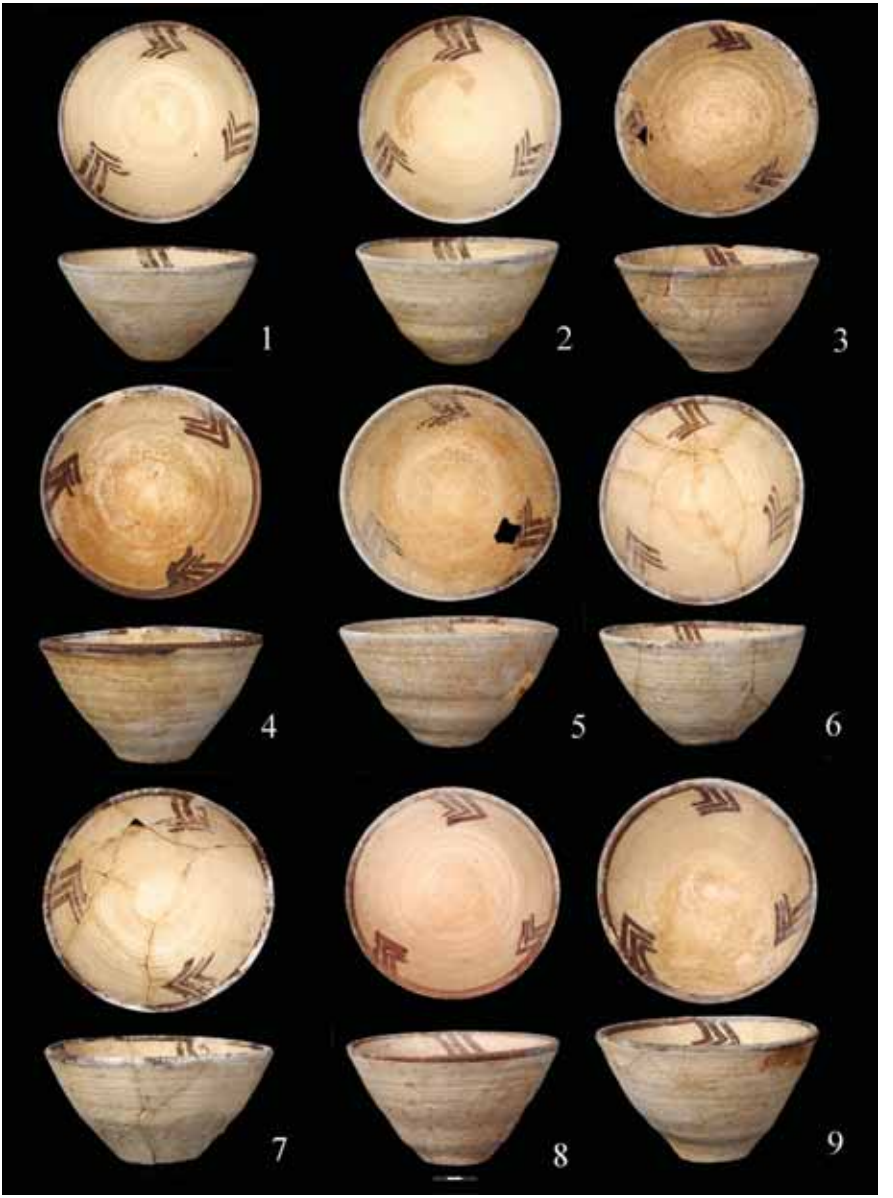

Fig. 29: G.N.9025. 1-9. Painted Buff Ware bowls. Cat. nos. 3, 5, 6, 7, 9, 12, 19, 20, 21 (photo M. Rahmani).

Fig. 30: G.N.9025. 1-4. Painted globular Buff Ware jars; 5-8. Painted Ogival shape Buff Ware jars (photo M. Rahmani).

et al. 2017: fig. 6), may be considered one of the earliest attempts to represent different types of natural movement on the Iranian plateau. The second object, or collection of objects, is a wooden game board with its dice and gaming counters. This is a rectangular board 33.4 cm long, 12.7 cm wide and 6 mm thick, divided into two compartments connected by a bridge, made from the wood of a seasoned ebony tree. On one of the faces there are 20 circular spaces formed by the coils of a snake, carved in relief. This game board is similar to the famous board from the royal necropolis of Ur (Wooley 1934). A similar object, made of chlorite, has been found at Jiroft (Madjidzadeh 2003). Found together with the board were four elongated wooden dice with numbers from 1 to 4 marked by circular

Fig. 31: G.N.9025. 1. Painted globular Buff Ware jar; 2. Painted small Red Ware jar; Painted buff ware small jar; 4-5. Painted Buff Ware sub-cylindrical cup; 6. Unpainted spouted Buff Ware beaker; 7. Alabaster bowl; 8. Bronze mirror of incenses burner; 9. Alabaster large bead; 10. Bronze stamp seal. 11. Beads (lapis lazuli, turquoise, calcite and cornelian) (photo M. Rahmani).

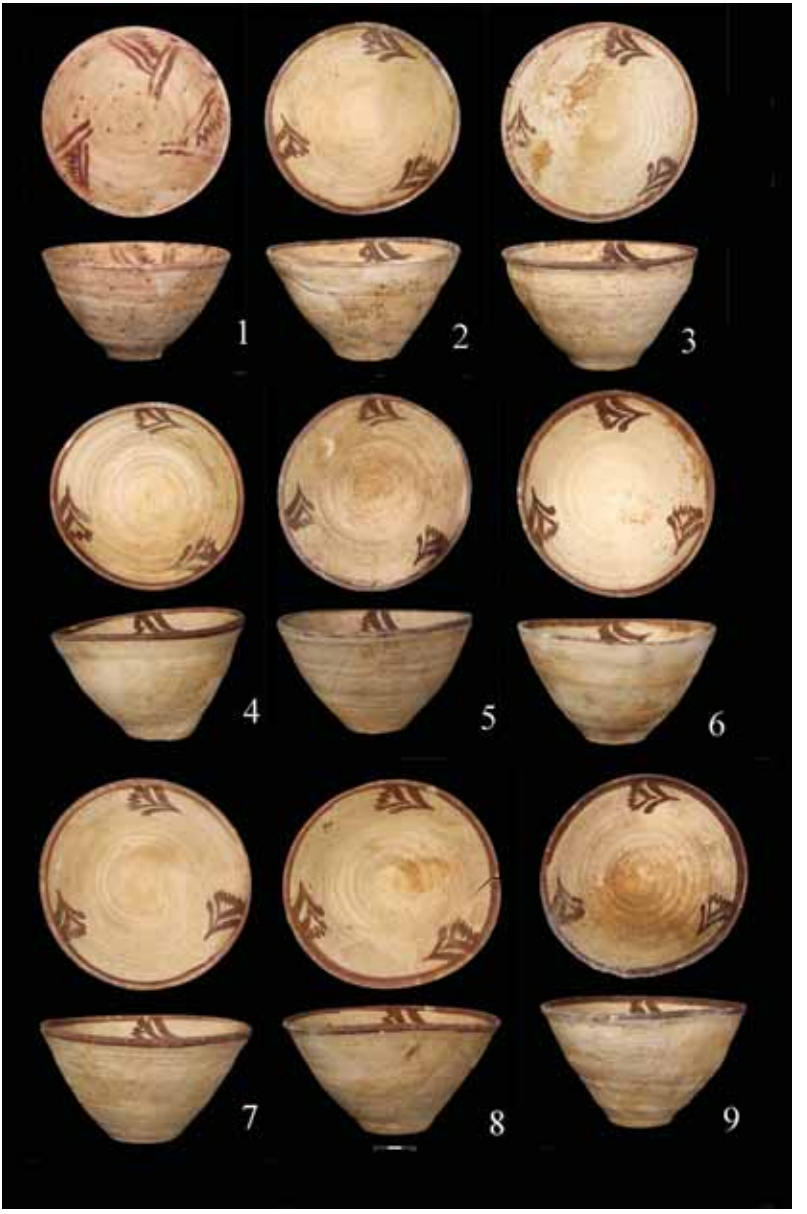

Fig. 32: G.N.9034: Painted Buff Ware bowls (photo M. Rahmani).

Fig. 33: G.N.9034: 1-2. Painted Buff Ware sub-cylindrical cup; 3. Painted Buff Ware small jar; painted pear-shaped Buff Ware beakers. Unpainted spouted Buff Ware beakers; 9. Alabaster bowl; 10. Clay/bronze incense burner; 11. Bronze mirror (photo M. Rahmani).

Fig. 34: G.N.9417: 1-8. Unpainted Buff Ware bowl; 9. Painted Buff Ware bowl (photo M. Rahmani).

bone inlays on the face; 10 triangular wooden pieces; 3 stepped-lozenge-shaped wooden pieces; 7 stepped-triangle-shaped wooden pieces; 4 other pieces and two ogival and conical pieces of calcite.

Another interesting grave in this group is 1400. This is a multiple grave of 4 individuals: one young female; two males and one child. It contains 88 objects: 72 pottery vessels including two bichrome beakers, an alabaster mortar, a wooden ladle, 4 baskets, an alabaster flacon, a wooden box, a metal mirror, a metal pin, a wooden comb, a wooden spindle and fragments of a carpet (Figs. 41-42). Grave 1615 belongs to a male individual aged 25-39 with 57 grave goods: 52 pottery vessels; an alabaster mortar, an alabaster flacon; a metal pin, a cornelian bead and a jade bead (Fig. 43). Grave 1705 is a female burial with 65 grave goods: 61 pottery vessels including 2 polychrome jars; 1 metal pin, one ceramic flacon and textile fragments (Figs. 44-45). Grave 5005, of a male aged 50-55 is the only catacomb with a kid/lamb. It had 63 objects: 58 pottery vessels, 2 alabaster

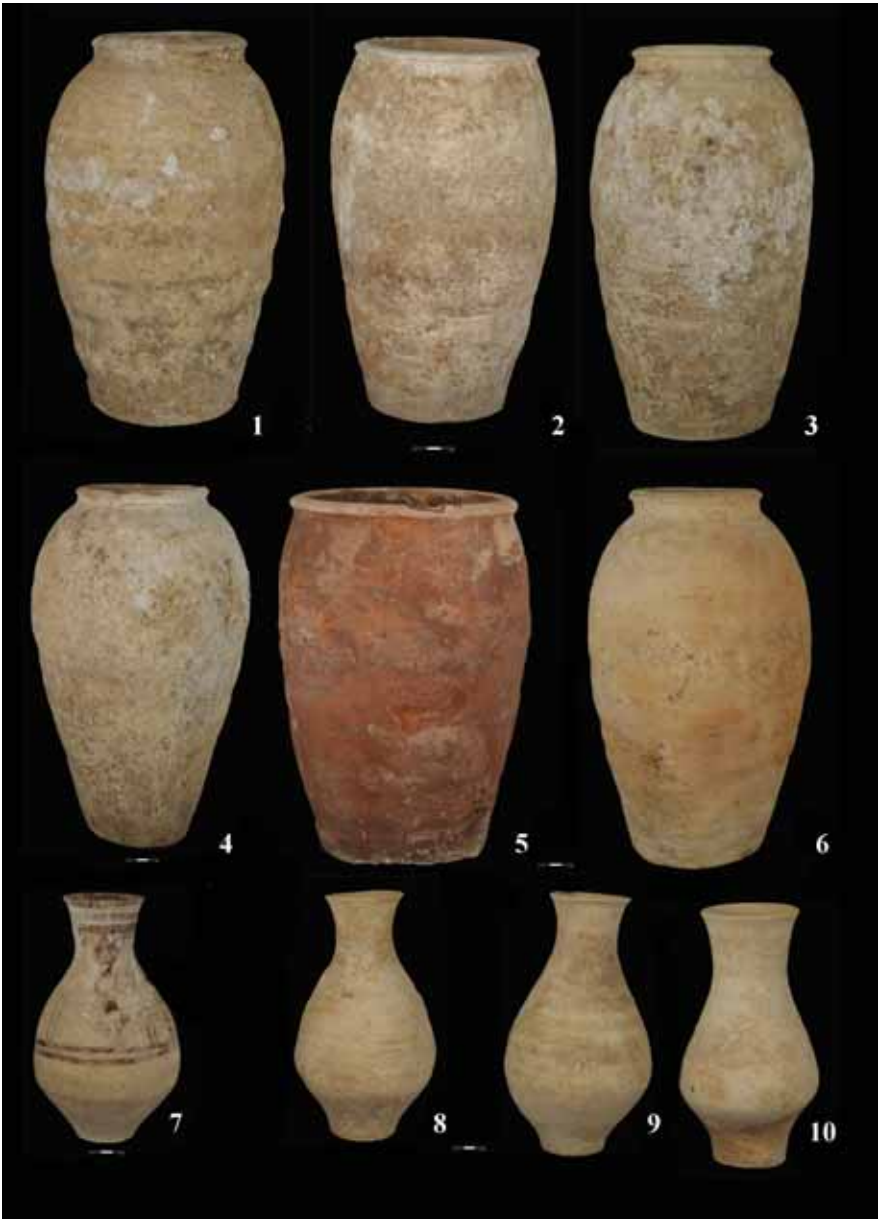

Fig. 35: G.N.9417: 1-6. Unpainted ogival shape jars; 7. Painted pear shape Buff Ware beaker; 8-10. Unpainted beaker shape jar (photo M. Rahmani).

Fig. 36: G.N.9417: 1-3. Painted Buff Ware chalice; 4. Unpainted deep bowl, Buff Ware; 5. Painted biconical Grey Ware jar; 6. Alabaster flacon; 7. Bronze pin; 8. Bronze stamp seal (photo M. Rahmani).

Fig. 37: G.N.9209: 1-3. Unpainted Buff Ware bowl; 4-6. Painted sub-cylindrical buff ware cups. Painted pear-shaped Buff Ware beakers; 11. Painted cylindrical Buff Ware beaker; 12. Unpainted spouted Buff Ware beaker; 13. Alabaster bowl; 14. Alabaster flacon (photo M. Rahmani).

Fig. 38: G.N.9209: 1-4. Unpainted globular Buff Ware jar; 5-6; Painted biconical small jar; 7-8. Painted globular Buff Ware jar; 9. Painted ogival Buff Ware jar (photo M. Rahmani).

Fig. 39: G.N.9209: 1-9. Painted Buff Ware bowl (photo M. Rahmani).

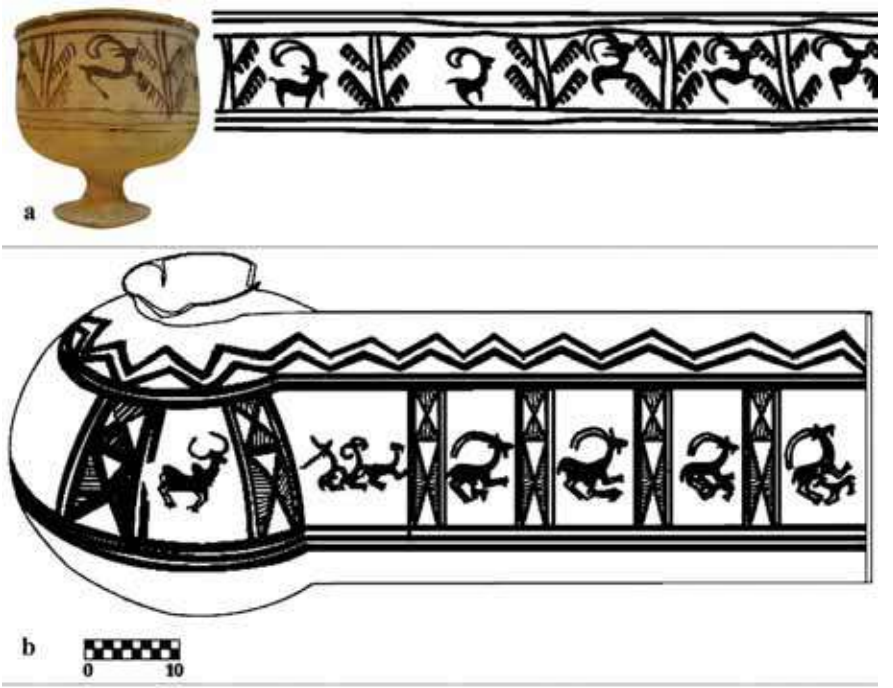

Fig. 40: G.N.731. Painted Buff Ware brandy cap, decorated with stylized tree and jumping goat (Piperno - Salvatori, 2007: 290); b. Keshik Cemetery. Redesigning cycle stages: birth, growth and development to reach the maturity stage (Sedghi *et al.* 2017: fig. 6).

mortars, a metal pin, an alabaster flacon and a clay stove (Fig. 23). Grave 8913 belongs to a very young man/child and contains 73 objects: 69 pottery vessels, a metal mirror, an alabaster bowl, a lapis lazuli bead and a basket (Figs. 46-47). Lastly Grave 9031, of an indeterminate adult individual, has 43 grave goods: 37 pottery vessels, a stone bowl, a metal mirror, a bead, a leather bag, a basket and an incense burner (Figs. 48-50).

The last group of graves in this list have more than 100 objects. Grave 1404 belongs to an adult male and a child with 101 grave goods: 93 pottery vessels including two bichrome beakers, a wooden bead, 5 baskets and one wooden comb. The last and the "richest" is Grave 8725, which belongs to a female aged 38-42 and has a total of 117 grave goods: 101 pottery vessels, 2 small clay vessels, a

Fig. 41: G.N.1400: 1, 4 Painted Buff Ware chalice with bell shaped stand. Unpainted pear-shaped buff ware beaker; 3. Painted dish Buff Ware; 5. bichrome beaker; 6-7. Unpainted Buff Ware bowl; 8. Unpainted globular Buff Ware jar; 9. Unpainted Buff Ware dish (photo Iranian Archaeological Expedition).

Fig. 42: G.N.1400: 1, 5, 6. Alabaster mortar; 2. Alabaster beaker; 3. Alabaster small bowl; 4. Alabaster flacon (photo Iranian Archaeological Expedition).

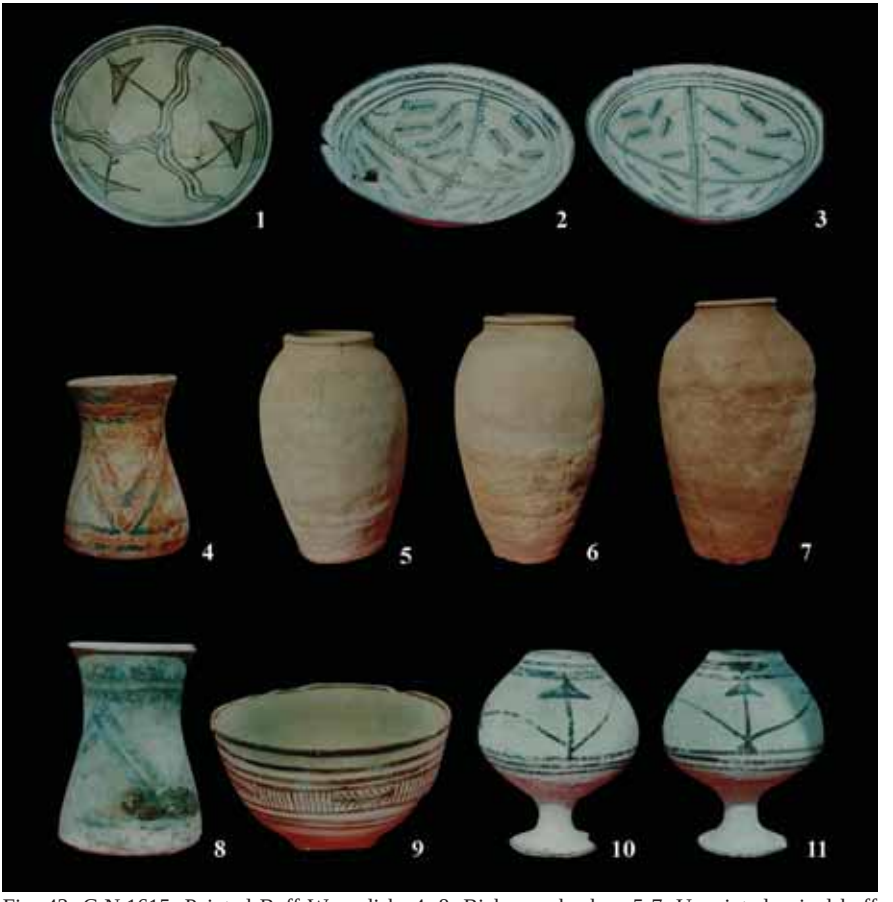

Fig. 43: G.N.1615: Painted Buff Ware dish; 4, 8. Bichrome beaker; 5-7. Unpainted ogival buff ware jar; 9. Painted Grey Ware bowl; 10-11. Painted Buff Ware cups with circular stand foot (photo Iranian Archaeological Expedition).

stone item, 2 alabaster flacons, 3 alabaster mortars, a metal mirror, 2 metal rods, a bone item, 2 lapis lazuli beads, a stone bead and a metal item (Fig. 51).

After years of excavations at Shahr-i Sokhta it is clear that this site does not display the typical features of a city-state in accordance with the model seen in Mesopotamia, Khuzestan and the Indus valley. Apparently, there is no real monumental building, central temple or governmental palace, nor does it have defensive towers or walls, or a defending or attacking army. There

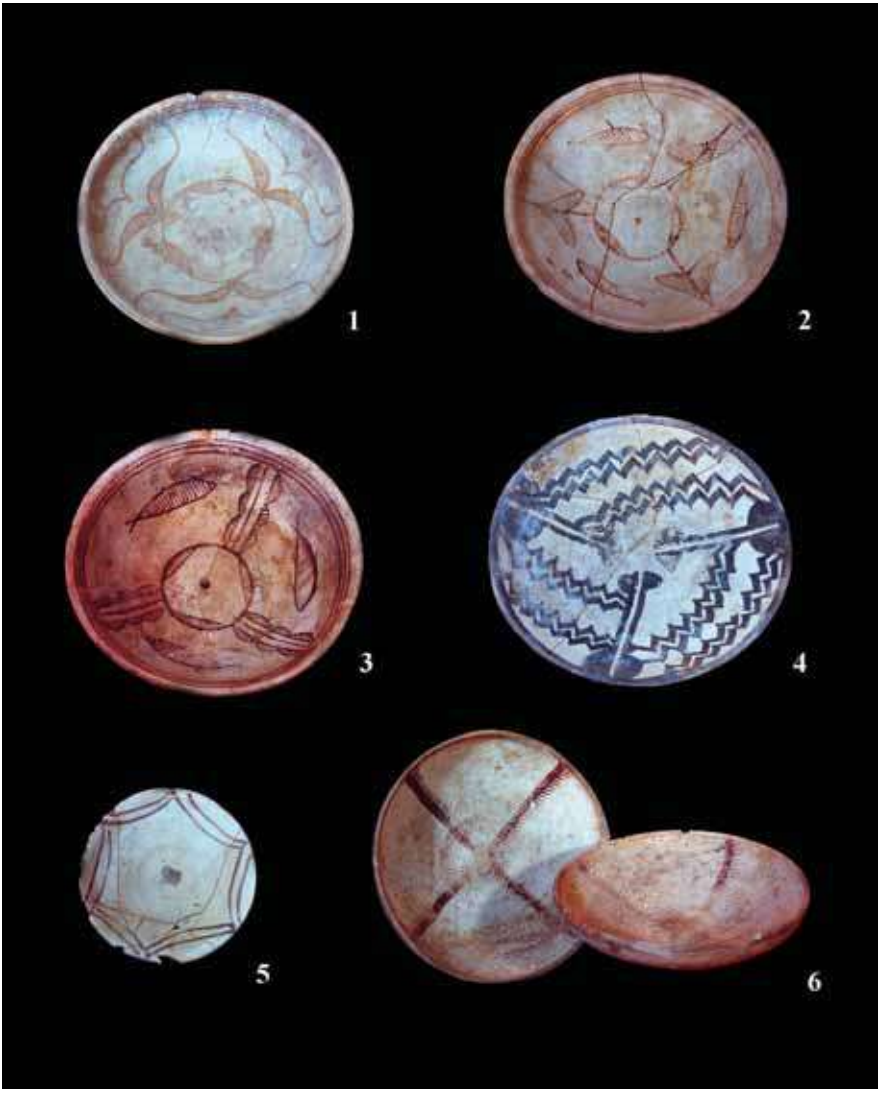

Fig. 44: G.N.1705: 1-6. Painted Buff Ware dishs (photo Iranian Archaeological Expedition).

Fig. 45: G.N.1705: 1-2. Unpainted Buff Ware bowl; 3. Unpainted pear-shaped Buff Ware bottle; 4. Unpainted pear-shaped Buff Ware beaker; 5. Polychrome cylindrical shape jar; 6. Biconical "wet ware" jar. 7. Painted biconical Buff Ware jar (photo Iranian Archaeological Expedition).

are no silos, no central archive and no royal necropolis. Thus, there was no central and organized control over the export and import of goods. The lack of all the structures required for the maintenance of a city state indicates that Shahr-i Sokhta's administration must have been different from that of other cities. The settlement is believed to have been governed and controlled by means of a sort of feudal system.

None of the catacombs are dated prior to Phase 5 of Period II, except a doubtful attribution to Phase 6 of Grave 749. Almost all of the graves belong to the period from 2500 to 2100 BC, i.e. Phases 5 to 3 of late Period II to

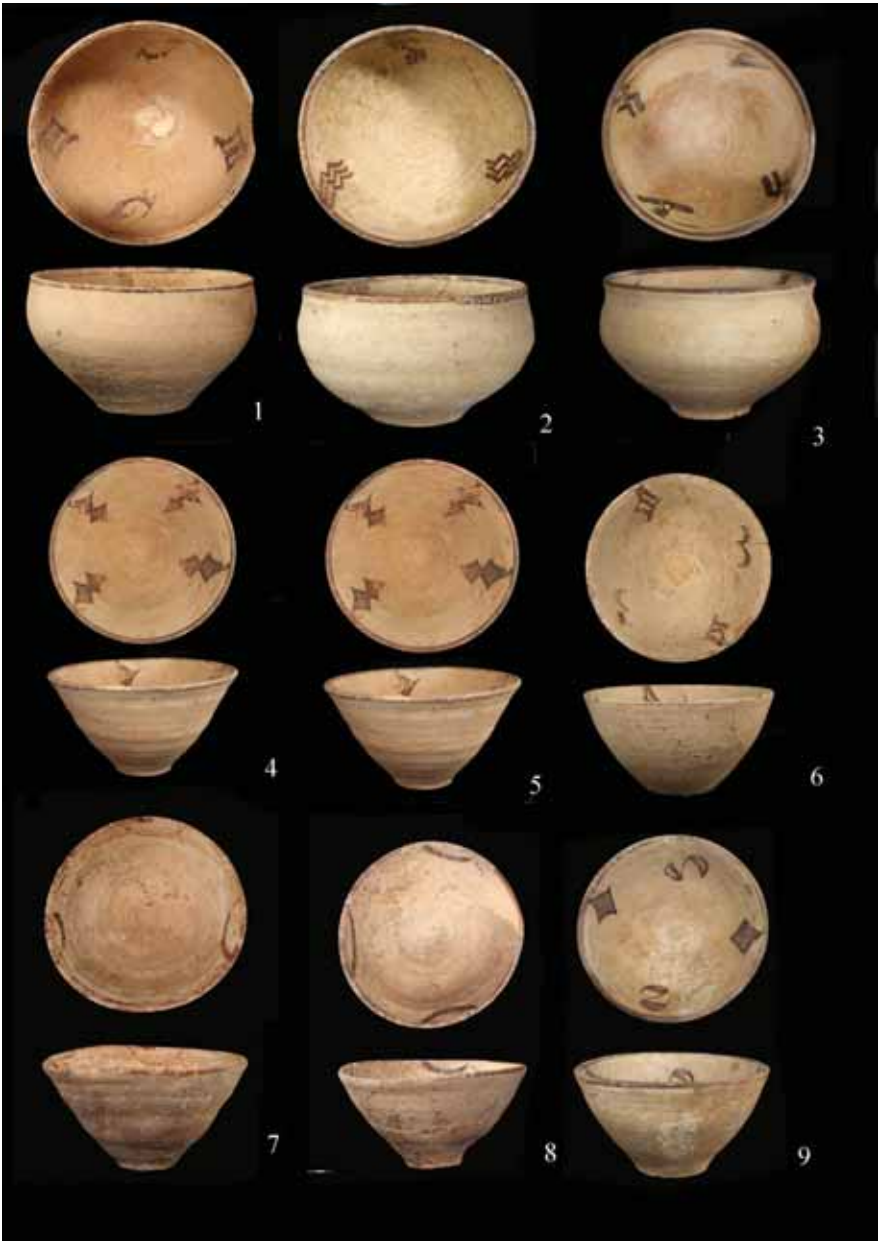

Fig. 46: G.N.8913: 1-9. Painted Buff Ware bowl (photo M. Rahmani).

Fig. 47: G.N.8913: 1. Painted Buff Ware jar; 2. Unpainted ogival jar; 3. Painted biconical Buff Ware jar; 4. Unpainted globular Buff Ware jar; 5-6. Painted cylindrical shaped Buff Ware beaker; 7. Painted pear-shaped Buff Ware beaker; 8-9. Painted spouted Buff Ware beakers; 10. Alabaster bowl; 11. Wooden (?) stamp seal; 12. Bronze mirror (photo M. Rahmani).

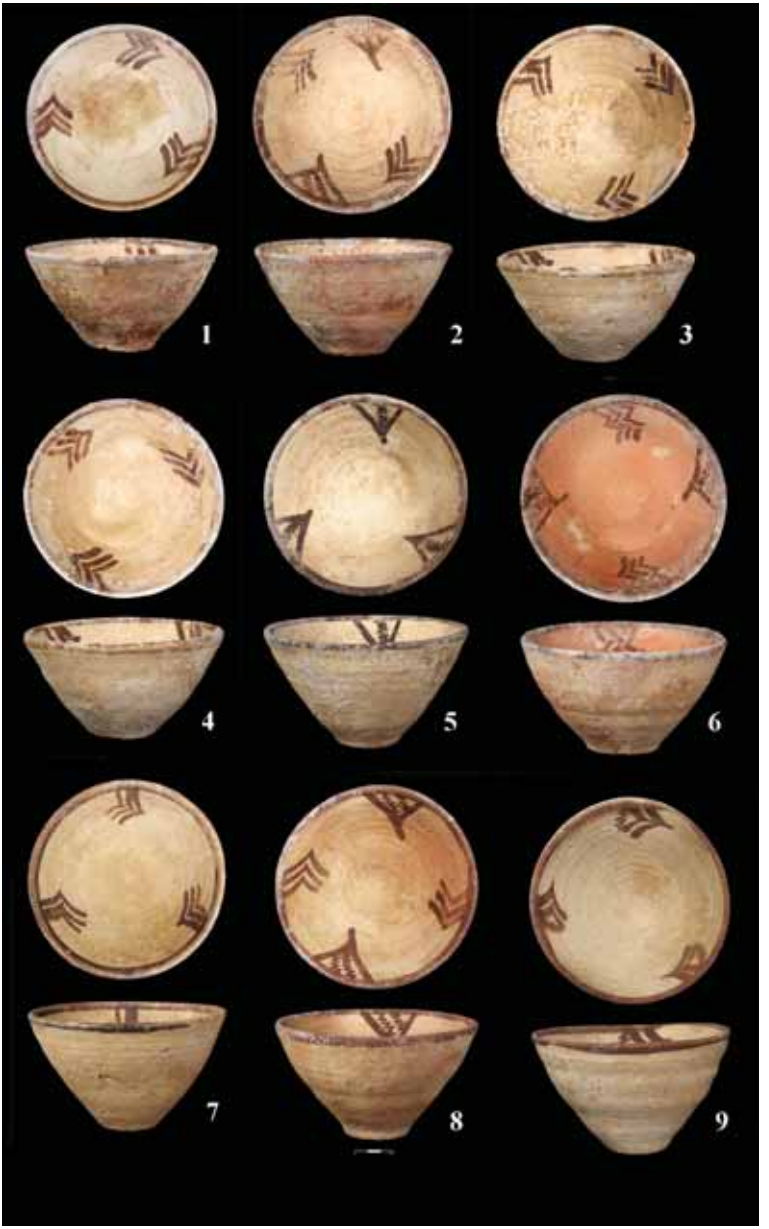

Fig. 48: G.N.9031: 1-9. Painted Buff Ware bowl (photo M. Rahmani).

Fig. 49: G.N.9031: 1-4: Painted globular Buff Ware jar. Painted ogival Buff Ware jar; 9-12. Painted sub-cylindrical Buff Ware bowl (photo M. Rahmani).

Fig. 50: G.N.9031: 1-2. Painted pear-shaped Buff Ware beaker; 3. Painted Buff Ware chalice; 4-5. Unpainted Buff Ware spouted beakers; 6. Unpainted globular Buff Ware jar; 8. Alabaster large bead; 9. Cornelian bead; 10. Clay small vessel; 11. Clay/bronze incense burner (photo M. Rahmani).

Fig. 51: G.N.8725: 1. Unpainted Buff Ware bowl with a cylindrical stand and applied snake figure; 2-3. Painted Grey Ware bowl. 4-6. Painted Buff Ware chalice with bell shaped stand; 7-8. Painted Buff Ware cups with circular stand foot; 9, 11. Alabaster mortar, 12. alabaster flacon; 13. Alabaster beaker (photo M. Rahmani).

late Period III. This is the period when Shahr-i Sokhta reached its maximum extent and population. Most of the catacombs of this rather long period are dated to Phases 3 and 4. Both quantitatively and qualitatively very rich, they indicate the high status of their owners in that society.

If this hypothesis is correct, it can be said that considering the small number of catacomb graves, accounting for less than 5% of all excavated burials, and their extraordinary richness, this type of grave was associated with a group of people with a very special status in that society: the chiefs of clans and thus Lords of Shahr-i Sokhta.

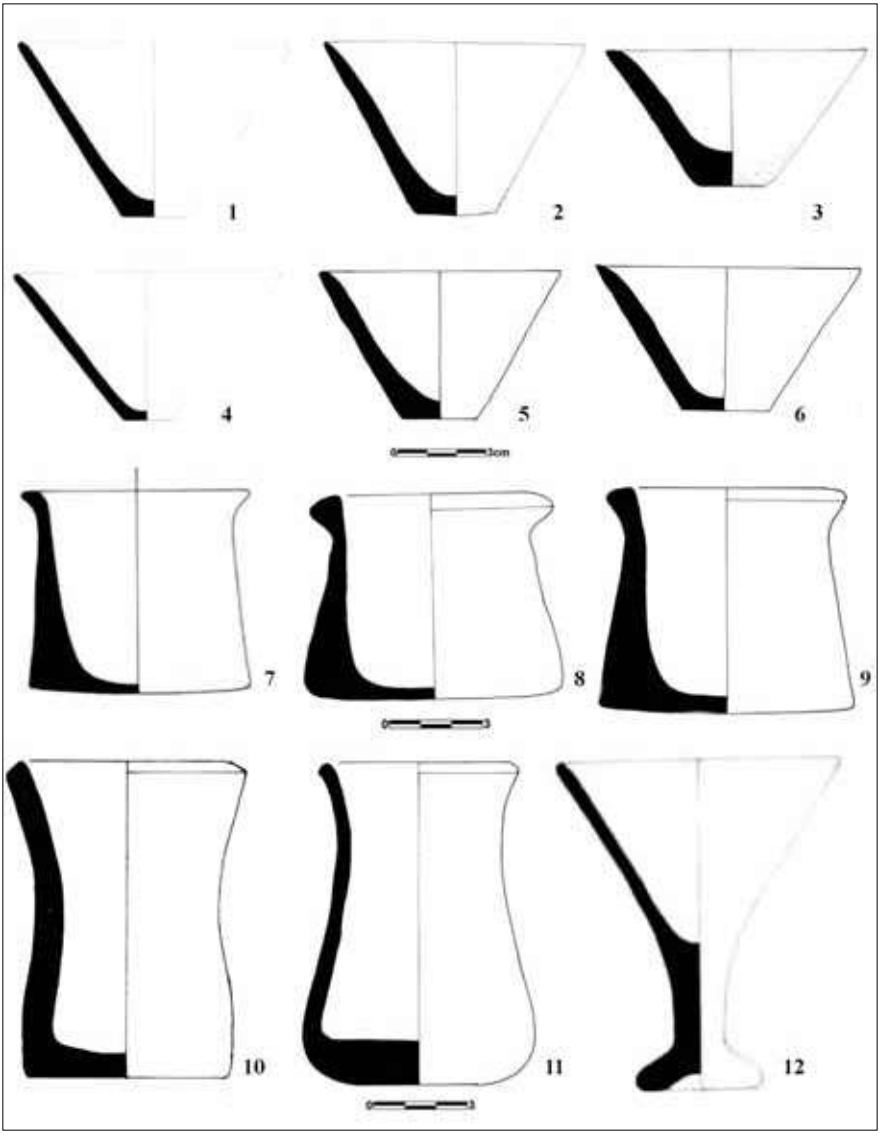

Fig. 52: Various types of alabaster vessels.

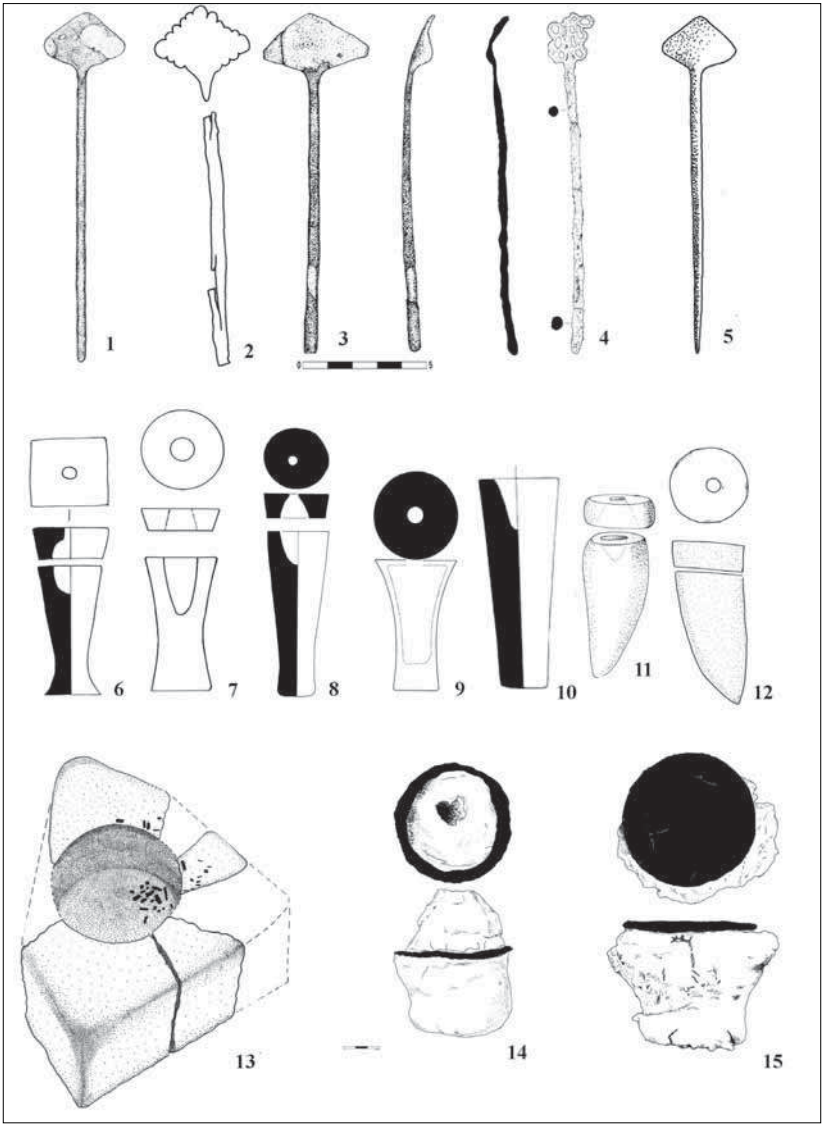

Fig. 53: Nos.1-5: Bronze pins; nos.6-10: alabaster cosmetic bottles; nos.11-12: terracotta cosmetic bottles; no. 13: movable clay stove; nos. 14-15:clay/metal incense burner.

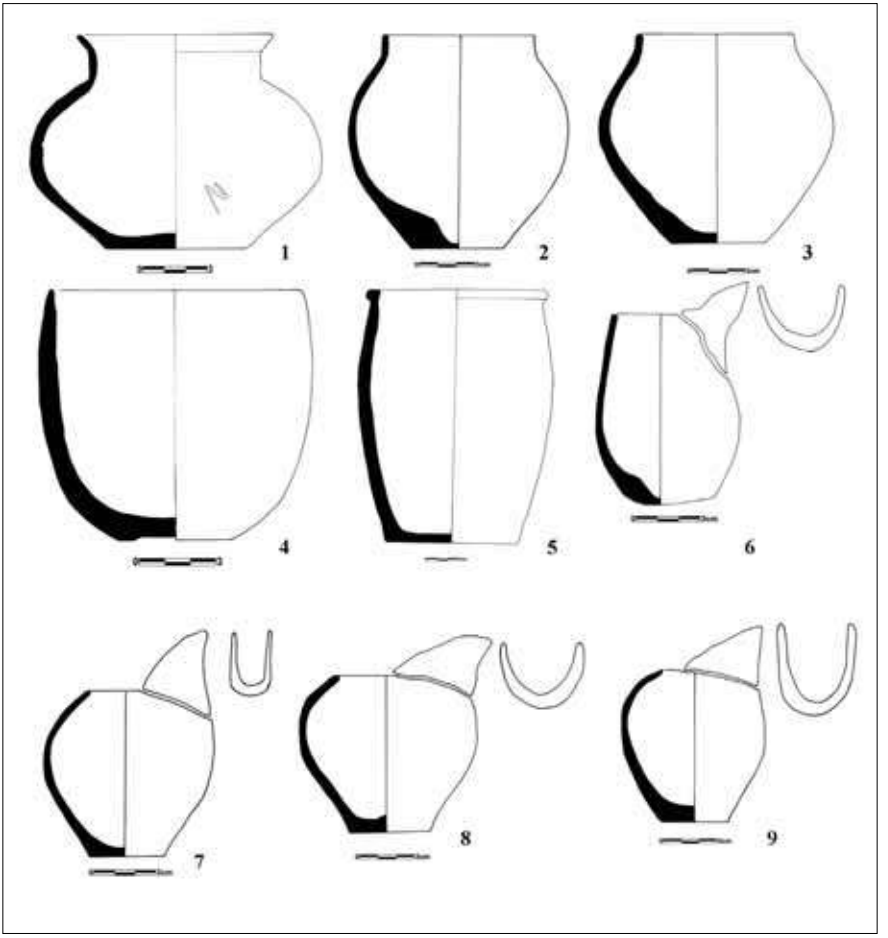

Fig. 54: unpainted Buff Ware vessels: biconical Buff Ware jar with flaring rim, cylindrical neck and flat base: 1. G.N.8725/77; biconical Buff Ware small jars with raised foot: 2. G.N. 9025/10; 3. G.N.9031/25; ovoid jar with vertical rim and flat base; 4. G.N.8725/90; deep buff ware beaker with flaring rim and flat base; 5. G.N.9029/3; Buff Ware spouted cylindrical beaker with applied spout; 6. G.N.9034/37; 7. G.N.9025/15; 8. G.N.9031/20; 9. G.N.9031/50.

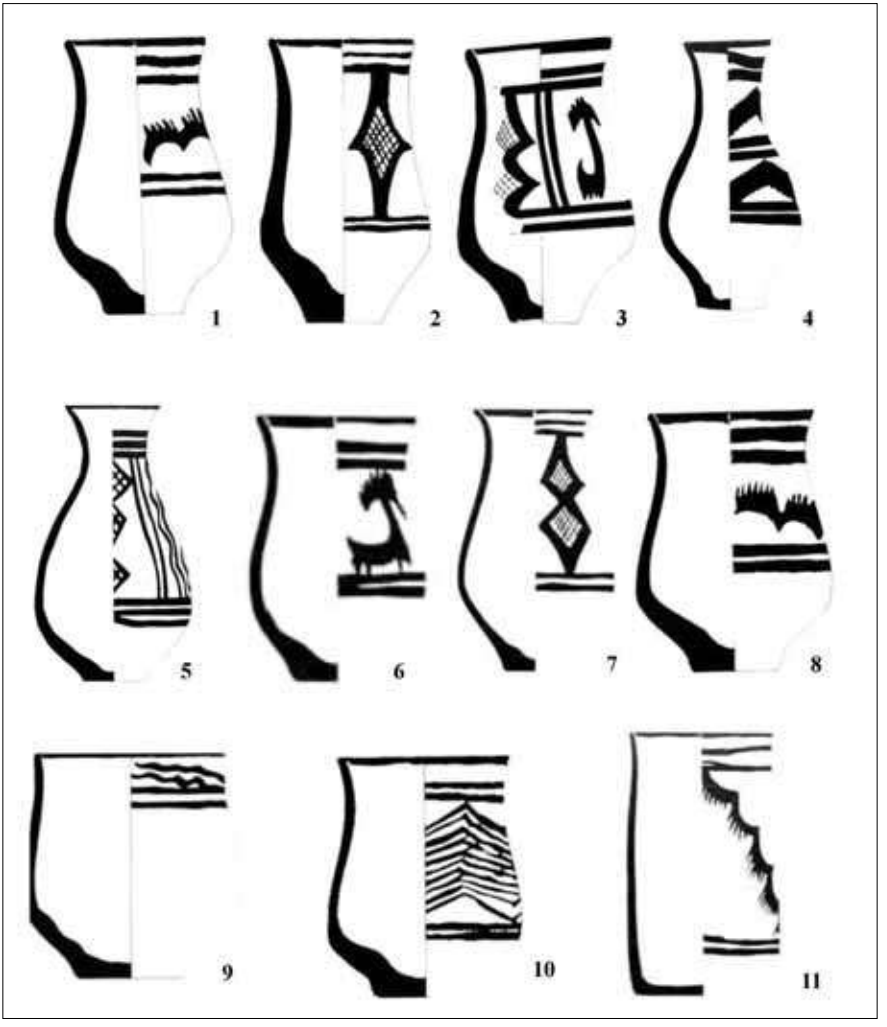

Fig. 55: painted pear-shaped beaker, Buff Ware, black paint; 1-2, G.N.36; 3. G.N.80; 4. G.N.75; 5. G.N.731; 6. G.N.2; 7. G.N.19; 8. G.N.23; 9-10. G.N.36. Painted biconical beaker with flaring rim. Buff Ware, black paint; 11. G.N.2.

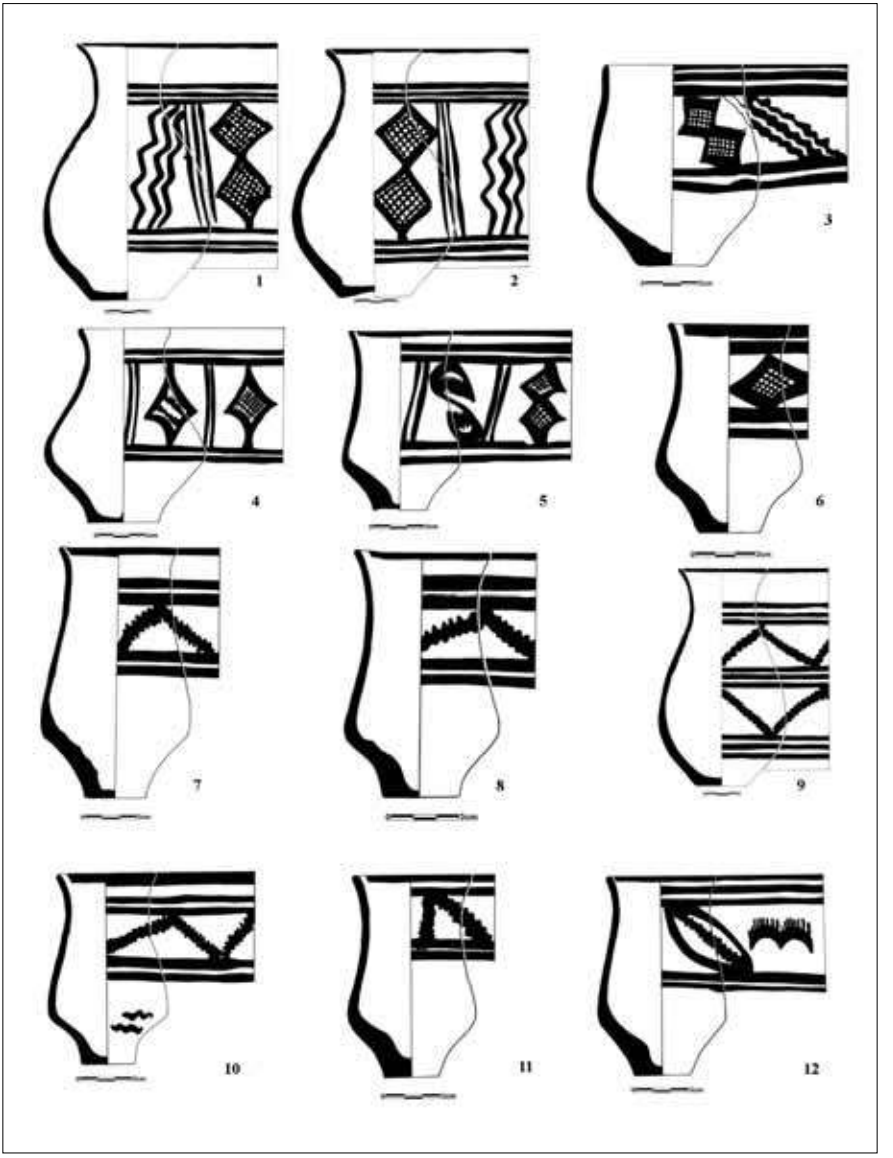

Fig. 56: painted pear-shaped Buff Ware beaker, black paint: 1. G.N.8725/37; 2. G.N.8725/50; 3. G.N.9031/35; 4. G.N.9031/19; 5. G.N.9031/55; 6. G.N.9034/15; 7. G.N.9029/4; 8. G.N.9034/42; 9. G.N.8725/82; 10. G.N.9029/7; 11. G.N.9034/8; 12. G.N.9025/4.

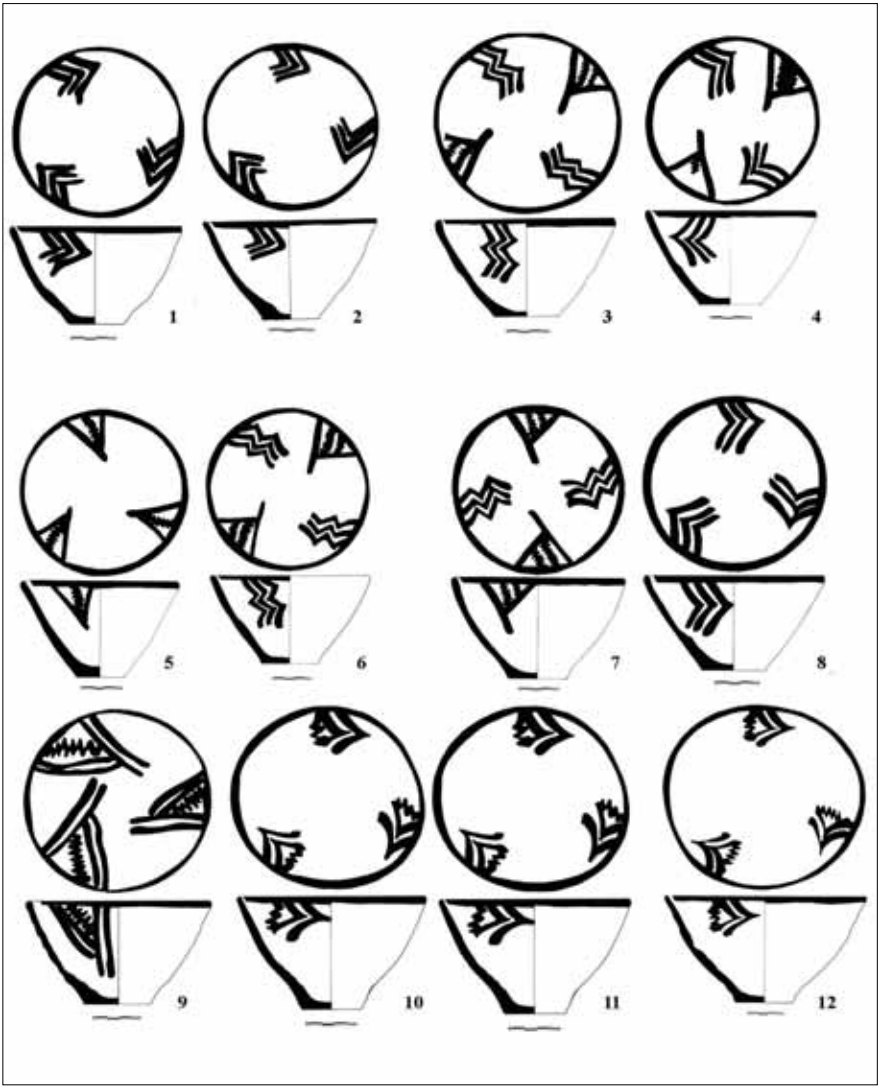

Fig. 57: truncated-conical painted Buff Ware bowls with raised foots. Light brown painted interior and exterior surface: 1. G.N.9025/8; 2. G.N.9025/21; 3. G.N.9031/3; 4. G.N.9031/11; 5. G.N.9031/17; 6. G.N.9031/22; 7. G.N.9031/27; 8. G.N.9031/34; 9. G.N.9034/6; 10. G.N.9034/71; 11. G.N.9034/34; 12. G.N.9031/37.

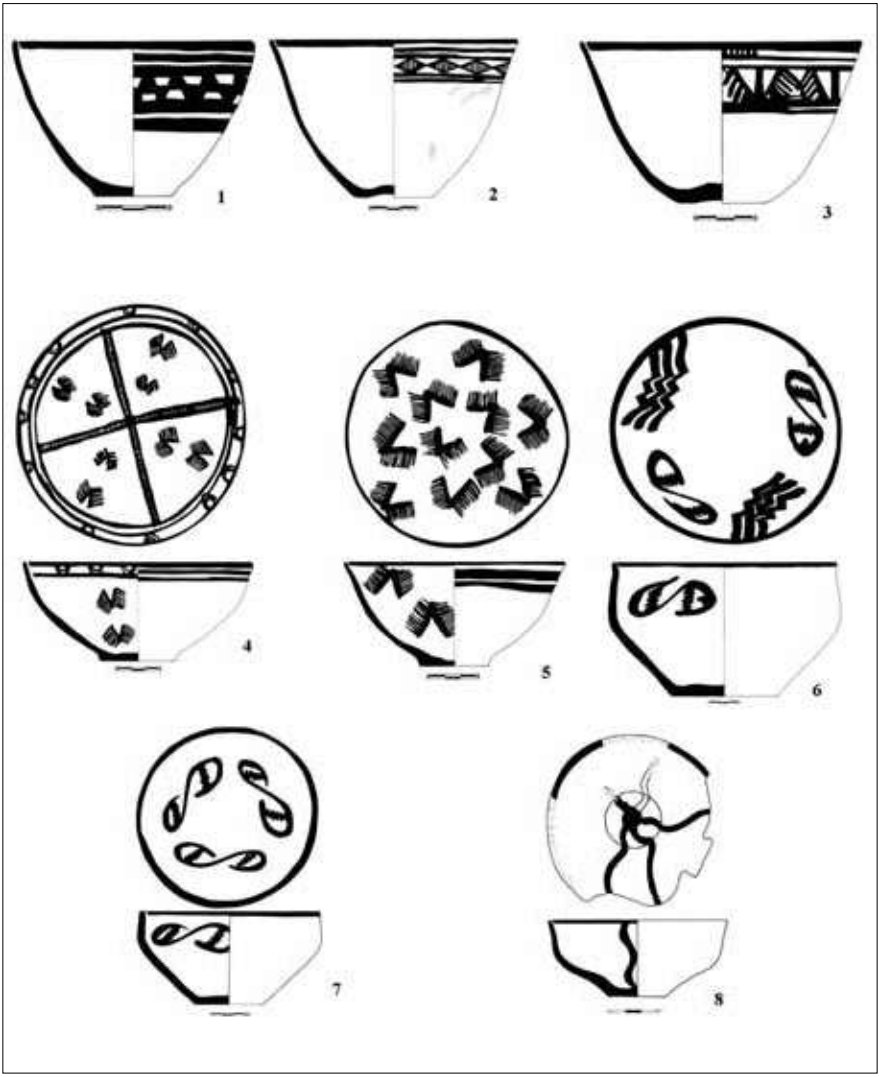

Fig.58: painted bowls: interior and exterior painted grey ware deep bowls, black paint; 1.G.N.8725/8; light brown paint; 2. G.N.8725/96; 3. G.N.8725/51; 4. G.N.8725/93; 5. G.N.8725/95; painted Buff Ware truncated conical bowl with convex walls, flaring rim, black paint on the interior; 6. G.N.8725/58; 7. G.N.9031/88; 8. Painted Buff Ware shallow bowl, black paint on interior.

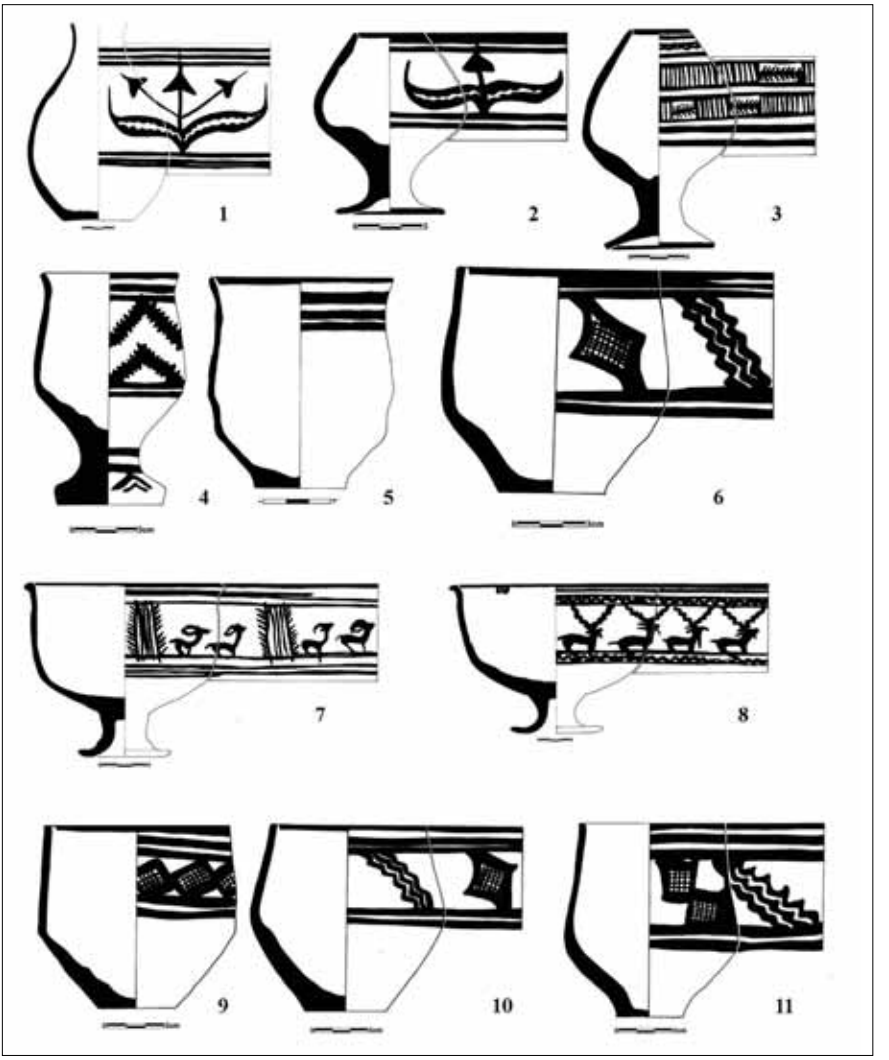

Fig. 59: painted truncated conical bowl. Buff Ware, black painted on the interior: 1, 4. G.N.2; painted small truncated conical bowl. Buff Ware, black painted on the interior: 3. G.N.19; 5. G.N.75; painted cylindrical conical bowl, Buff Ware, black painted on the interior; 6. G.N.80; painted bowl with convex wall. Buff Ware, black painted on the interior; 7. G.N.19; painted truncated-conical bowl, Buff Ware, black painted on the interior; 8. G.N.311; painted truncated bowl, Buff Ware, black painted on the interior: 9. G.N.75; hemispherical painted small bowl, Buff Ware, black painted on the interior; 10. G.N.731; painted truncated bowl, buff ware, black painted on the interior; 11. G.N.311; painted cylindrical- conical bowl, Buff Ware, black painted on the interior.

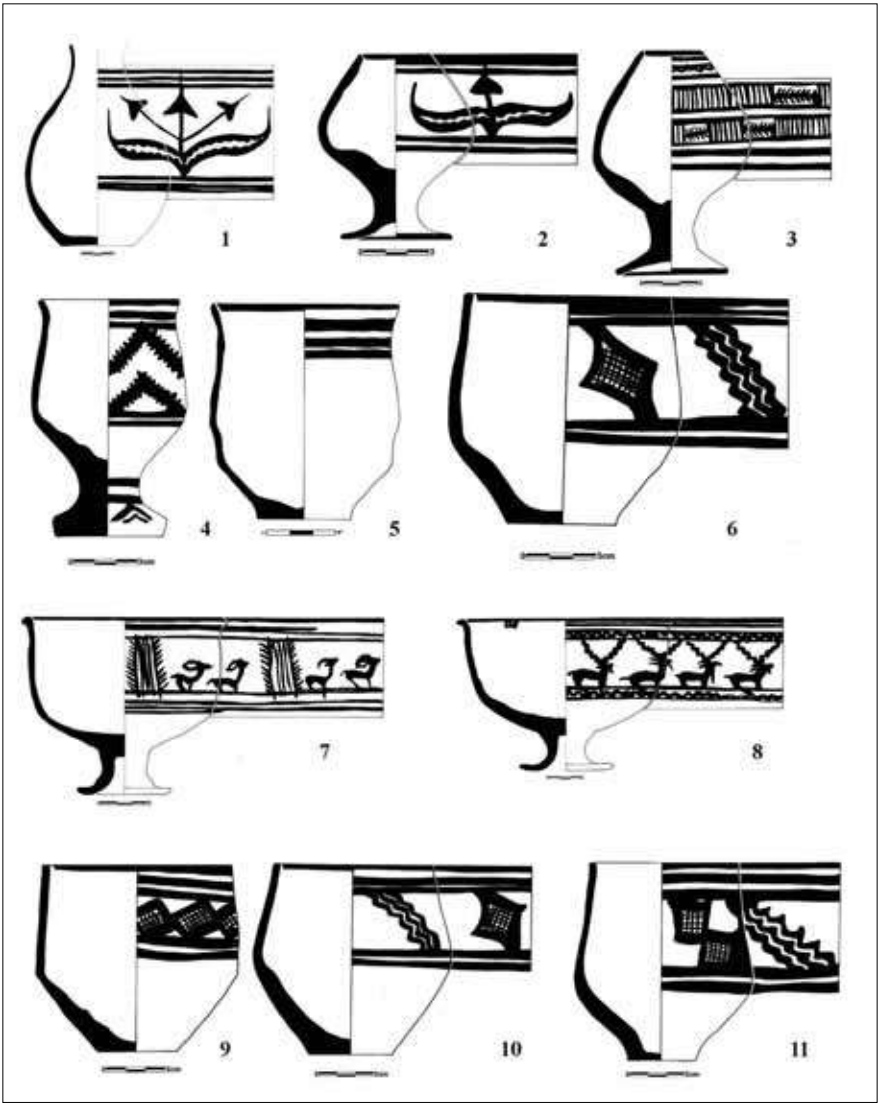

Fig. 60: Buff Ware beakers and cups; painted Buff Ware pear-shaped bottle with flat base, black paint; 1. G.N.8725/26; painted Buff Ware brandy cup on high sub-cylindrical flaring stand, black paint; 2. G.N.8725/59; 3. G.N.9031/9; 4. Cylindrical-conical cup stand on a circular shape base, black paint; painted Buff Ware beaker, black paint. 5. G.N.6805/2; painted Buff Ware cylindrical-conical beaker, black paint; 6. G.N.9031/1; 9. G.N.9025/13; 10. G.N.9031/42; 11. G.N.9034/19; painted Buff Ware sub-cylindrical cup with flared rim and stand with extended bell-shaped base, black paint on exterior and interior; 7. G.N.8725/79; 8. G.N.8725/99.

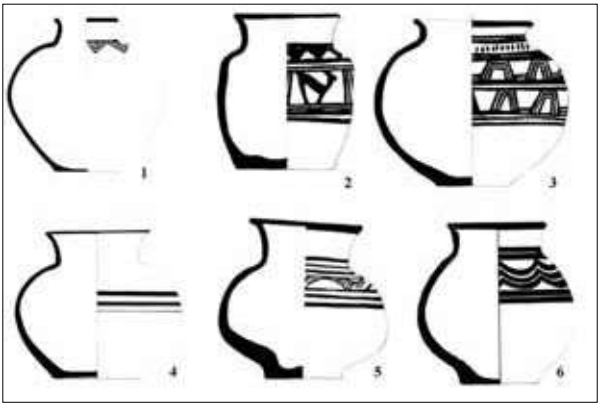

Fig. 61: painted jars. Biconical jar, Buff Ware, black paint: 1. G.N.4, sub-cylindrical small jar flared rim, Red Ware, black paint; 2. G.N.731; globular small Grey Ware jar, black paint; 3. G.N.731; globular small jar, flaring rim. Buff Ware, black paint; 4. G.N.80; biconical small jar, Red Ware, black paint; 5. G.N.731; globular small jar, Buff Ware, black paint; 6. G.N.75.

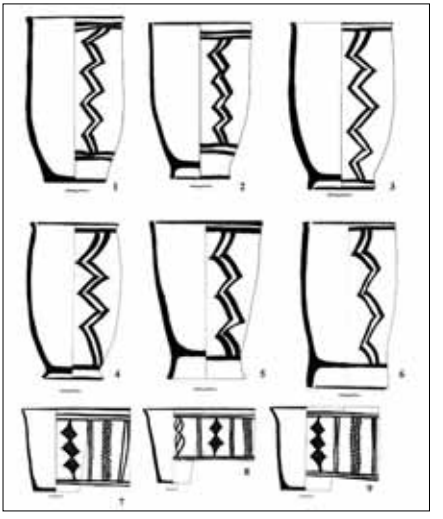

Fig. 62: painted ogival shape Buff Ware jars, light brown paint: 1. G.N.9025/11; 2. G.N. 9025/16; 3. G.N.9031/26; 4. G.N.9031/40; 5. G.N.9034/9; 6. G.N.9034/23; painted sub-cylindrical deep beakers, flared rim, flat base, black paint; 7. G.N.9029/6; 8. G.N.9029/25; 9. G.N.9029/26.

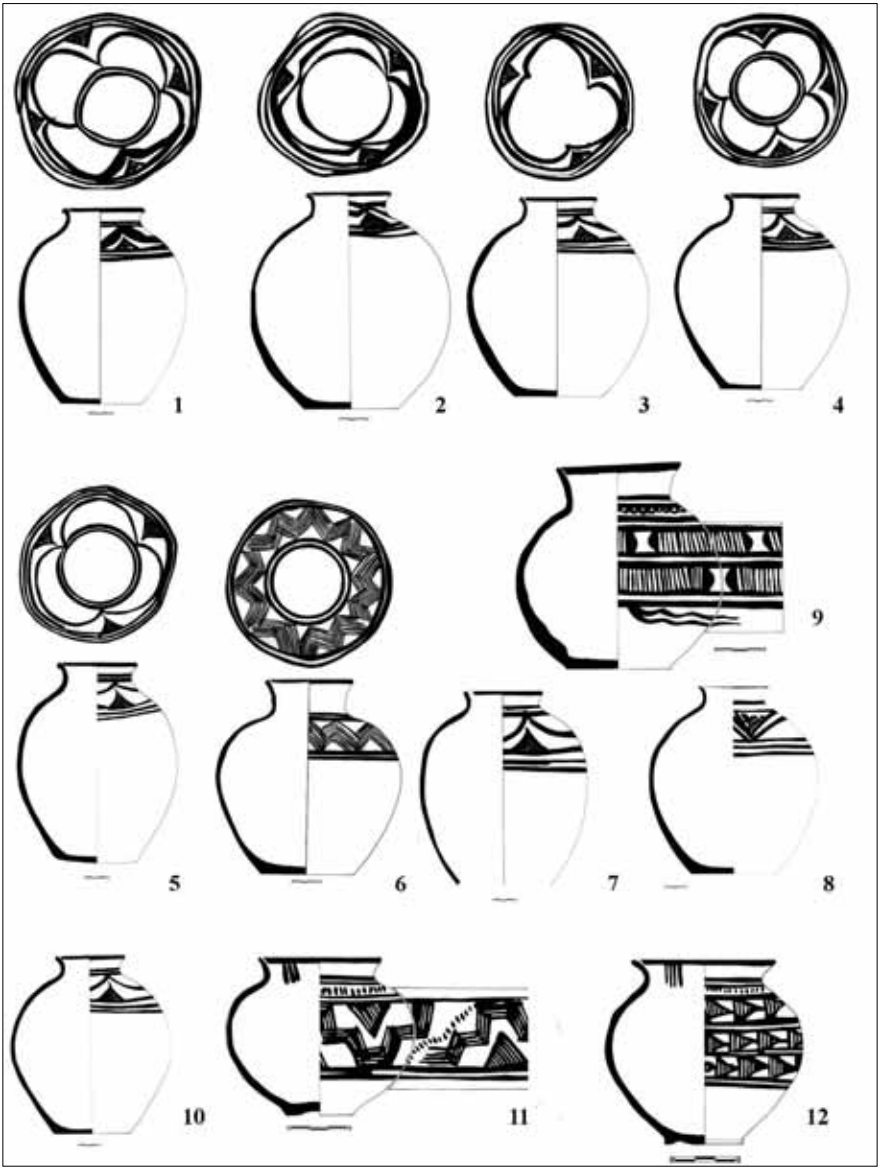

Fig. 63: painted globular Buff Ware jar with flaring rim and short neck, black paint: 1. G.N.9025/2; 2. G.N.9025/4; 3. G.N.9025/18; 4. G.N.9025/24; 5. G.N.9031/16; 6. G.N.9029/1; 7. G.N.9034/14; 9. G.N.9031/41; painted Buff Ware globular small jar with flaring rim and low sub-cylindrical neck, black paint; 8. G.N.9013/3; 11. G.N.8725/73; 12. G.N.8725/64.

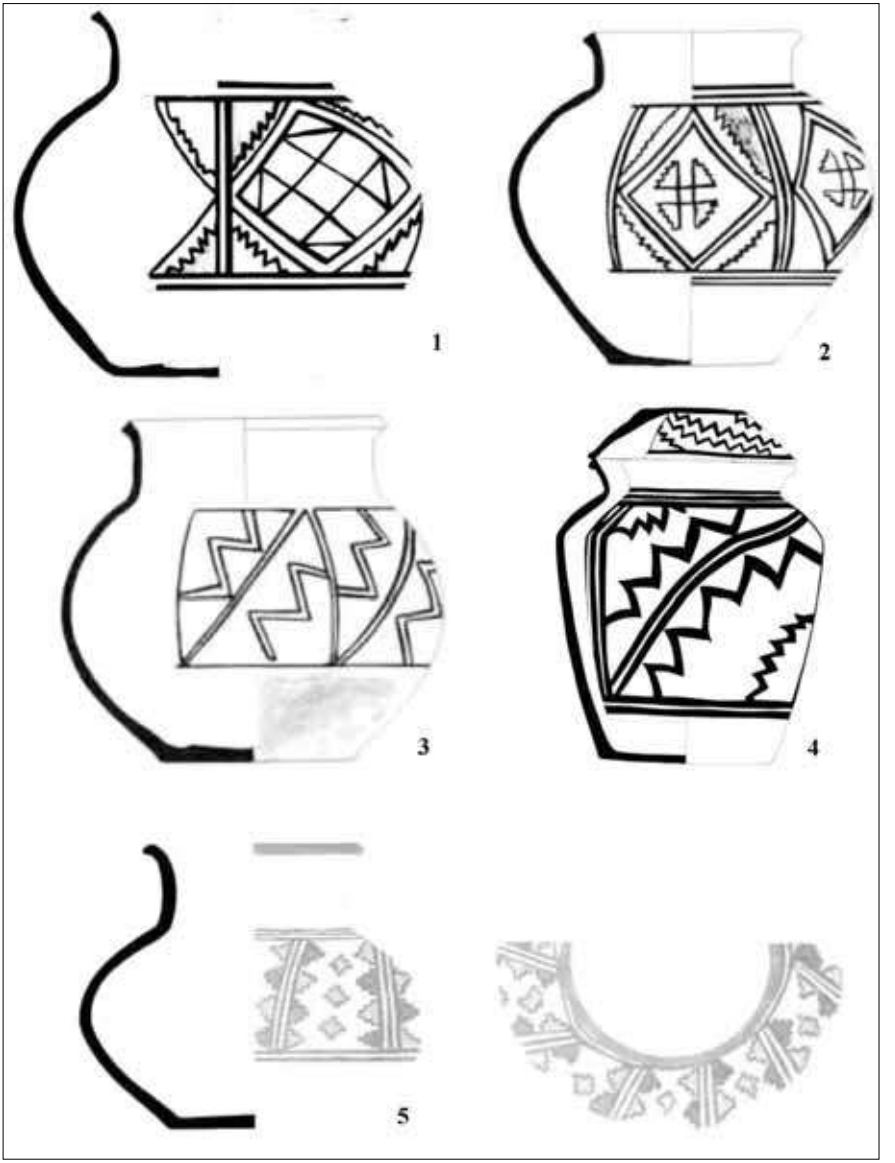

Fig. 64: polychrome jars, globular shape small jar, Buff Ware: 1. G.N.301; biconical shape small jar, Buff Ware: 2. G.N.311; globular flared rim jar, Buff Ware; 3. G.N.311; truncated conical jar. Buff Ware, conical jar; 4. G.N.712; biconical small jar, flared rim, bichrome: 5. G.N.4

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Excavations in Square X in the ERA of Shahr-i Sokhta: Pottery Traditions and Cultural Interaction during Period I (ca. 3550-3000 BC)

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1. Introduction

The *ERA (Eastern Residential Area)* of Shahr-i Sokhta was the nucleus of the city during Periods I, II, and III for over 1000 years (Salvatori - Tosi 2005: fig. 12). This part seems to be the only section with evidence of the town's foundation (Vidale - Salvatori 1997; Sajjadi - Moradi 2014). The excavations conducted by IsMEO in the *ERA* focused on Periods II and III (Tosi 1983: 102). The earliest period of human occupation of the site is one of the most ambiguous and obscure of the four known periods. Although previous excavations revealed useful archaeological data, they covered only 25 m^2 of the deepest layers and cannot provide appropriate indicators for examining this period. Since 1978, when the results of the excavations in the ERA were published (Amiet - Tosi 1978), our knowledge has been limited to very limited information regarding the layers of Period I.

Initially, the excavations conducted by the Iranian Archaeological Expedition also focused on Periods II-III, later examining Period IV in the central and

northern parts of the settlement (Sajjadi - Moradi 2017). It was only in the last two campaigns that attention was paid to the *ERA*, which was more likely to yield information about the older periods and establishment phases of Shahr-i Sokhta. It seemed that the only place to reach the earliest layers, and Phases 9 and 10 in particular, was the western part of the *ERA* (Amiet - Tosi 1978: 9).

Two Workshops, no. 34 and 35, were excavated for the first time and workshops nos. 4 and 10 were excavated again (Sajjadi - Moradi 2020: 717). Workshop no. 35 is located inside one the rooms of the House of the Stairs in square XIN (Tosi 1983: 107) (Fig. 1).

In this article I am discussing the results from these excavations with first presentation of the archaeological contexts based on the materials we found. These materials confirm the 'multi-cultural' character of Period I and wide interactions with the other areas in south east of Iran.

2. Excavation of layers pertaining to Phases 10 and 9 of Period I

Workshop 4

Workshop 4 is located in the south-eastern section of the *ERA*, and about 200 meters northeast of the *Burnt Building*. It was first excavated in 2001 with focusing on upper layers relating to period II-III. Findings in this workshop included a number of seal impressions, pottery fragments and a complete skeleton of a quadruped animal, probably a mule. A deep trench 6×4 m was excavated in a point where the architectural evidence appeared to be concentrated, digging down until the sterile layer was reached. The vertical distribution of cultural materials indicates eight architectural layers. In the upper layers, 1, 2, and 3, the architectural remains are denser and more regular. Some spaces in the lower layers were filled with household trash such as charcoal, pottery sherds, ash and bone, and there is evidence of heating and burning, particularly in layers 6, 7, and 8. The mud bricks with traces of straw in the upper layers follow the standard structure and measurements of mud bricks in Periods I and II (Mariani 1992: 414) but the mud bricks of layer 8 were probably made from pure lacustrine clay.

The materials related to Phase 9 lie in a layer 1.5 m. thick. This thickness is rare and the layer includes only Phases 9-10. An analogous layer is also present in Workshops 35 and 34 (Fig. 2).

Workshop 10

Workshop 10, excavated for the first time in 2007, is located on the north-eastern edge of the ERA, outside the Shahr-i Sokhta grid system. The initial dimensions of this trench were 10×2 m. The finds included Phase 8 and late Phase 9 pottery fragments, mostly painted Buff and Emir Grey Ware (Sajjadi 1998; 2019), figurines, seal impressions, and clay tokens (Fig. 3) (Tab. 1).

N°	Paste Colour	Body	Cover	Slip Colour	Paint Colour	Style
1	Buff	Buff	Slipped	Buff	Brown	Local
2	Red	Red	Washed	Red	Dark brown	Kerman type
3	Buff	Buff	Slipped	Buff	Brown	Local
4	Buff	Buff	Slipped	Buff	Brown	Nal
5	Buff	Buff	Slipped	Buff	Brown	Local
6	Buff	Buff	Slipped	Buff	Brown	Namazga III
7	Buff	Buff	Slipped	Buff	Brown	Local
8	Reddish	Buff	Slipped	Buff	Brown	Local
9	Buff	Buff	Slipped	Buff	Brown	Local
10	Buff	Buff	Slipped	Buff	Brown	Local
11	Buff	Buff	Slipped	Buff	Brown	Local
12	Buff	Buff	Slipped	Buff	Brown	Local
13	Buff	Buff	Slipped	Buff	Brown	Local

Tab. 1: description of Workshop 10 ceramics (see also Fig. 3).

Workshop 35

The spaces chosen for excavation in Workshop 35, west of the *House of the Stairs*, had already been excavated by IsMEO down to the layers of Phase 7 (Fig. 4). These included Room 88 inside square XIB, related to the second construction stage of the House of the Stairs (Mariani 1992: 192), and Room 88a inside square XVD at the end of Street 1 of the *ERA*. The pottery from this trench

Fig. 1: location of workshops 10, 34, 35.

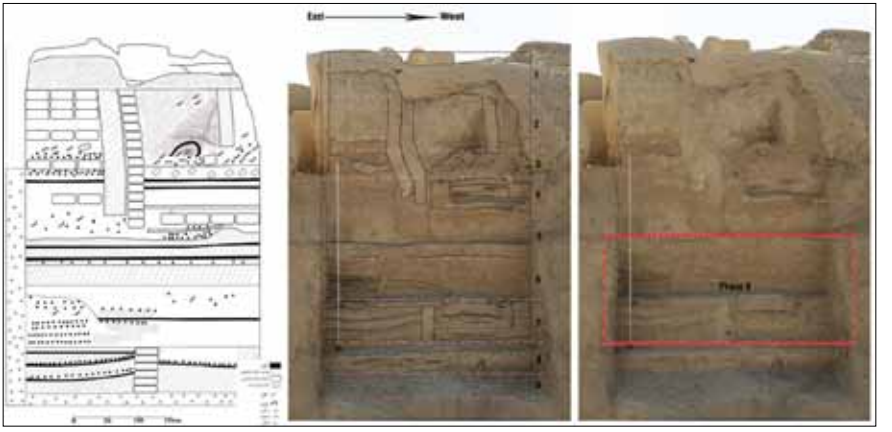

Fig. 2: Workshop 4, vertical cut.

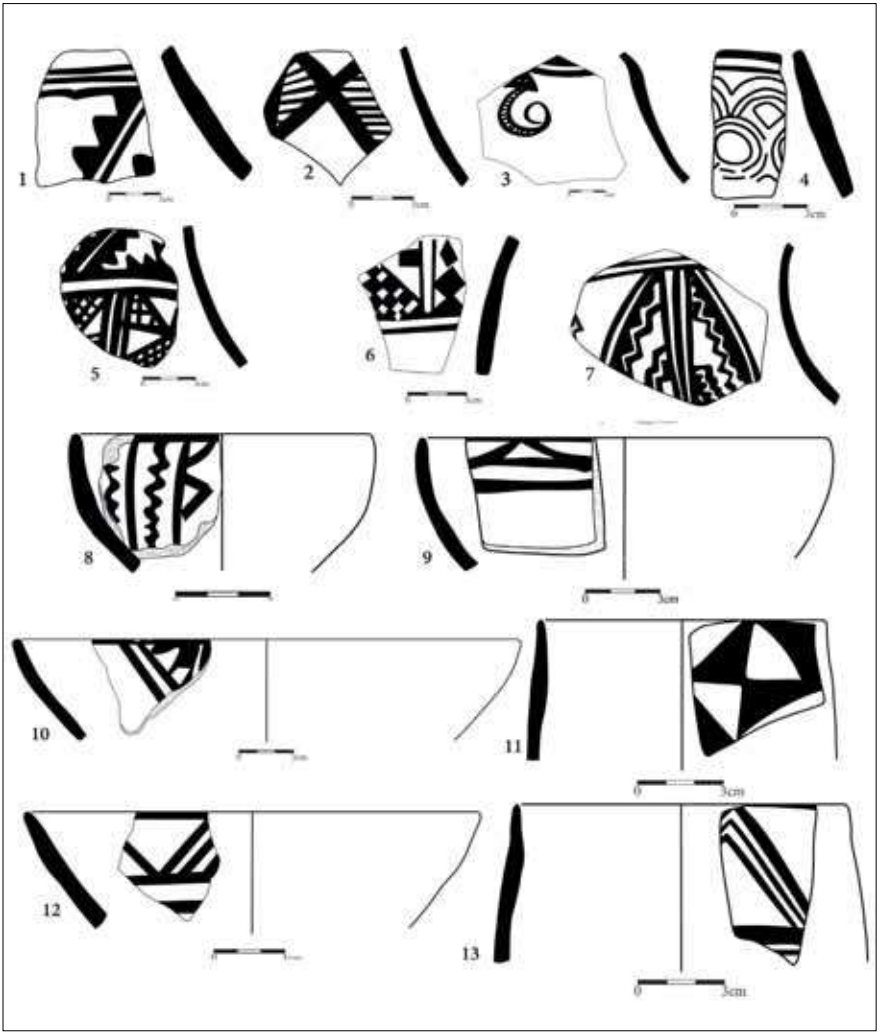

Fig. 3: Workshop 10, pottery.

includes Buff Ware characterized by a brick-color paste and a buff slip, as well as Red Ware and Gray Ware. Buff Ware includes both Local Buff Ware typical of Shahr-i Sokhta and Quetta Ware, which connects to the Quetta Valley in Pakistan, while Gray Ware relates to ceramic vessels recorded in the Bampur Valley and southwestern Pakistan (Fig. 5). Clay items including clay balls, sling pellets, and seal impressions, as well as zoomorphic figurines were found in this test-trench that are similar to those from the Period II layers that may be mixed with the pottery assemblage from lower layer due to high slope of this part of the mound. Stone tools were also recovered.

Excavation in Room 88

The upper layers of Room 88 are associated with Phases 5, 6 and 7, and had been excavated by IsMEO as part of the *House of the Stairs* (Tosi 1983: 109). The new excavations in this space showed three layers, two pertaining to the later phases, and one with an archaeological deposit 160 cm thick related to Phase 9.

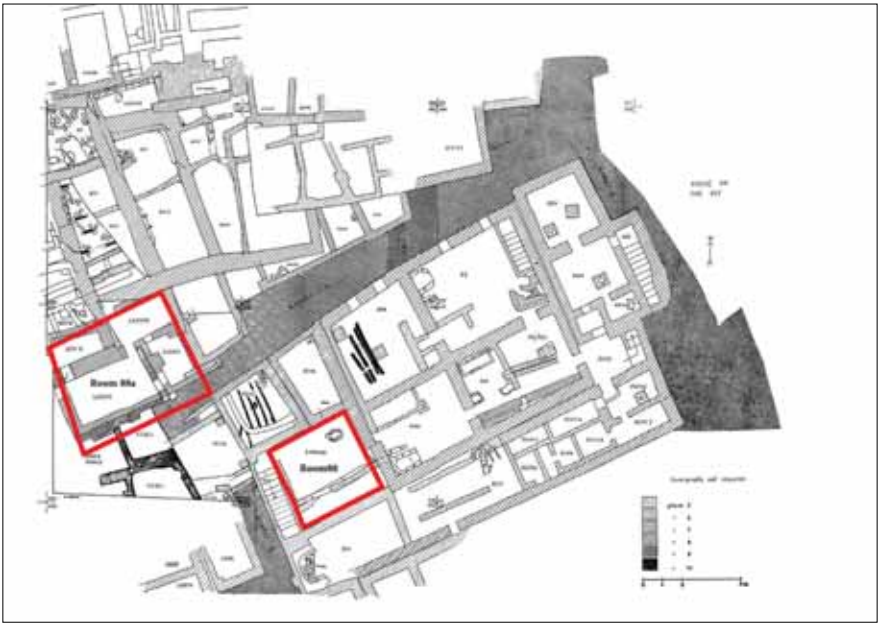

Fig. 4: Plan of *ERA* in phase 7 and position of excavated rooms (Mariani 1992: fig. 22.5).

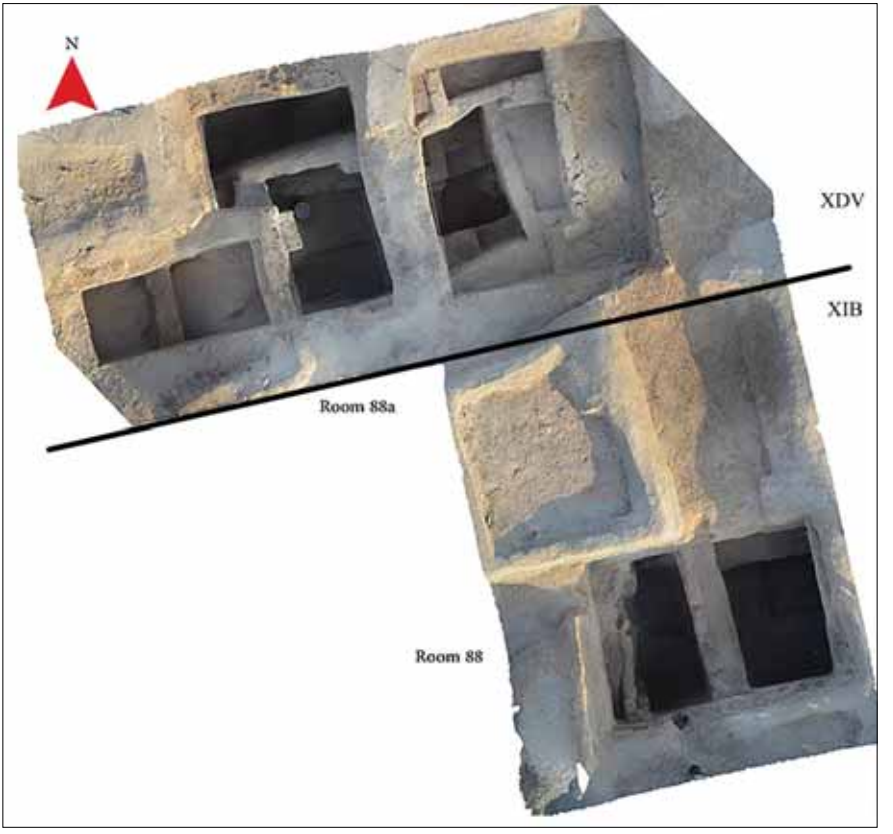

Fig. 5: Workshop 35, ortophoto of rooms 88 and 88a.

The latter, which was excavated down to sterile soil, contained no architectural evidence (Fig. 6). The 160 cm thickness of the deposit is considerable, since the total thickness of Period I was estimated to be about 200 cm (Amiet - Tosi 1983: 18).

The first layer of Room 88 in the *House of the Stairs* is related to Phases 5 and 6 of Period II. The pottery of this layer consists of fragments of pear-shaped beakers and hemispherical bowls with crosshatched triangular motifs on the internal surface and linear staircase motifs on the outside. The second layer is separated from this layer by a gap filled with fine sand. The pottery in the second

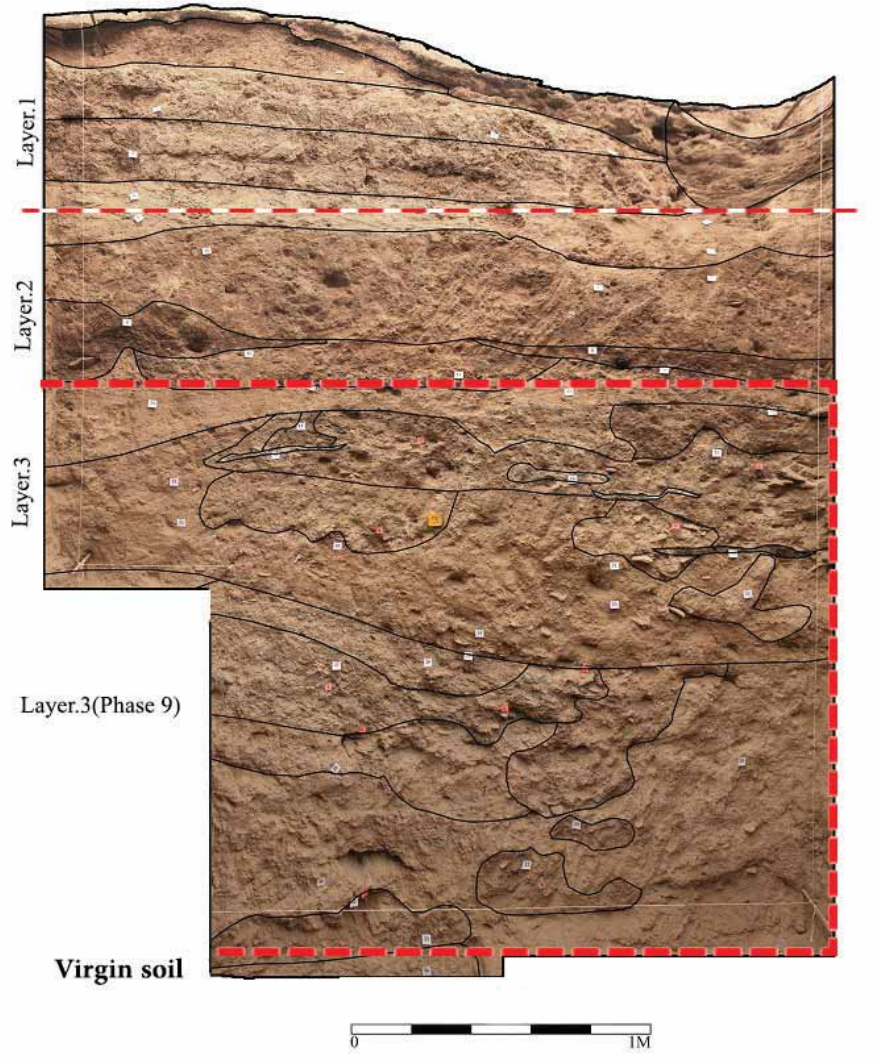

Fig. 6: Workshop 35, XIB. Vertical cut on Eastern wall room No. 88.

layer includes common forms related mostly to Phase 8 such as cylindrical beakers and other simple shapes such as conical bowls with linear and wavy bands inside them. More complicated shapes such as pear-shaped beakers, which require higher skills and fast wheels (Vidale 1984: 82), were not found in this layer. The third layer contained a limited number of common ceramic shapes including tall open bowls and plain wide bowls.

The third layer is the main excavated layer in this section with a 150 cm-thick archaeological deposit and no architectural evidence. Fragments of large-bodied animals such as cattle, long wooden ceiling poles, cylinder seal impressions with four-petalled flower motifs and pottery sherds were found. The pottery of this layer can be categorized into Buff, Grey, and Red Ware in declining order of abundance. Buff Ware is generally made by hand or slow wheel and its forms are limited to conical open bowls and spherical jars with an everted rim. Some of these have ear-shaped handles that are similar to Jemdet Nasr specimens (Matthews 1989: fig. 12.2). Other forms found here include beakers and tub-shaped vessels. The frequency of open forms in this layer indicates the use of slow wheels. The pottery is fine and the geometrical motifs are reminiscent of the simplified motifs of the Quetta and Namazga III styles (Biscione 1974: 134) (Fig. 7: 10-12).

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Style
1	Buff	Buff	Slipped	Buff	Brown	Nal
2	Buff	Buff	Slipped	Buff	Brown	Local
3	Buff	Buff	Washed	Buff	Brown	Nal
4	Buff	Buff	Washed	Buff	Brown	Local
5	Buff	Buff	Washed	Buff	Brown	Local
6	Buff	Buff	Washed	Buff	-	Jemdet Nasr
7	Buff	Buff	Washed	Buff	Brown	Namazga III
8	Reddish	Buff	Washed	Buff	Brown	Local
9	Buff	Buff	Washed	Buff	Brown	Local
10	Buff	Buff	Slipped	Buff	Dark Brown	Namazga III
11	Buff	Buff	Slipped	Buff	Dark Brown	Namazga III
12	Buff	Buff	Slipped	Buff	Brown	Namazga III

Tab. 2: description of Room 88 ceramics (see also Fig. 7).

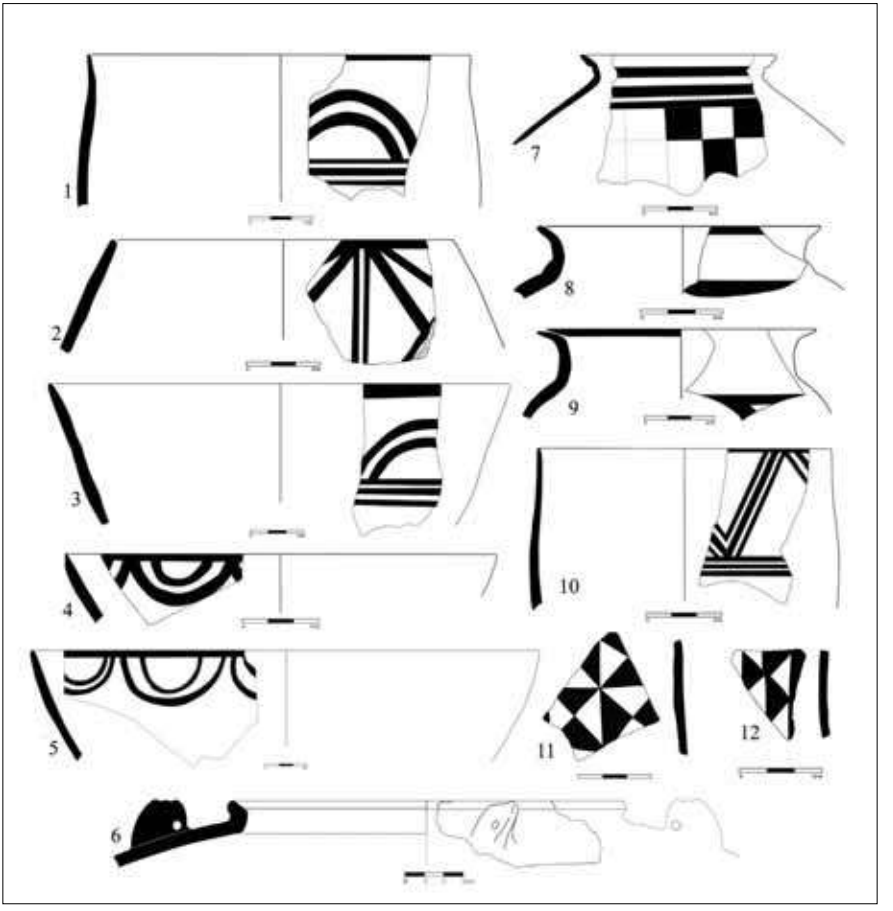

Fig. 7: Workshop 35, Square XIB, Room 88, Layer 3. Pottery fragments.

Wide-mouthed bowls with wavy line motifs under the rims are quite common in layer 3, and there are Grey Ware vessels with crisscross motifs inside them (Mutin 2007: fig. II.278, 12-14) similar to Khurab Grey Ware (Biscione 1974: 134). Unlike the later phases of the ERA and Building 1, the objects in this workshop are limited to clay figurines, clay tokens, bone tools and seal impressions with simple and linear geometric motifs, mostly from cylinder seals, and four-petalled flower motifs (Fig. 8). Similar motifs are also found in sites such as Susa (Amiet

1972: pl. 26); Tall-e Malyan (Pittman 1997: fig. 4a) and Umm Al-Nar, dated to around 3000 BC.

Excavation in Room 88a

Room 88a is located inside square XDV west of Room 88 at the end of Street 1 (Fig. 9). Excavation in this room continued down to sterile soil and 7 consecutive layers were found (Fig. 10). The pottery of layer 1 consists of wheel-made Buff Ware with the same shapes and paints as Periods II and III: pear-shaped beakers, long-necked jars and open conical bowls decorated with wavy lines. A square stamp seal with two squares and a circle incised in the centre was also found in this layer (Fig. 11). The pottery of layer 2 is analogous to that of layer 1, but it displays some of the common motifs of the lower layers, mostly staircase lines and geometric shapes.

The third layer is the main layer in this room but not the oldest. Traces of this layer can be observed throughout this square. The architectural remains include

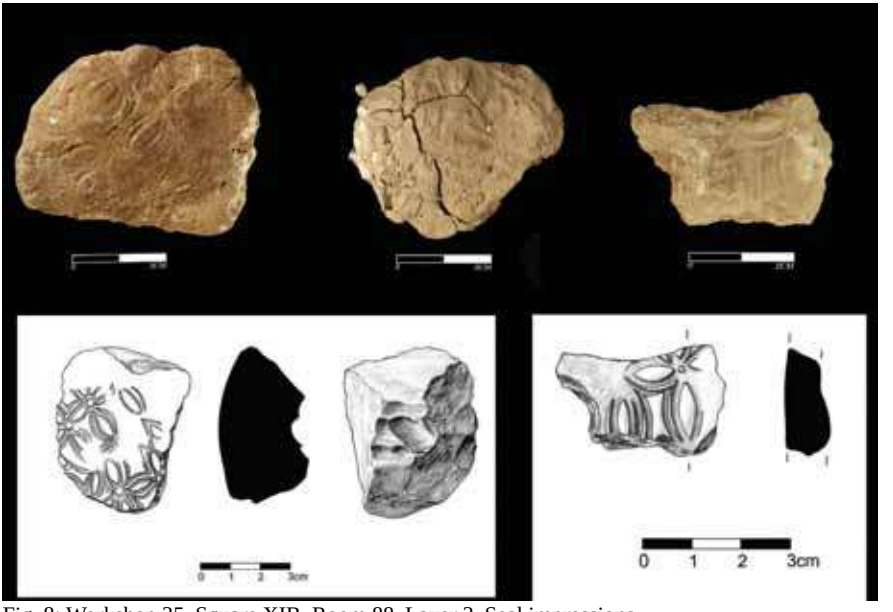

Fig. 8: Workshop 35, Square XIB, Room 88, Layer 3. Seal impressions.

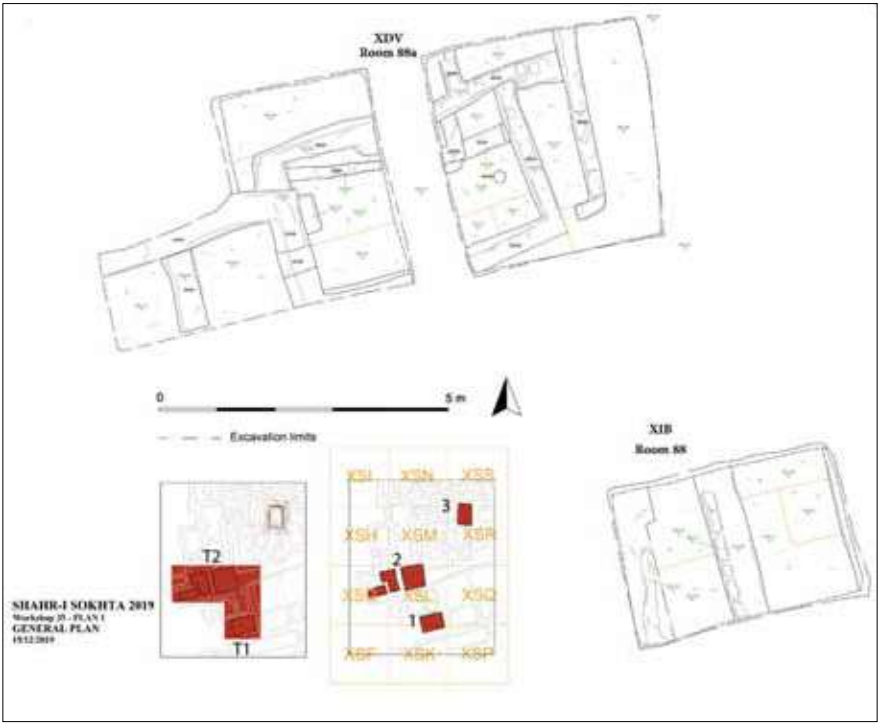

Fig. 9: Workshop 35. Squares XDV and XIB. Rooms 88 and 88a (drawing G. A. Minaya).

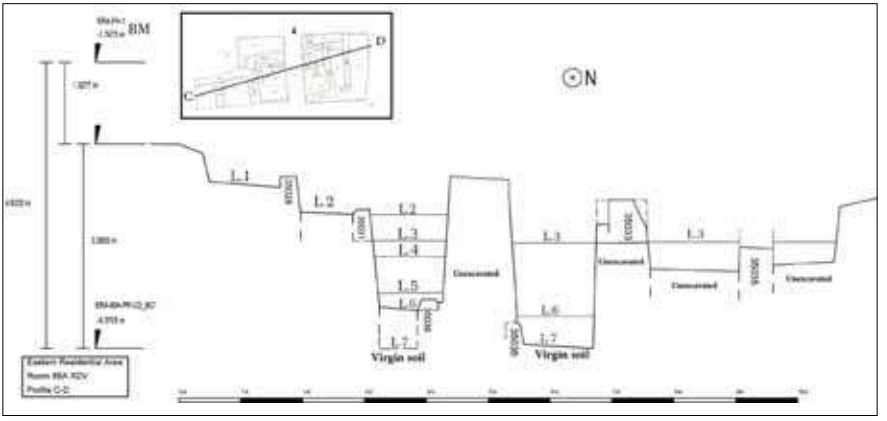

Fig. 10: Workshop 35, Square XDV. Room 88a.

Fig. 11: Workshop 35, Room 88a, layer 1, stone stamp seal.

two separate rectangular spaces surrounded by thinly plastered walls. The layer is about 100 cm thick. The plastered walls probably belong to the late centuries of the 4th millennium BC or late Phase 9, and were constructed using only one row of mud bricks 20 cm thick (Fig. 12). In the pottery assemblage of this layer, there are significantly fewer simple linear geometric motifs but more wavy stripes underneath the rim and wavy lines on the body. Simple open vessels are common. Both forms and motifs are characteristic of the early 3rd millennium BC (Fig. 13).

With respect to layer 2, some motifs such as crosshatched triangles under the rim and geometric designs are more common. A large number of anthropomorphic and zoomorphic figurines including cattle and seated men and women are among the findings in this layer. The diversity of styles, especially in the human figurines, is a prominent feature. Some female figurines are reminiscent of the South Turkmenistan Style (Fig. 14: 3; 15) (Shirazi 2007: fig.11).

The archaeological remains of the fourth layer, found only in Space 2 in Room 88a, are about 40 cm thick. Most of the pottery in this layer corresponds to Phase 9. The form and thickness of the vessels, as well as the fine buff paste, suggest the use of a fast wheel, although there are handmade vessels too. Motifs include thick lines, solid triangles and in some cases the paint is covered by a thick buff slip. The jars are spherical and neckless, similar to those with ear-like handles.

Fig. 12: Workshop 35, Square XDV. Room 88a.

Two fragments from this layer are analogous to Namazga III, and one painted jar with Quetta motifs and an ear-like handle is similar to Jemdet Nasr ware (Fig. 24, No. 1). The variety of unearthed objects was much higher here than the other layers, and the anthropomorphic figurines are highly diverse. (Figs. 14-15). Another interesting object found in this layer is a cylinder seal impression with the four-petalled flower of the Proto-Elamite period (Fig. 16) (Amiet - Tosi 1978: fig. 6.15). Clay tokens and cattle figurines are also worth mentioning.

The layer 5 deposits were found in a restricted space with few architectural elements. Layer 5 contains two very small walls in the north-western corner of the space. Among the pottery fragments found in this layer is a large quantity of painted ware similar to Namazga III and Quetta ceramics (Fig. 13: 13-15). This kind of pottery is more abundant here than in the upper layers, and the variety and craftsmanship of the motifs are outstanding. The motifs and forms of layer 4 are still present, but there is much more painted pottery than simple pottery. The vessels are made by hand or slow wheel, and there is no trace of rendering with

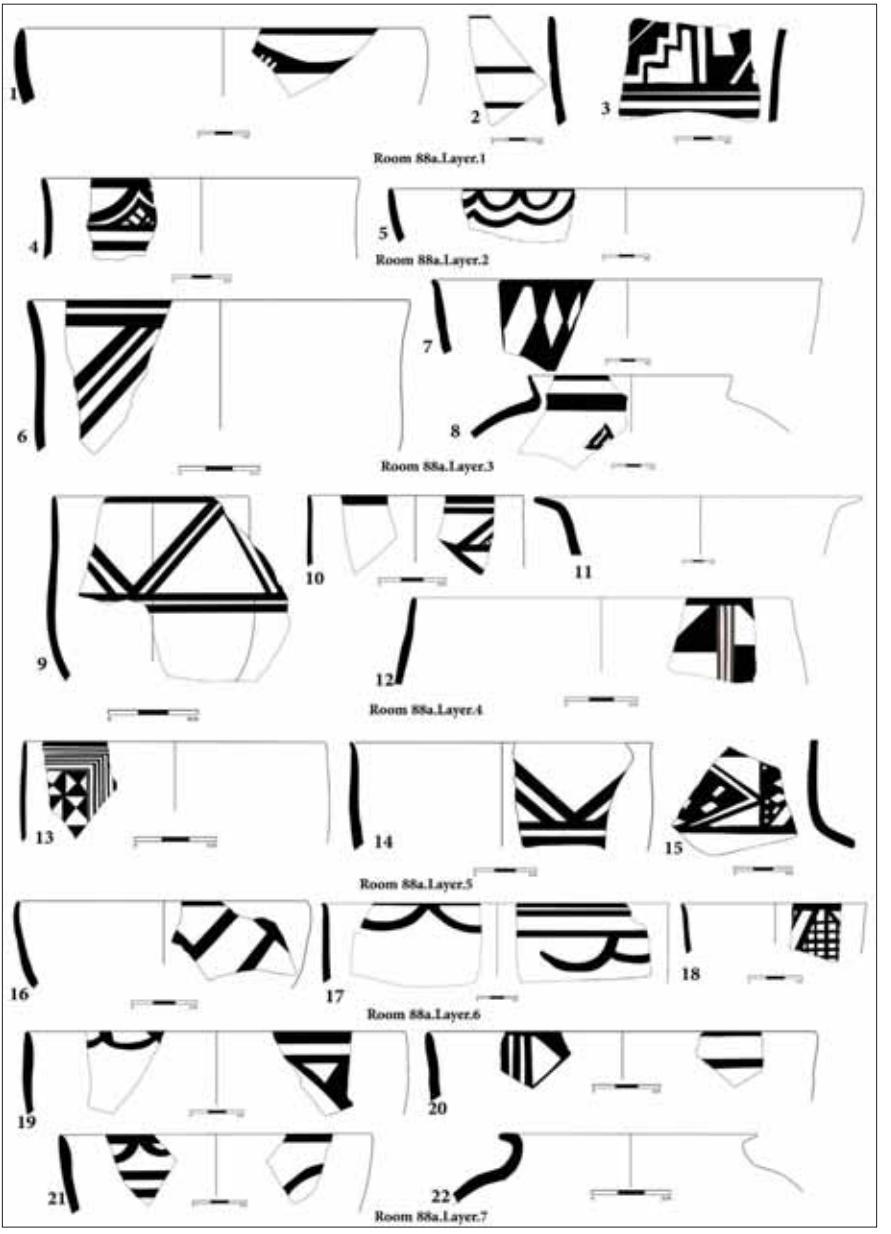

Fig. 13: Room 88a. Layers 3-7. Pottery collection.

Fig. 14: Workshop 35, Room 88, layer 3, clay figurines.

Fig. 15: room 88. Layer 4: male figurines.

a fast wheel. It seems this layer probably belongs to the early years of Phase 9. A four-petalled seal impression similar to the previous one found in layer 4, related to the Proto-Elamite period, a clay figurine with a long neck and two sherds analogous to Namazga III and Quetta ware are distinctive objects of this layer that can be attributed to the final stages of Phase 9 (Fig. 17).

The general characteristics of the pottery in layer 6 are similar to those of the upper layers except that there are far fewer painted vessels. In addition, there are no specimens comparable with Quetta ware, especially those with geometric motifs. The motifs are limited to parallel stripes inside open bowls, which have been categorized as belonging to a local Shahr-i Sokhta style (Fig. 13).

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Style
1	Buff	Buff	Wash	Buff	Brown	Local
2	Buff	Buff	Slipped	Buff	Brown	Local
3	Reddish	Buff	Slipped	Buff	Dark Brown	Local
4	Buff	Buff	Washed	Buff	Brown	Khurab
5	Buff	Buff	Washed	Buff	Brown	Local
6	Buff	Buff	Slipped	Buff	-	Namazga III
7	Buff	Buff	Washed	Buff	Dark Brown	Local
8	Reddish	Buff	Slipped	Buff	Brown	Local
9	Buff	Buff	Slipped	Buff	brown	Namazga III
10	Buff	Buff	Washed	Buff	Dark Brown	Local
11	Buff	Buff	-	-		Local
12	Buff	Buff	Slipped	Buff	Brown	Namazga III
13	Buff	Buff	Slipped	Buff	Dark Brown	Namazga III
14	Buff	Buff	Slipped	Buff	Brown	Local
15	Buff	Buff	Slipped	Buff	Dark Brown	Namazga III
16	Buff	Buff	Washed	Buff	Brown	Local
17	Buff	Buff	Slipped	Buff	Brown	Local
18	Grey	Grey	Washed	Grey	Black	Baluchistan
19	Buff	Buff	Slipped	Buff	Brown	Local
20	Buff	Buff	Slipped	Buff	Brown	Local
21	Buff	Buff	Slipped	Buff	Brown	Local
22	Buff	Buff	Washed	Buff	-	Local

Tab. 3: description of Room 88a ceramics (see also Fig. 13).

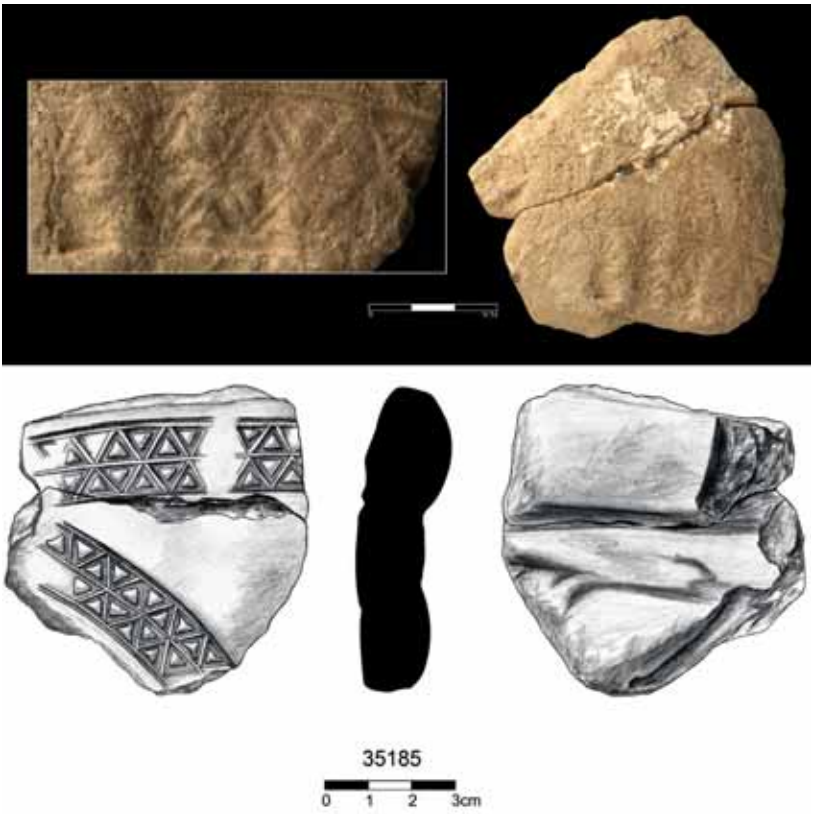

Fig. 16: room 88a. Layer 4. Cylindrical seal impression with geometric design.

Fig. 17: room 88a. Layer 5. Clay figurines and seal impression.

The seventh layer is the deepest in Room 88a and square XDV. The remnants of this layer, which is located immediately over sterile soil, include a very simple stove on the floor that has only one fire pit (Figs. 18-19). The architectural remnants of this layer are the oldest in the eastern residential area. The pottery in the seventh layer is similar to the sixth layer. The only difference is that some Quetta fragments are among the findings. Two grey pottery fragments, similar to the older layers of Tepe Yahya IVC, are representative of this layer. In general, there are fewer painted vessels and the decoration is limited to simple linear motifs and some patterns that have not been seen before. There are also plenty of plain hand-made vessels with overfired bodies in this layer.

3. Cultural materials and interaction in Shahr-i Sokhta I (late 4th and early 3rd millennia BC)

Although the ceramic categories are divided to buff, gray and red wares as well as global division of pottery in the other sites, our comparison is built based on

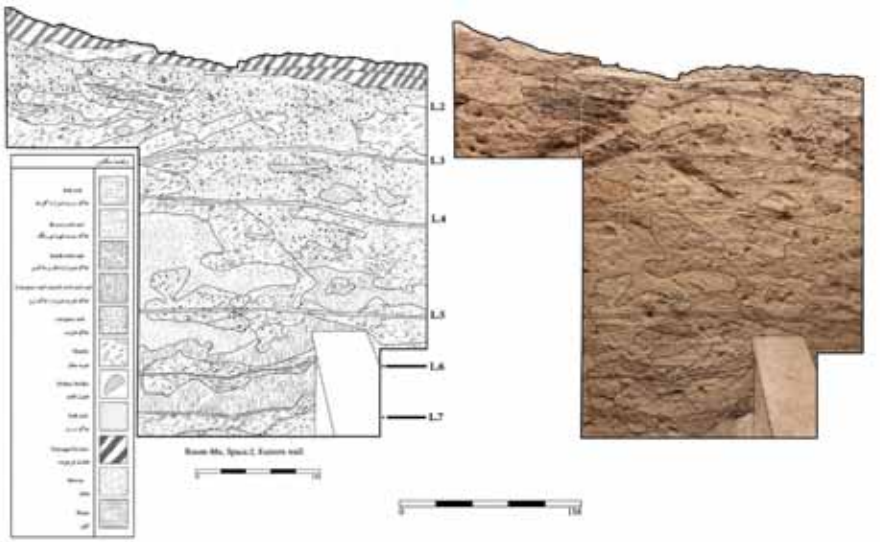

Fig. 18: Workshop 35, Square XDV. vertical cut on western wall of room 88a.

Fig. 19: Workshop 35, Room 88a. Circular stove on the virgin soil of layer 7.

the cultural types of ceramics for better understanding of interaction sphere at Shahr-i Sokhta period I or the formation era of Shahr-i Sokhta.

In the late 4th millennium BC Shahr-i Sokhta interacted with both Jemdet Nasr and south Turkmenistan (Lamberg-Karlovsky - Tosi 1973: 52). The former was part of a trans-regional system for trading goods in western Asia that operated along a west-east axis. It began in southern Mesopotamia and Khuzestan and passed through Malyan, Tepe Yahya and Shahr-i Sokhta, reaching the plain of Kech near Makran in Pakistani Baluchistan and ending in Miri Qalat and the necropolis of Shahi Tump west of the Makran mountains. In addition, there are some other evidences from different regions that includes Central Pakistani Baluchistan, Bampur valley, Kech-Makran, as well as Kerman region. Proto-Elamite culture, expressed in standard cultural materials such as cylinder seals, bevelled-rim ceramics and clay tablets, has been found in Tepe Yahya (Potts 2001); Mahtoutabad cemetery on the banks of the Halilrud (Desset *et al.* 2013); Shahr-i Sokhta I.9-10 (Tosi 1974a: 13); and Miri Qalat IIIa (Besenval 2001: 5), 3500-3000 BC. Kesh Makran marks the eastern limit of Proto-Elamite culture. It

is worth noting that the Beveled Rim Bowls of this site is limited to five shards and this evidence are not comparable to the evidence from Yahya IVC - a true Proto Elamite building with typical tablets, beveled rim bowls, sealing-impressions, etc. - or even to that from Shahr-i Sokhta I.9-10. The limit comparison with Yahya IVC came from some pottery in Miri Qalat IIIa which are comparable to those at Yahya IVC. Therefore, there is not enough materials to debate about true cultural influences from the west of Iran and it is better to assume that Proto Elamite influences on Kech - Makran came from Kerman and Halil rud Basin during the Proto Elamite period. Miri Qalat IIIa is coeval with Tepe Yahya IVC and Shahr-i Sokhta I, 9-10. The excavations in Shahr-i Sokhta also confirm that the Proto-Elamite tablets and Nal and Central Asian pottery (Tosi 1979: 159) are coeval.

Shahr-i Sokhta also interacted with south Turkmenistan during its formation period. This was characterised by Namazga III pottery, which has also been found in large quantities in Mundigak III north of Shahr-i Sokhta and the Quetta valley in Pakistani Baluchistan (Biscione 1974). This type of pottery has been found in layers related to Phase 10 and 9 of Shahr-i Sokhta approximately dated to 3200-3000 BC (Salvatori - Tosi 2005). The domain of interaction extended from the south Kopet Dagh Mountains to the Quetta valley in Pakistani Baluchistan (Biscione 1973: 113-117).

Although the effects of these two interaction domains are mostly evident in Shahr-i Sokhta Phase 10, it seems that the effects and presence of cultural materials from these two domains continued until the end of Period I (3550-3000 BC). New excavations have shown that during Phase 9 the influence of the Proto-Elamite and south Turkmenistan domains declined, while southern areas such as Nal and the Quetta valley became more influential. Prior to the new excavations, Tosi had classified Period I pottery into two traditions: Buff and Grey Ware (Tosi 1969: 324). Mutin and Minc used the Italian classification for the purpose of compositional analysis. They divided this pottery to three main categories based on the paste and cultural background (Mutin - Minc 2019: 884) (Mutin - Minc 2019: 884). A study of the material found in the lower layers of the *ERA*, especially those of Phase 9, shows six groups of pottery with different

provenance and styles: 1. Local (Shahr-i Sokhta), 2. Southern Turkmenistan and Quetta, 3. Khurab/Emir Gray type, 4. Proto-Elamite and Jemdet Nasr, 5. Nal and Central Pakistani Baluchistan, 6. Kerman, Bampur and Makran.

Local Shahr-i Sokhta cultural materials

The materials locally produced in Shahr-i Sokhta include a number of clay figurines and ceramic vessels. The latter are Buff Ware and generally consist of wide-mouthed bowls with parallel or wavy stripes below the rim on the internal surface. There are also small cup-like beakers with motifs under the rim and on the external surface. This type of pottery, with brown paint on a buff background, is very simple without much variety. Similar wavy motifs have been found in the Bampur and Chah Hosseini sites, probably dating back to the mid-4th millennium BC (Moradi *et al*. 2015; Mutin *et al*. 2017: 16). Anthropomorphic and zoomorphic figurines made of clay, especially humped-back cattle, are also considered to be indigenous to Shahr-i Sokhta (Fig. 20).

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Ø mouth (cm)
1	Reddish	Buff	Slipped	Buff	Brown	17
2	Buff	Buff	Slipped	Buff	Brown	-
3	Reddish	Buff	Slipped	Buff	Brown	30
4	Reddish	Buff	Slipped	Buff	Brown	30
5	Buff	Buff	Slipped	Buff	Brown	17
6	Buff	Buff	Slipped	Buff	-	28
7	Buff	Buff	Slipped	Buff	Brown	16
8	Reddish	Buff	Washed	Buff	Brown	-
9	Buff	Buff	Washed	Buff	Brown	-
10	Buff	Buff	Washed	Buff	Brown	6
11	Buff	Buff	Washed	-		27
12	Buff	Buff	Slipped	Buff	Brown	28
13	Buff	Buff	Slipped	Buff	Brown	-
14	Buff	Buff	Slipped	Buff	Brown	-
15	Buff	Buff	Slipped	Buff	Brown	-
16	Reddish	Reddish	Washed	Reddish	Brown	-
17	Buff	Buff	-	-	-	30

Tab. 4: description of local Shahr-i Sokhta pottery (see also Fig. 20).

South Turkmenistan and Quetta Valley cultural materials

Namazga III ware from Shahr-i Sokhta is painted with various decorative designs including solid geometric shapes, chequered patterns and zigzag motifs. Similar pottery has been found in Mundigak, Quetta, and Southern Turkmenistan and dates back to the second half of the 4th to the early 3rd millennia BC (Biscione 1973: 113). This type of pottery, along with locally produced ware, is the most abundant type in the ceramic assemblage of Shahr-i Sokhta I. However, some examples of pseudo-Jemdet Nasr pottery are painted with Quetta motifs, creating an intermediate style. The pseudo-Jemdet Nasr potteries also found in Yahya IVC that were decorated with local motifs (Potts 2001: fig. 1.40) and it may be an influence from Kerman region during the Proto Elamite period or Yahya IVC. It should be noted that many Namazga and Quetta pottery fragments were actually produced in Shahr-i Sokhta (Fig. 21) (Mutin and Minc used hybrids for defining of these types, Mutin - Minc 2019: 897). Among the other cultural materials that show similarity with southern Turkmenistan are seated or standing female figurines whose sexual organs are presented with incised lines (Shirazi 2007: fig. 11).

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Ø mouth (cm)
1	Buff	Buff	Slipped	Buff	Brown	12
2	Buff	Buff	Slipped	Buff	Brown	-
3	Buff	Buff	Slipped	Buff	Brown	-
4	Buff	Buff	Slipped	Buff	Brown	-
5	Buff	Buff	Slipped	Buff	Brown	16
6	Buff	Buff	Slipped	Buff	Brown	-

Tab. 5: description of South Turkmenistan and Quetta Valley pottery (see also Fig. 21).

Khurab/Emir Grey Ware

Emir Gray Ware pottery dated back to late fourth and early third millennium BC (Wright 1984; Sajjadi 2019: 82) and it was reported for the first time by A. Stein from Shahi Tum and Khurab (Stein 1937). It has cross-shaped motifs over the inside bowls and generally are reported in Shahr-i Sokhta (Sajjadi 2003),

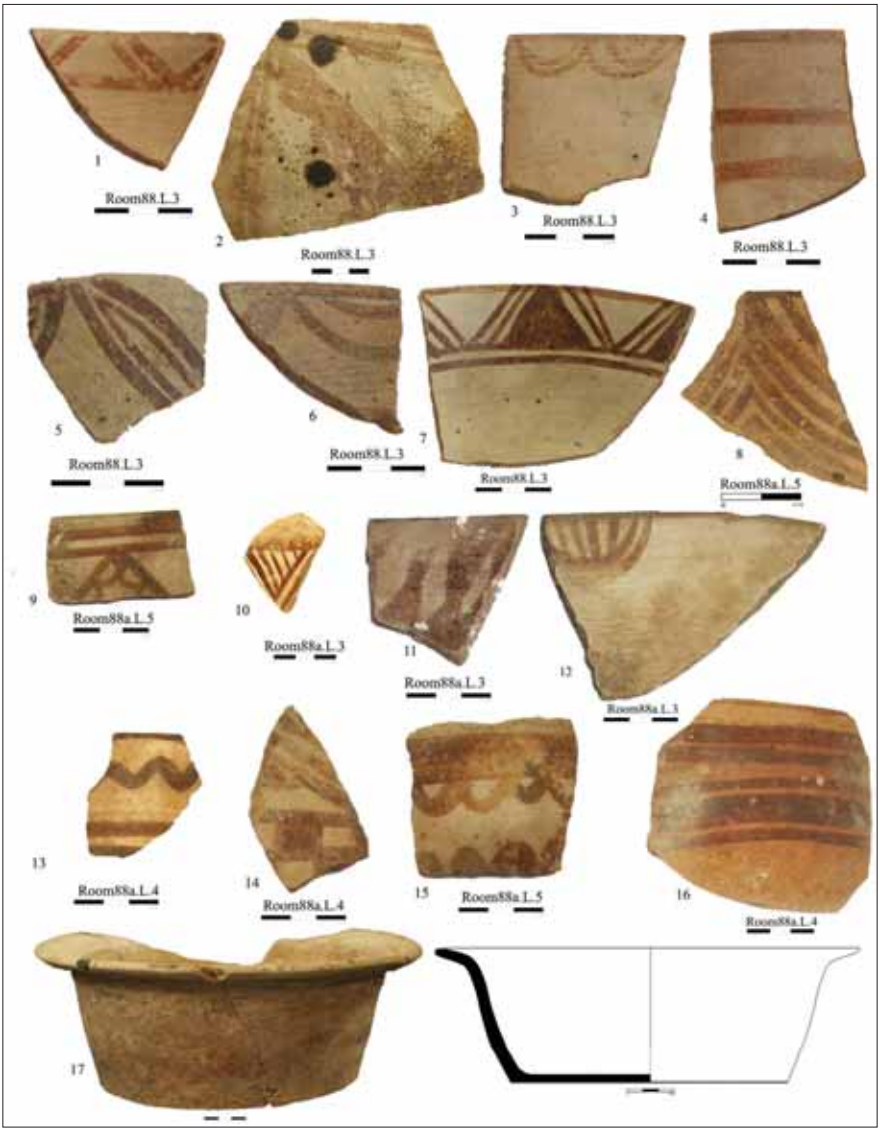

Fig. 20: local pottery of Shahr-i Sokhta of layers related to phase 9 in *ERA*.

Fig. 21: Namazga III pottery of Shahr-i Sokhta.

Espidezh, (Heidari *et al* 2019: pl.14), Kech-Makran (Mutin 2007: fig. II) and a number of sites all around the south eastern of Iran and Pakistan (Wright 1984: 64-70). A large number of this pottery related to period I of Shahr-i Sokhta has been found in *ERA* (Fig. 22) and Shahr-i Sokhta graveyard (Sajjadi 2003: fig. 26). The most important reason to avoid categorized of this kind of pottery under the type of Baluchistan/Kech-Makran type is that the origin of them is ambiguous in archaeological context.

No.	Paste Colour	Body Colour	Cover	Slip	Paint Colour	Ø mouth (cm)
1	Grey	Grey	-	-	Black	18
2	Grey	Grey	-	-	Black	26
3	Grey	Grey	-	-	Black	28
4	Grey	Grey	-	-	Black	-
5	Grey	Grey	-	-	Black	-
6	Grey	Grey	-	-	Black	-

Tab. 6: description of Emir Grey Ware pottery (see also Fig. 22).

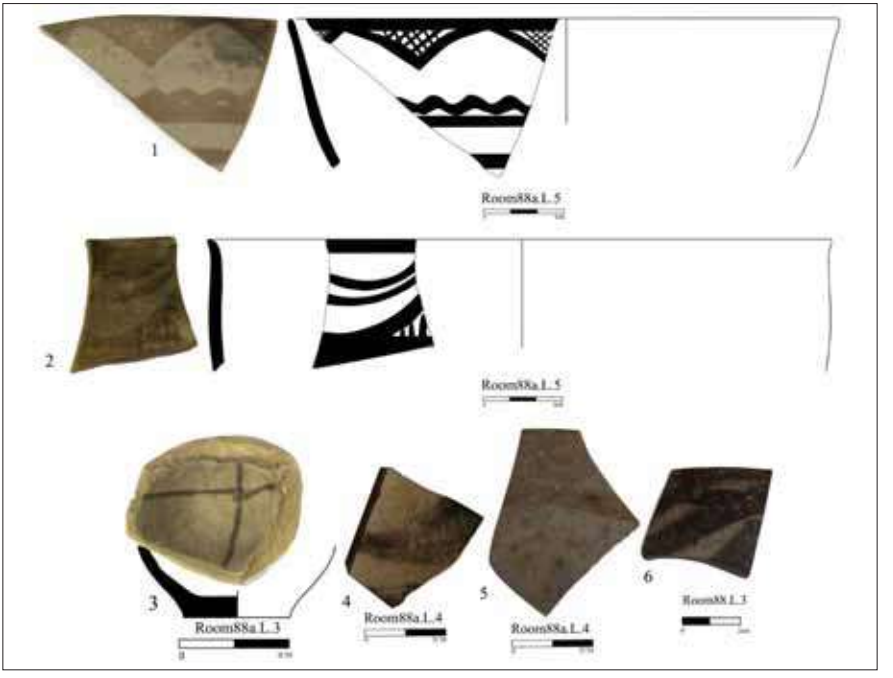

Fig. 22: Grey Ware pottery of Period I.

Nal and Central Baluchistan pottery

Nal pottery is a fine buff ware with semicircular motifs on the external body mostly in the form of high cylindrical bowls. It was found in the Nal archaeological site in Pakistani Baluchistan and dates back to 3000 BC (Biscione 1984: fig. 10.15). A rare piece from Shahr-i Sokhta with a depiction of standing humans is also similar to the Nal style (Fig. 23: 1). Fragment No. 3 (Fig. 23) with nested circle motifs is one of the rare examples that is generally similar to Nal pottery (Franke 2016: figs. 22-24). Two other fragments (Fig. 23: 4-5) are similar to samples collected by de Cardi from central and northern Pakistani Baluchistan (de Cardi 1983: fig. 22.21) and are classified as Nal-type pottery (Cortesi et al. 2009: fig. 6.1). In addition, a painted Buff Ware fragment with a leopard design is comparable with Nal ware (Franke 2015: pl. 6).

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Ø mouth (cm)
1	Buff	Buff	Slipped	Buff	Brown	-
2	Buff	Buff	-	-	Black	-
3	Buff	Buff	Slipped	Buff	Brown	-
4	Buff	Buff	Slipped	Buff	Brown	-
5	Buff	Buff	Slipped	Buff	Brown	32

Tab. 7: description of Nal and Central Baluchistan pottery (see also Fig. 23).

Proto-Elamite cultural materials and pseudo-Jemdet Nasr pottery

The Jemdet Nasr-type pottery found in Shahr-i Sokhta consists of globular jars with rounded flared rims. In addition to the rim shapes, shared features include two or four ear-like handles on the shoulder (Fig. 24). Unlike the carinated Jemdet Nasr examples from Tepe Yahya IVC (Potts 2001: fig. 1.40), the profile of these vessels is completely round and the motifs are more like Quetta Ware. Therefore, they cannot be fully compared with the Jemdet Nasr type, but rather constitute a local and Sistanized form of Mesopotamian pottery. A clay figurine from layer 5 of Room 88a (Fig. 17) is also reminiscent of the Jemdet Nasr style (Matthews 1989: fig. 11.3).

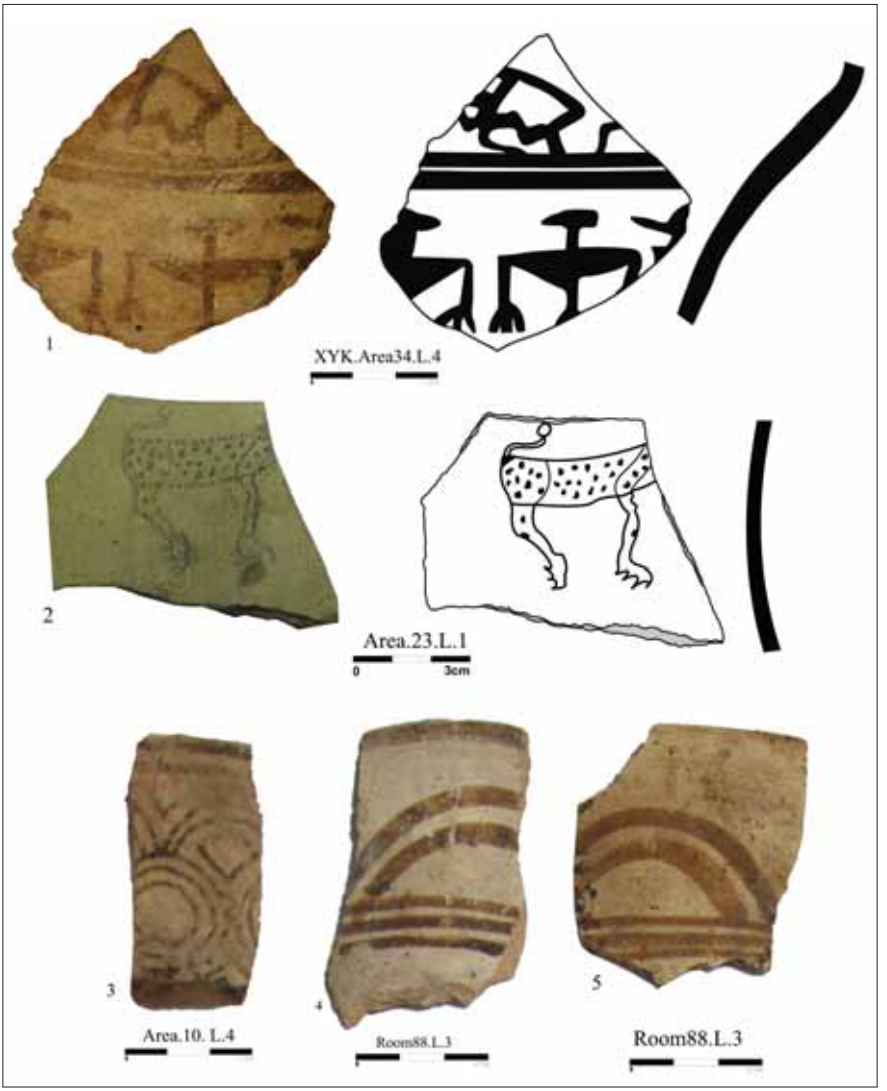

Fig. 23: Nal Ware pottery from Shahr-i Sokhta.

No.	Paste Colour	Body Colour	Cover	Slip Colour	Paint Colour	Ø mouth (cm)
1	Buff	Buff	Washed	Buff	Brown	18
2	Buff	Buff	Washed	Buff	Brown	19
3	Buff	Buff	Washed	Buff	Brown	19
4	Buff	Buff	Slipped	Buff	Brown	20
5	Buff	Buff	Slipped	Buff	Brown	18

Tab. 8: description of Proto-Elamite and pseudo-Jemdet Nasr pottery (see also Fig. 24).

Kerman, Bampur and Makran pottery

Much of the Red, Grey and Buff Ware from the various levels and workshops of Period I in the *ERA* is similar to that of Yahya IVC/Mahtoutabad III in the Kerman region (Figs. 25-27), the Bampur valley in Baluchistan and to a lesser extent Miri Qalat III in Pakistani Makran (Fig. 26: 1), and the latter has also been found in Yahya IVC2. However, Khurab/Emir Gray Ware and Bampur-type ceramics are much more abundant in Shahr-i Sokhta than Miri and Kech-Makran types. It seems that at the end of the 4th millennium BC, the Bampur plain functioned as a dynamic communication corridor between Kerman and Sistan.

The presence of Yahya IVC and Mahtoutabad III pottery (Figs. 25-27) among the cultural material of Period I in Shahr-i Sokhta is impressive. The site of Mahtoutabad is located about 1.5 km south-east of Konar Sandal in the Halil Rud valley. A one-year excavation of this site found that Mahtotabad III has no relations with earlier or later cultural horizons in the Halil Rud basin and it is known to be an isolated phase (Desset *et al*. 2013: 21). Based on the abundance of bevelled-rim pottery and other types of Proto-Elamite ceramics from Mahtoutabad III (more than six times the quantity of Proto-Elamite ceramics in Malyan and much more than in Yahya (Desset *et al*. 2013: 27), it seems that this site was one of the most important centres of Proto-Elamite expansion in the southeast of Iran.

No evidence of bevelled-rim pottery has been documented from the Proto-Elamite phase in the *ERA* in Shahr-i Sokhta, but other Proto-Elamite elements such as pseudo-Jemdet Nasr jars, cylinder seal impressions and a Proto-Elamite tablet have been found in the deepest layers (Period I) (Amiet - Tosi 1978), which

Fig. 24: Shahr-i Sokhta. Pseudo Jemdet Nasr pottery from *ERA*.

Fig. 25: Shahr-i Sokhta. Layers of phase 9: Kerman pottery.

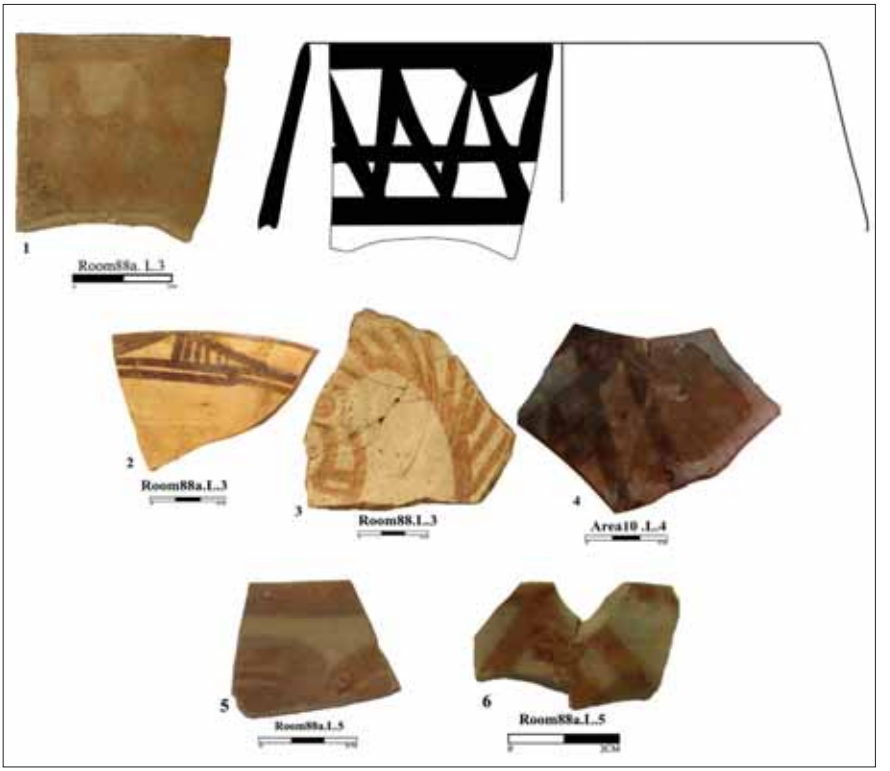

Fig. 26: pottery fragments of Bampur valley and Pakistani Makran.

confirms the penetration of this culture in Sistan. The presence of the Mahtoutabad III culture rather than Yahya IVC in the Hirmand valley during the early 3rd millennium BC is shown by the bevelled-rim vessels from Shahr-i Sokhta I, which are similar to Mahtoutabad III pottery (Fig. 27). It should be noted that the Yahya IVC pottery in Shahr-i Sokhta is more comparable to what is seen in the Bampur valley than Yahya itself. The historical association of Kermani and Makrani materials in the Bampur valley suggests the active role of this area as a conduit for spreading Mahtoutabad III and the Proto-Elamite culture to Sistan and Pakistani Makran.

Fragment 4 in Fig. 25 was previously interpreted as Kermani pottery of the Yahya IVC period (Mutin 2013: fig. 3.47), but it is now clear that this kind

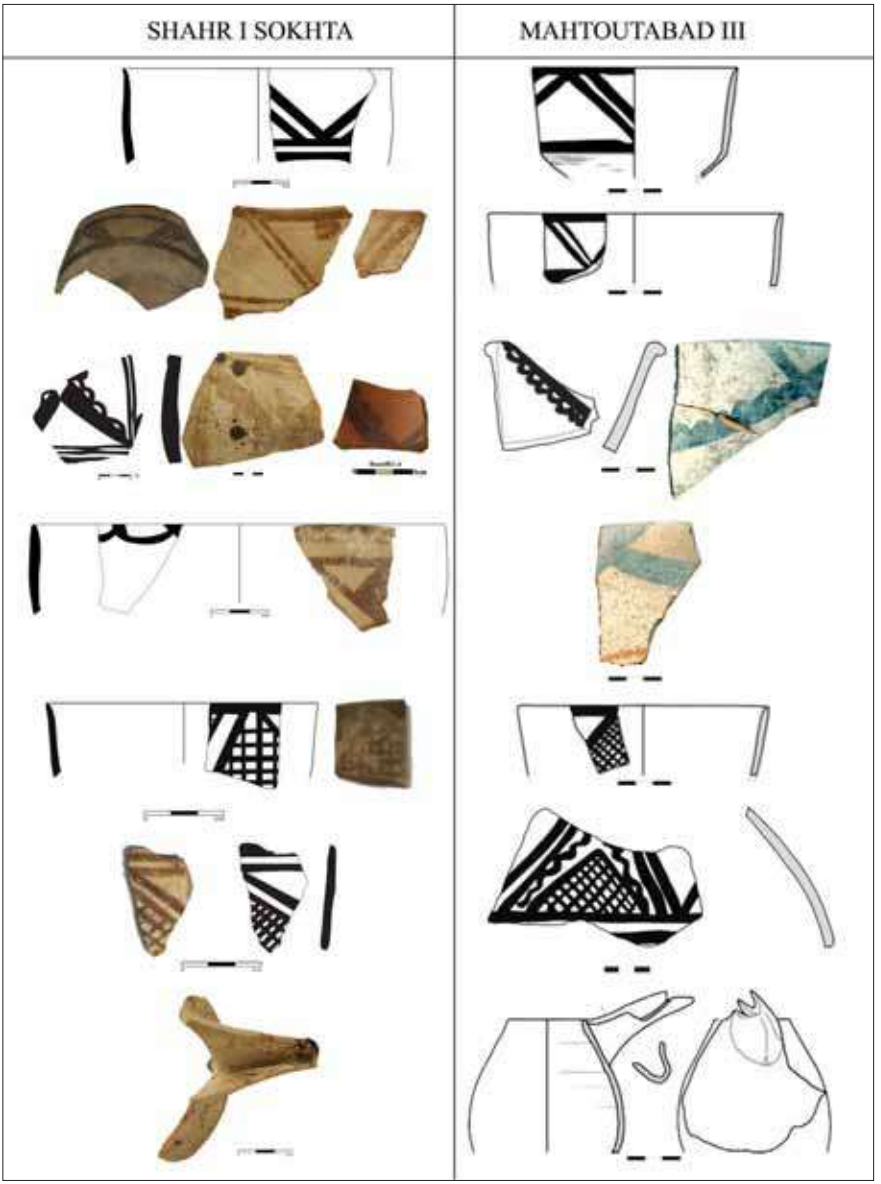

Fig. 27: comparison of painted pottery motives from Shahr-i Sokhta and Mahtoutabad III.

of pottery of the late 4th millennium BC probably originated from Tepe Chah Hosseini in the Bampur valley (Moradi 2016: 160 No. 2 and 179 Nos. 2, 3 and 7). Fragment 12 in Figure 25 is more reminiscent of the colourful pottery of Chah Hosseini (Moradi 1395: 259, no. 15; 322, no. 22) than the bichrome pottery of Yahya IVC, and Fragment 11 was interpreted by Mutin - Lamberg-Karlovsky as a western Baluchistan product (Mutin - Lamberg-Karlovsky 2013: fig. 3.36 nos. 1 and 4). However, Fragment 1 in Figure 25 is comparable with Yahya IVC (Mutin - Lamberg-Karlovsky 2013: fig. 3.55 no. 9), and Fragment 8, made of red paste, is similar to another specimen from Yahya IVC2 (Mutin - Lamberg-Karlovsky 2013: fig. 3.73 no. 3). Other specimens shown in Figure 25 display similarity with the pottery tradition of Yahya IVC and it is even possible to attribute the origin of Fragment 11, representative of a type found in the Bampur valley in large quantities, to Aliabad ware, produced in Tell Iblis IV or Aliabad wares in Kerman (Sarraf 1978: 217, fig. I, 90). To these Kerman influences on the pottery of Shahr-i Sokhta Period I should be added the four-leaf seals, which have also been found in Yahya IVC (Lamberg-Karlovsky - Potts 2001: fig. 10.29).

No.	Paste colour	Body colour	Cover	Slip colour	Paint colour	Ø mouth (cm)
1	Red	Red		-	Dark Brown	
2	Reddish	Reddish	-	-	Light brown	
3	Buff	Buff	Slipped	Buff	Dark brown	-
4	Reddish	Reddish	-	-	Light brown	30 cm
5	Buff	Buff	Slipped	Buff	Dark brown	-
6	Buff	Buff	Slipped	Buff	Brown	-
7	Buff	Buff	Slipped	Buff	Brown	-
8	Red	Red		Polished	Dark brown	-
9	Buff	Buff	Slipped	Buff	Brown	-
10	Red	Red		-	Dark Brown	-
11	Reddish	Reddish	Slipped	Brown	Dark Brown	
12	Reddish	Reddish	Slip	Buff	Polychrome	-

Tab. 9: description of Kerman and Makran pottery (see also Fig. 25).

The influence of the western regions of Baluchistan, namely the Bampur plain, can also be seen directly in Shahr-i Sokhta. Fragment 1 in Figure 26 is comparable

to Miri Qalat IIIa (Mutin 2013: fig. 14.16) and Yahya IVC (Lamberg-Karlovsky - Potts 2001: 21, fig. 2.22.H). According to B. Mutin and C.C. Lamberg-Karlovsky (2013: 90), Fragments 2 and 3 in Figure 26 are imitations of Baluchistan Buff Ware pottery, a type also found in Yahya.

It is very difficult to determine the exact origin of each single pottery fragment in Figure 26, but since a large quantity of Bampur Plain pottery is also found in Yahya, it suggests that the communicative and transitional corridor of these traditions to the Sistan plain was originally the Bampur plain.

No.	Paste colour	Body colour	Cover	Slip colour	Paint colour	Ø mouth (cm)
1	Grey	Grey	-	-	Dark brown	14
2	Buff	Buff	Buff	Buff	Dark brown	32
3	Buff	Buff	Buff	Buff	Brown	-
4	Grey	Grey	-	-	Dark brown	-
5	Grey	Grey	-	-	Brown	-
6	Grey	Grey	-	-	Light brown	-

Tab. 10: description of Bampur (Baluchistan) pottery (see also Fig. 26).

4. Conclusion

The aim of the excavations in the *Eastern Residential Area* is to obtain more detailed information about the early formation of Shahr-i Sokhta in Period I, focusing on spaces that seem to contain adequate evidence from this period. Although we are still waiting to receive the results of radiocarbon tests concerning the sequential stratigraphy in the excavated workshops, some useful information has been obtained through examination and comparison of cultural materials.

The new excavations mostly focused on Phase 9 deposits, with a small quantity of Phase 10 remains found only in the lowest layers of Room 88a in Workshop 4. The evidence shows that Phase 9 was the first stage of Shahr-i Sokhta's expansion from a small village to a larger settlement. The remains of this phase have been found in almost all of the excavated workshops in the *ERA*. Similar pottery to this phase has also been found in some suburban sites around Shahr-i Sokhta. In most sections the archaeological deposits related to Phase 9 (3100-3000 BC) are about

150 cm thick, showing the stability and continuity of this long period that paved the way for Shahr-i Sokhta to become a large population centre in eastern Iran. This large volume of deposits is easily investigable in Workshops 4, 10, 33 and 34 and can be observed in almost all of the lower layers of the *ERA*. However, no trace of this phase has been found in other residential sections such as the northern and western parts of the site.

In Period I and in particular in Phase 9, the presence of pottery from other contiguous regions is evident. It seems that during this period Shahr-i Sokhta was an attractive and hospitable region due to its fertile lands and rich water supplies and was able to attract a relatively large population from neighbouring areas especially Baluchistan. The presence of a huge volume of cattle bones in the lower levels of this phase suggests extensive agriculture in a region using large-bodied animals such as cattle, needed for working muddy wetlands.

It seems that the early urban developments in the easternmost regions of Iranian plateau was under influences of Proto Elamite centers in Kerman (Mahtoutabad III and maybe Yahya IVC) around 3100-3000 BC which can be seen from seals impressions and a Proto Elamite tablet at Shahr-i Sokhta I, 10-9. This is important to note that in Shahr-i Sokhta, the management control objects such as seal impressions and tablets are more abundant than the other Proto-Elamite elements (like beveled rim ceramics).

After Phase 9, we see a standardization and homogenization of cultural materials, especially pottery, which is probably a sign of the stabilization of Shahr-i Sokhta culture in the Sistan plain. It is also likely that the transition from Periods I to II involved changes in architectural structure, pottery, and management methods.

As mentioned above, Phases 8 and 7 saw the emergence of what is known as Shahr-i Sokhta standard pottery, and the influence of the adjacent cultures and regions decreased considerably.

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The Multidisciplinary International Archaeological Project in Shahr-i Sokhta (MAIPS)

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The idea of conducting an international multidisciplinary study project with interdisciplinary implications at the site of Shahr-i Sokhta emerged from three distinct yet complementary priorities. In the first place, given the tradition of research in the settlement in Sistan, there was perceived to be a need for scientific continuity with the pioneering and effective studies conducted by the Italian archaeological mission headed by M. Tosi in the late 1960s and 1970s. This tradition was reprised by the Iranian Archaeological Mission headed by S.M.S. Sajjadi, who began a new season of field work and scientific research in 1997. These multifaceted studies helped, and indeed, are still helping, to shed new light on the proto-urban cultures of Iranian Sistan. In the second place, there was a desire to enrich the decades-old tradition of studies with the new evidence emerging from the most recent discoveries in the areas neighbouring Sistan (especially Jiroft). Specifically, the aim was to create a new research laboratory that would go beyond the investigations at Shahr-i Sokhta in order to include the broader historic perspective, looking at the evolution – and involution – of the major civilisations of the Near East in a geographical framework comprising the Persian Gulf, Central Asia and the valley of the Indus. The study of the data

gathered at Shahr-i Sokhta, be they archaeological, archaeozoological, palaeo-environmental or anthropological, represents the initial objective of a process that began with the acquisition of local information and then expanded to the adjacent regions. It should be remembered that the civilisations of these regions (Oxus, Jiroft and Indus) followed the same pattern of growth throughout the 3rd millennium BC, followed by rapid and simultaneous collapse in the first half of the 2nd millennium BC. Shahr-i Sokhta thus provides a wealth of data that are comparable with those of neighbouring areas, and in the same way it represents a laboratory and a key vantage point from which to reconstruct in greater detail the historical dynamics affecting the Near East and Southern Asia as an integrated cultural system. For the project therefore, Shahr-i Sokhta represents a central node in the transmission and dissemination of a variety of cultural phenomena that are believed to have generated forms of hybridisation in a complicated interactive and integrated system linking Oxus, Jiroft and Indus, naturally without forgetting the role played by Baluchistan and Makran from the late 4th to the early 2nd millennium BC.

On the basis of this broader perspective, the University of the Salento has provided and continues to provide an extra interface between the tradition of multidisciplinary studies and technological innovation, fundamental for maintaining the dynamic exchange of knowledge with our Iranian colleagues. Following this two-track approach, embracing both tradition and innovation, the research laboratories of Ancient Topography and Photogrammetry (headed by Prof. Giuseppe Ceraudo), Archaeobotany (headed by Prof. Girolamo Fiorentino), Archaeozoology (headed by Prof. Jacopo De Grossi Mazzorin and Prof. Claudia Minniti) and Physical Anthropology (headed by Prof. Pier Francesco Fabbri) represent the driving force for the development of research in accordance with the agreements signed with the Iranian authorities. These activities performed by the Department of Cultural Heritage are supplemented with research conducted by universities and international research institutes designed to help fulfil our objectives. These studies have also helped to ensure the systematic nature of the project, specifically by means of geophysical prospections (as documented in this

volume), parasitological studies, archaeometric studies and isotopic analyses, which will be the object of subsequent publications.

This volume presents the work of the first two research campaigns, which were performed in two separate periods in 2017. In the conviction that work in the field and on the materials cannot proceed without publication of the research performed, the project envisages a further "preliminary" publication in 2021 (describing the excavations and research conducted during the 2018 and 2019 campaigns) and a "definitive" publication in 2023 (which will include the work performed in 2020 and 2021). At this point I should emphasise that from the first year of our project, as guests of the Iranian Archaeological Mission, the sharing of knowledge based on the use and dissemination of scientific data has been our priority. The focus has been on sharing new results and new historical interpretations based on what has been discovered with the international scientific community. At the time of writing there have been 29 scientific publications, 21 conferences and one special day of studies on Shahr-i Sokhta in Munich, during the last International Congress on the Archaeology of the Ancient Near East (ICAANE 11). In line with the indications of RICHT and ICAR, and with what has been achieved by the Iranian Archaeological Mission, the intensity of scientific production is set to continue undiminished in the next few years, especially regarding the studies of Shahr-i Sokhta.

In concluding this brief note on the principles underlying the project of the University of the Salento, I would like to extend the concept of sharing to include its more philosophical meaning, not limited to mere scientific data. The success of all these studies, confirmed by their publication, depends on the sharing of the daily work load with the Iranian research group headed by Mansur Sajjadi. Performing everyday tasks, engaging in scientific debate and tackling and solving problems together undoubtedly constitute the best way to achieve our common objectives. It is clear to both the current author and all the participants in the project that our shared values represent the first step towards the success of our work and, at the same time, an indispensable precondition for demonstrating, by means of actions rather than words, that obsolete mental and cultural approaches

have been abandoned. The other contributions to this volume exclusively concern the campaigns conducted from 28.01 to 06.02 and from 28.10 to 17.12 in 2017. In addition to the presentation of the excavation activities conducted by the present author, there are studies focusing on individual classes of artefact, some discovered during the excavation campaigns conducted by the Archaeological Iranian Mission from 1997 to 2015 and kindly made available for publication by Mansur Sajjadi. Specifically, the study by Alberto Potenza on bone utensils represents the basis for more extensive future research which lends itself to doctoral theses, while the paper by Silvia Festuccia on the alabasters of Area 33, found in closed and well-defined contexts, which is supported by petrographic analyses, opens up new avenues of research on the use of this material. The topographical studies are presented by Giuseppe Ceraudo, who enriches the detailed and general topography at the start of the volume with the work performed by his team (Paola Guacci and Veronica Ferrari), which involves processing and interpreting the data from the site and from satellite images. The palaeoenvironmental studies are presented by Girolamo Fiorentino, with the help of Ignazio Minervini and Claudia Minniti, respectively responsible for archaeobotanical and archaeozoological studies aimed at reconstructing the flora and fauna of the regional context of Shahr-i Sokhta. The preliminary anthropological data were processed by Pier Francesco Fabbri (with the help of Giorgia Vincenti), with whom the current author presents, on the basis of what has been determined so far, conservative considerations regarding the demographics and development of the settlement from the late 4th to the early 2nd millennia BC.

To summarise, Tradition, Innovation and Sharing are the main principles inspiring our project, which aims in the near future to increase the volume of data by excavating various sectors of the settlement and studying its materials. Our scientific debate will be centred on issues of topography (the recognition and measurement of specific sectors of the settlement's layout), chronology (in terms of both absolute chronology and the creation of an internal framework of reference that can facilitate comparison with the sequences of neighbouring regions) and history (the causes and drivers of the growth and collapse of the

settlement within the broader historical framework including Oxus, Jiroft and Indus and the dynamics of cultural contact and integration). The work that awaits us in the next few years, together with our Iranian colleagues, will require great commitment, but we remain as convinced as we were at the very start that we can contribute, in some small measure, to the understanding of the settlement and its history.

Preliminary Report on the 2017 Excavations in Area 33 in Shahr-i Sokhta: Stratigraphy, Finds and Pottery

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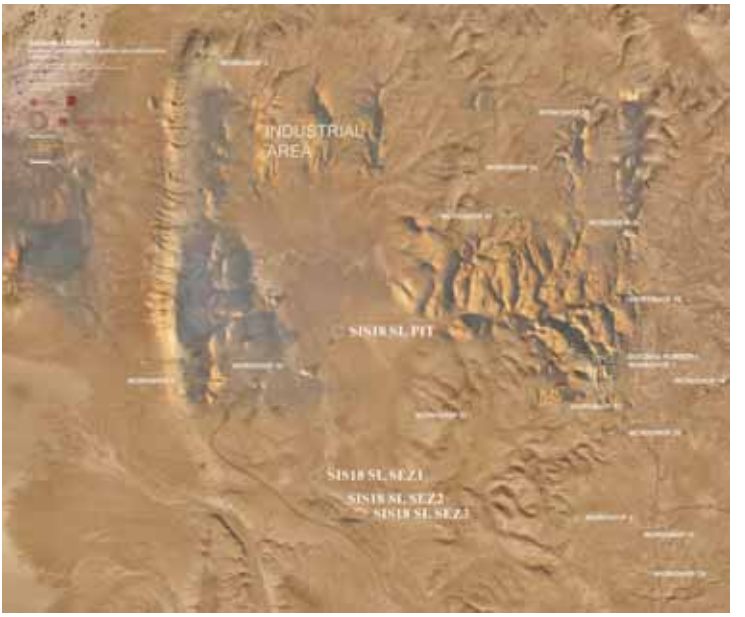
1. Introduction

The choice of area in which to intervene by means of excavations that might yield preliminary stratigraphic and topographical data was made following the surface reconnaissance campaigns conducted as part of the initial research in January and February 2017. The selected area was labelled Area 33 on the basis of the progressive numbering that followed on from the previous excavations conducted by the Iranian mission headed by S.M.S. Sajjadi (2003; 2005; 2104). The choice of area was guided by four main finds that were immediately perceived as particularly significant and in line with our research objectives, mainly concerned with the periods when the settlement was at its largest extent, i.e. Periods II and III. It was therefore decided to focus on a sector located a few dozen metres north-west of the so-called *Central Quarters* (Salvatori - Vidale 1997), south of the Monumental Area and immediately to the west of *Building 1* (Sajjadi - Moradi 2014) (Figs. 1-2), selected on the basis of satellite and aerophotogrammetric analyses providing clear evidence of a large and complex structure (Figs. 3-4).

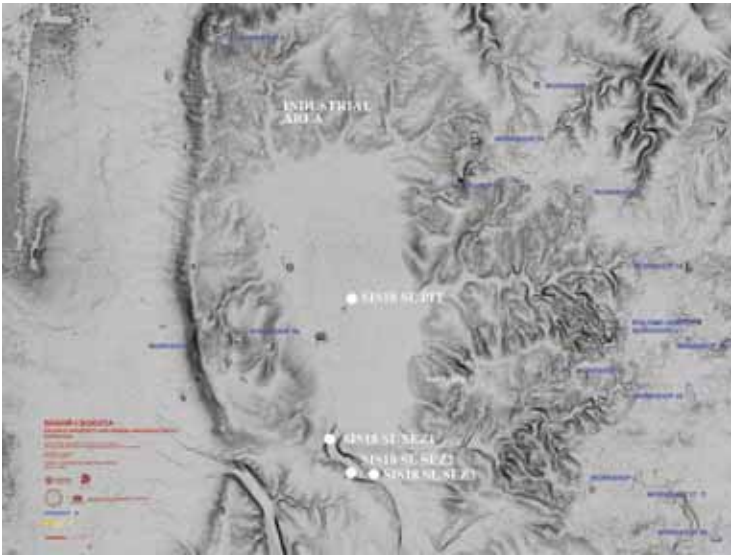
Fig. 1: topography of the settlement of Shahr-i Sokhta.

These preliminary assessments were followed by reconnaissance in the area and the gathering of ceramic fragments on the surface. The seriation of these finds indicated a horizon attributable to Period II-III of the site on the basis of the chronological and periodical sequences reconstructed by the Italian archaeological mission in the late 1960s and 70s.[1] To the abundant ceramics

1. For the reports on excavations conducted by the mission headed by M. Tosi, see especially Piperno - Salvatori 1983; 2007; Piperno - Tosi 1975; 1979; Salvatori 1979; Tosi 1967; 1968a; 1968b; 1969a; 1969b; 1969c; 1969d; 1969e; 1970a; 1970b; 1971a; 1971b; 1971c; 1972a; 1972b; 1972c; 1973a; 1973b; 1974; 1975; 1976a; 1976b; 1977; 1978; 1983.


INDUSTRIAL
AREA
SIS18 SL PIT
SIS18 SL SEZ1
SIS18 SL SEZ2
SIS18 SL SEZ3

2a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AREA
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2b

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2d

2e

2f

Fig. 2: topographical identification of Area 33.

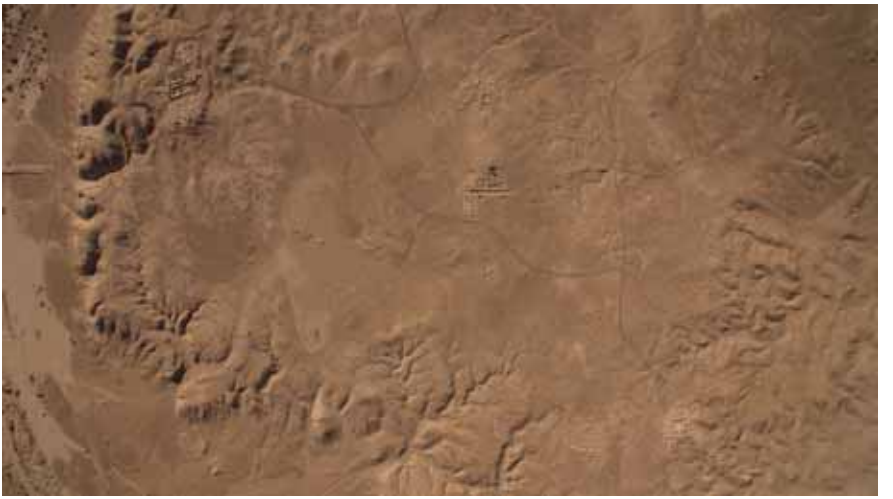


Fig. 3: Area 33 before the excavation, viewed with the drone (photo by M. Rahmani).

Fig. 4: Area 33 before the excavation.

gathered on the surface in Area 33 may be added a significant and impressive quantity of fragments of alabaster vessels (see in this volume the paper by Silvia Festuccia) and carved lapis lazuli, which were decisive in choosing the area to be investigated in this initial excavation campaign. To summarise, Area 33 was considered to be particularly interesting on the basis of both the evidence just described and its topographical location, between the settlement area to the east and the large central depression immediately to the west, future investigations of which will help to understand the topographical relations between the settlement and the surrounding area.[2]

2. Stratigraphic sequence, contextual analysis and archaeological associations

Area 33 was investigated from 28.10.1917 to 17.12.2017 with the excavation of a trench 30 x 10 m (300 m^2) that made it possible to recognise at least three phases of occupation, attributed to the first half of Period III of the site (Figs. 5-6).[3]

The intense wind erosion in this sector has enabled the identification of structural remains in the subsoil and has clearly facilitated the gathering of material from the surface, contributing to the preliminary understanding of the area. However, it has also badly damaged the walls of the building, which are conserved to a height of 10-40 cm, with the erosion gradually worsening towards the south and east, where natural washout resulting from the flow of rainwater run-off has led to the total removal of the most superficial structures, preventing their identification, except for some short and insubstantial stretches (Figs. 7-8).

The excavations have made it possible to identify a significant building (called *Building 33*) of a certain complexity and sophistication in terms of the layout (Fig. 9), and to make general observations regarding its functions on the basis of the contexts and archaeological associations discovered (Fig. 10).

2. Core samples were taken and palaeobotanical analyses were conducted (see in this volume the chapter by Girolamo Fiorentino) inside the central depression, mainly aimed at the reconstruction of the ecosystem of this sector.

3. The sector was excavated with the indispensable help of Alessia Leoni, Silvia Festuccia and Aida Torseh. I would also like to thank Media Rahmani for the use of the drone, essential for conducting architectural and topographical surveys.

Fig. 5: *Building 33* at the end of the 2017 campaign (photo by M. Rahmani).

Fig. 6: *Building 33* at the end of the 2017 campaign (photo by M. Rahmani).

Fig. 7: view from the north of *Building 33.*

Fig. 8: view from the north-west of *Building 33.*

Fig. 9: panoramic view from the north-east of *Building 33.*

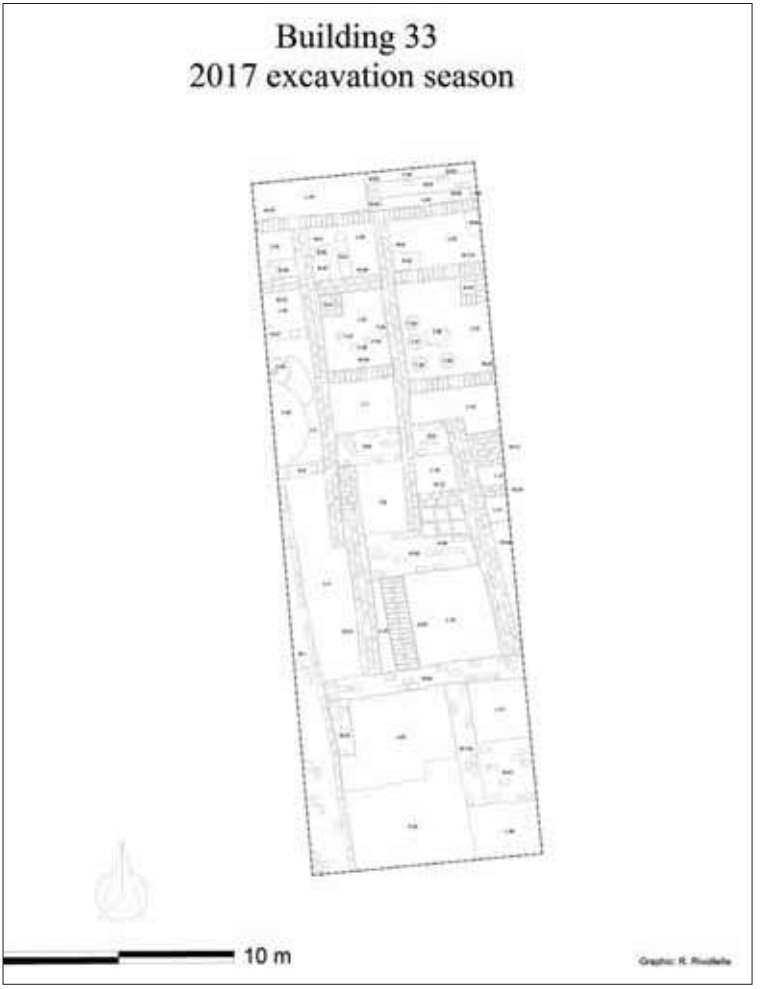


Fig. 10: schematic drawing of *Building 33.*

On the basis of the stratigraphic units excavated and the ceramic material associated with it, at least two main structural macro-phases were identified, along with another about which little could be determined due to the limited nature of the survey. The new research has enabled a more thorough understanding of the stratigraphic sequence in Area 33. In the report on the 2017 excavations (Ascalone - Sajjadi 2019), Layer 1 of the Area was below that of *Building 33*, which lay within Layer 2, corresponding to the most recent occupation levels. Following the recent results and the identification of the long stratigraphic sequence in the two subsequent campaigns, it was considered necessary to change the previously published terminological labels in order to make the stratigraphic sequence definitive. Specifically, the new sequence in Area 33 has a Layer 1 (corresponding to the previous phase 2 of the area in Ascalone 2019a: 33-34) and a Layer 2 (phase 1 in Ascalone 2019a: 29-33). In detail, the identification of a second architectural and stratigraphic phase as a result of three limited surveys conducted in L.15, L.16 and L.17 during the 2017 campaign (Ascalone 2019a: 29-30, fig. 12) has now been better documented by the 2018 and 2019 excavations, which have made it necessary to adopt new terminology without, however, any change in the layer sequence itself.

The most ancient phase (Layer 3), revealed by two assays conducted inside three rooms (L.15, L.16 and L.17), an intermediate phase, detectable only by the presence of a widespread greyish layer but no structural relations, identified in the same two assays (Layer 2), and the most recent phase (Layer 1), clearly the last, detected throughout the trench, highly eroded by atmospheric agents but particularly important due to the identification of distinct functional sectors that enabled broader considerations of a historical nature on the life of the settlement.[4]

Area 33, Layer 1. Building 33. Shahr-i Sokhta III - Phases 4-3: ca. 2600-2450 BC
Area 33, Layer 2. Shahr-i Sokhta II - Phases 5b: ca. 2620-2600 BC
Area 33, Layer 3. Shahr-i Sokhta II - Phase 5a: ca. 2850-2620 BC

4. The new chronologies of Shahr-i Sokhta created mainly on the basis of the new analyses at C14 from areas 33, 35 and 36 will be published in the next issue of this monograph series (ERSS 3) by the writer, S.M.S. Sajjadi, H. Moradi and P. Vecchio.

Area 33, Layer 3 (Shahr-i Sokhta II - Phase 5a) (ca. 2850-2620 BC)

Phase 3 was detected in L.15, L.16 and L.17 by a survey that made it possible to recognise the continuity of occupation and to identify the original ground level at -0.90 to -0.95 m. This was represented by a layer of beaten earth covered in very fine plaster that is not seen in the subsequent phase (partly due to erosion) (Figs. 11-14).

The excavation strategies and the time remaining did not allow researchers to explore further this architectural phase. It will however be the subject of attention in the 2018 campaign, when the excavation will be extended horizontally in order to gather new data on the most superficial phase, and vertical research will be conducted in order to fully determine the chronological limits of Area 33. Due to the limited nature of the survey, the ceramic horizon is still incomplete. However, on the basis of the current state of knowledge and the evidence gathered during the 2017 campaign, it seems to be dated to Phase 5, detected in the *Central Quarters*. This confirms the homogeneity of pottery production in late Period II and Period III in Shahr-i Sokhta (Phase 5-4), when a certain continuity of use is also seen in Tombs 731 and 725 (Piperno - Salvatori 1982; 1983).

Stratigraphic units - Layer 3 (Shahr-i Sokhta III - Phase 5a) (ca. 2850-2620 BC)

US 10 = L.15; US 11 = L.15; US 12 = L.16; US 13 = L.17; US 15 = L.16.

Levels between -0.35 m and -0.95 m.

Objects: SiS.17.33.35; SiS.17.33.36; SiS.17.33.37; SiS.17.33.38; SiS.17.33.39.

Area 33, Layer 2 (Shahr-i Sokhta II - Phases 5b/4) (ca. 2620-2600 BC)

This phase unfortunately cannot be documented due to its limited presence in the surveys conducted in L.15, L.16 and L.17. It is associated with only one stratigraphic unit, which is distinguished by the presence of a greyish layer lying between Layer 1 and 3, documenting a stratigraphic break with no structural sequence. The limited quantity of ceramic evidence means that it is not possible to fully determine the chronological horizon, which appears to be sandwiched

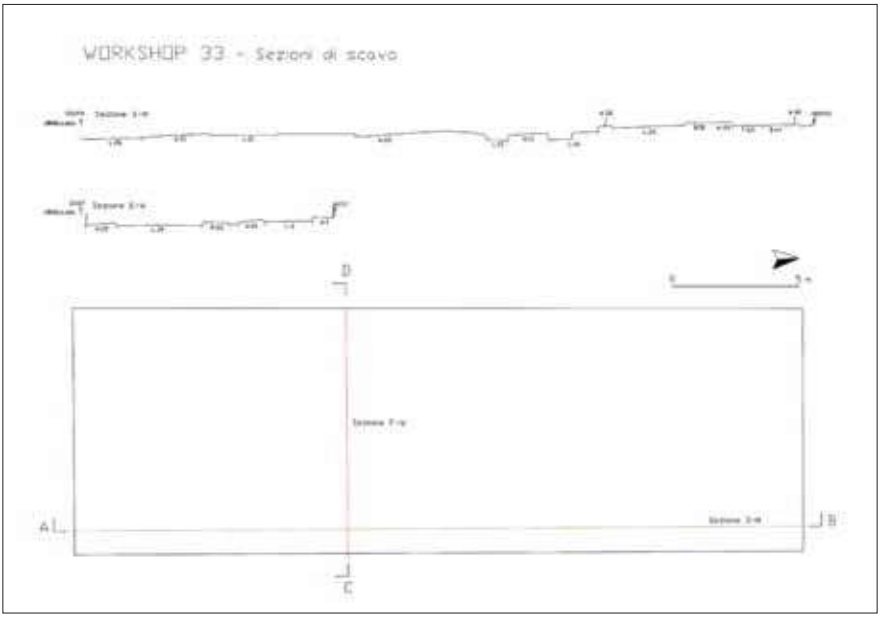


Fig. 11: section north-west of area 33.

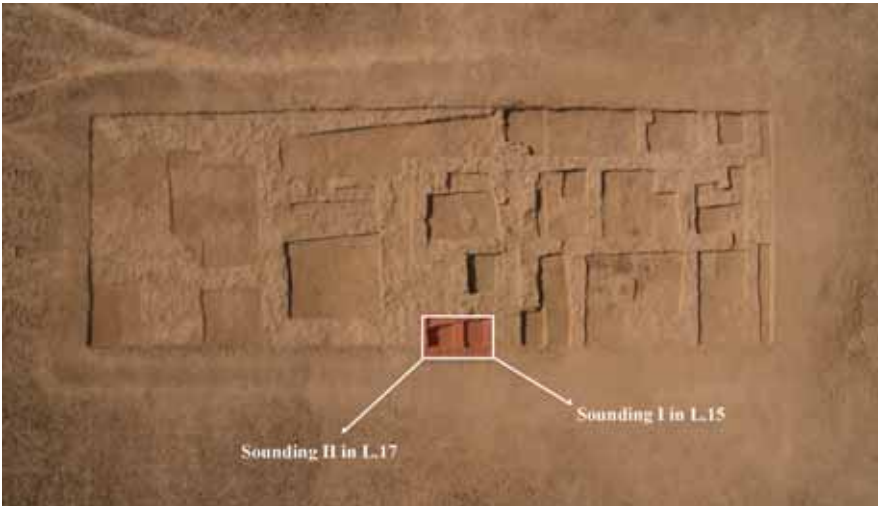


Fig. 12: identification of L.15 and L.17, the subject of surveys during the 2017 campaign.

Fig. 13: detail of L.15 and L.17 from the east.

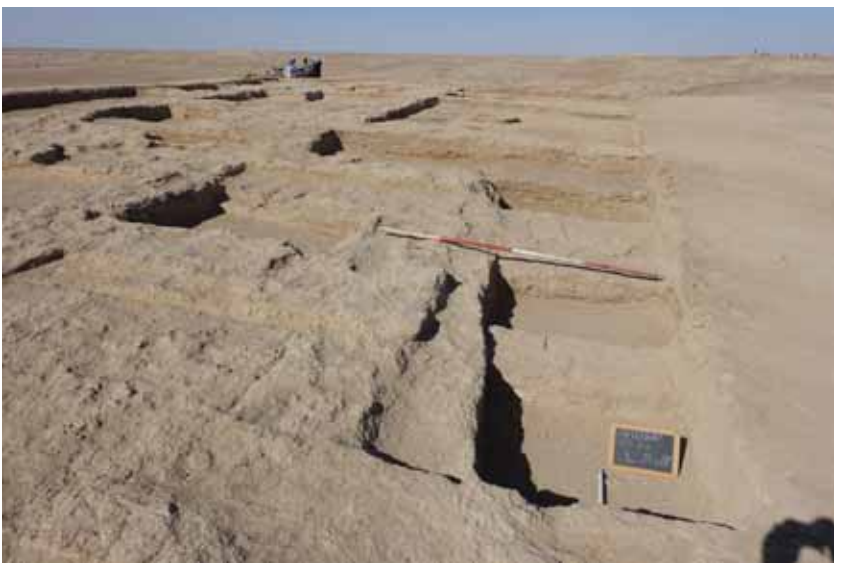


Fig. 14: detail of L.15 and L.17 from the south.

between the two macro-phases, which are better-known in terms of both their ceramics and their architectural evidence.

Stratigraphic units - Layer 2 (Shahr-i Sokhta II - Phases 5b/4) (ca. 2620-2600 BC)
US 40 = L.15
Levels between -0.30 m and -0.35 m.

Area 33 - *Building 33* - Layer 1 (Shahr-i Sokhta III - Phases 4-3) (ca. 2600-2450 BC)
Layer 1 of Area 33 and is still the most thoroughly investigated. The trench, with an area of 300 m^2 (30 x 10 m), has yielded a building (= *Building 33*) with 18 rooms, mostly rectangular or trapezoid due to the imperfect alignment of one of the sides, with walls whose thickness varies from 0.60 m in the northern sector to 1 m in the central sector (Fig. 10). As mentioned above, the walls are conserved to heights of between 0.35 m in the northern stretch and 0.10 m in the southern part due to the varying impact of atmospheric agents, mainly water and wind (Fig. 7). The flooring is composed of a thin layer of beaten earth without plaster-based consolidation, with the exception of L.19. Running all the way cross this room was a corridor paved with brick tiles fired at high temperature measuring 60 x 30 x 10 cm. Also identified was highly compact flooring composed of medium-sized pebbles laid in a thin bed of clay-based material.

Clear structural differences are visible between the building's central part, mostly built with walls of imposing thickness, the western part, represented by long latitudinal rooms running almost parallel to the edge of the excavation, and the northern part, composed of smaller rooms in a more complex arrangement, with thinner walls.

Due to the intense erosion of all the structures, it does not appear possible to trace any passageways or access doors that might indicate the internal circulation, although small clues, which will be studied in greater detail subsequently, might help us to determine the layout and development of the building. In terms of

size (at least 30 metres along the front, which runs the length of the trench on a south-north axis), structural thickness (especially in the central sector) and topographical position (beside the lake), and on the basis of the functional and distributive analyses conducted (see below) and material discovered (see the chapter by the author in this volume) to date, the building is assumed to have played an important role in the socio-economic fabric of the settlement in the late 2nd and early 3rd quarter of the 3rd millennium BC.

Stratigraphic units - Layer 1 (Shahr-i Sokhta III - Phases 4-3) (ca. 2600-2450 BC)

US 2 = L.4; US 3 = L.5; US 4 = L.5; US 5 = L.6; US 6 = L.4; US 7 = L.7; US 8 = L.6; US 9 = L.10;

US 14 = L.10; US 16 = L.4; US 17 = L.19; US 18 = L.20; US 19 = L.20; US 20 = L.21; US 21 = L.5;

US 22 = L.26; US 23; US 24 = L.5; US 25 = L.7; US 26 = L.37; US 27 = L.33; US 28 = L.36+L.37;

US 29 = L.34; US 30 = L.35; US 31 = L.36; US 32 = L.37; US 34 = L.36; US 35 = L.43; US 36 = L.43; US 37 = L.5

US 38 = L.16; US 39 = L.7

Levels between 0 m and -0.30 m.

Finds: SiS.17.33.12; SiS.17.33.13; SiS.17.33.18; SiS.17.33.19; SiS.17.33.20; SiS.17.33.21; SiS.17.33.22; SiS.17.33.23; SiS.17.33.24; SiS.17.33.25; SiS.17.33.26; SiS.17.33.27; SiS.17.33.28; SiS.17.33.29; SiS.17.33.30; SiS.17.33.31; SiS.17.33.32; SiS.17.33.33; SiS.17.33.34; SiS.17.33.40; SiS.17.33.41; SiS.17.33.42; SiS.17.33.43; SiS.17.33.44; SiS.17.33.45; SiS.17.33.46; SiS.17.33.47; SiS.17.33.48; SiS.17.33.49; SiS.17.33.50; SiS.17.33.51; SiS.17.33.52; SiS.17.33.53; SiS.17.33.54; SiS.17.33.56; SiS.17.33.57; SiS.17.33.58; SiS.17.33.59; SiS.17.33.60; SiS.17.33.61; SiS.17.33.62; SiS.17.33.63; SiS.17.33.64; SiS.17.33.65; SiS.17.33.66; SiS.17.33.67; SiS.17.33.68; SiS.17.33.69; SiS.17.33.70; SiS.17.33.71;

SiS.17.33.72; SiS.17.33.73; SiS.17.33.74; SiS.17.33.75; SiS.17.33.76; SiS.17.33.77; SiS.17.33.78; SiS.17.33.79; SiS.17.33.80; SiS.17.33.81; SiS.17.33.82; SiS.17.33.83; SiS.17.33.84; SiS.17.33.85; SiS.17.33.86; SiS.17.33.87; SiS.17.33.88; SiS.17.33.89; SiS.17.33.90; SiS.17.33.91; SiS.17.33.92; SiS.17.33.93; SiS.17.33.94; SiS.17.33.95; SiS.17.33.96; SiS.17.33.97; SiS.17.33.98; SiS.17.33.99; SiS.17.33.100; SiS.17.33.101; SiS.17.33.102; SiS.17.33.103; SiS.17.33.104; SiS.17.33.105; SiS.17.33.106; SiS.17.33.107; SiS.17.33.108; SiS.17.33.109; SiS.17.33.110; SiS.17.33.111; SiS.17.33.112; SiS.17.33.113; SiS.17.33.114; SiS.17.33.115; SiS.17.33.116; SiS.17.33.117; SiS.17.33.118; SiS.17.33.119; SiS.17.33.120; SiS.17.33.121; SiS.17.33.122; SiS.17.33.123; SiS.17.33.124; SiS.17.33.125; SiS.17.33.126; SiS.17.33.127; SiS.17.33.140; SiS.17.33.142; SiS.17.33.143; SiS.17.33.144; SiS.17.33.145; SiS.17.33.146; SiS.17.33.147; SiS.17.33.148; SiS.17.33.149.

Surface

US 1

US 33 in OOI2+OOH4 = L.36+L.43

Finds: SiS.17.33.1; SiS.17.33.2; SiS.17.33.3; SiS.17.33.4; SiS.17.33.5; SiS.17.33.6; SiS.17.33.7; SiS.17.33.8; SiS.17.33.9; SiS.17.33.10; SiS.17.33.11; SiS.17.33.14; SiS.17.33.15; SiS.17.33.16; SiS.17.33.17; SiS.17.33.55; SiS.17.33.128; SiS.17.33.129; SiS.17.33.130; SiS.17.33.131; SiS.17.33.132; SiS.17.33.133; SiS.17.33.134; SiS.17.33.135; SiS.17.33.136; SiS.17.33.137; SiS.17.33.138; SiS.17.33.139 (Tab. 1).

By cross-referencing contextual, associative and stratigraphic data, it is possible to link every individual object and ceramic fragment inside the investigated sectors, enabling subsequent attempts to interpret what has been excavated more broadly. The relationship between the object, its provenance (locus) and the ceramic fragments associated with it (US) is shown in Table 4, which is based on a periodisation of the site established in accordance with the study of the morphology and typology of the ceramics discovered (Tab. 2-3).

Periods	Phases	Large Building Central Quarters	House of the Jar Central Quarters	House of the Foundations Residential Area	House of the Pit Residential Area	House of the Stairs Residential Area	Burnt Building
I	10						
	9						
	8						
II	7						
	6						
	5						
III	4						
	3						
	2						
IV	1						
	0						

Tab. 1: stratigraphic relationship between the main sectors excavated in Shahr-i Sokhta by M. Tosi.

Periods	Tosi's Phases	Area 33	Area 1	Area 20	Area 26	Area 28
I	10					
	9					
	8					
II	7					
	6					
	5					
III	4					
	3					
	2					
IV	1					
	0					

Tab. 2: stratigraphic relationship between Area 33 and the main sectors excavated in Shahr-i Sokhta by S.M.S. Sajjadi.

2.1. Architectural and functional analysis of *Building 33* (Layer 1)

Together with preliminary considerations on the building's development and layout, the distributive and associative analyses of the evidence gathered (see Tab. 3 and 4) help to determine the essential features and aspects of *Building 33*. To these may be added historical assessments that enable a partial reconstruction of the settlement's internal dynamics of growth and socio-economic development.

The excavated portion has shown that the building has a complex layout, with a specific and planned functional division of its internal spaces. The architectural planning seems to follow a pre-determined logic, quite different from the additive and apparently random architectural traditions which entailed starting with a central nucleus that was subsequently expanded in a process of attaching new rooms to the existing structure as needed.

The idea of creating an architectural module on the basis of a well-defined project necessarily has numerous wider implications concerning the settlement of Shahr-i Sokhta as a whole. Before conducting a historical reading however, in addition to the processes underlying the growth of the settlement, it should be considered that the modular development and planning behind *Building 33* can also be recognised in the division of the building into various functional sectors. On the basis of the fixed installations, the material discovered, the archaeological

Chronology (BC)	Period	Area 33 Layer	US	Locus	Find (SiS.17.33.)
2850-2620	SiS II (Phase 5a)	3	10	L.15	35, 36, 38
			11	L.15	33
			12	L.16	39
			13	L.17	37
			15	L.16	
2620-2600	SiS III (Phase 5b/4)	2	40		
2600-2450	SiS III (Phase 4-3)	1	2	L.4	12-13, 18-23
			3	L.5	
			4	L.5	24
			5	L.6	
			6	L.4	25-26
			7	L.7	
			8	L.6	27-32, 34
			9	L.10	
			14	L.10	41-44, 57
			16	L.4	40, 45, 142
			17	L.19	46-50
			18	L.20	58
			19	L.20	
			20	L.21	51-54, 56
			21		59
			22	L.26	60-71
			23	L.36+L.43	78
			24	L.5	
			25	L.7	72, 76-77, 79
			26	L.37	73-75, 80, 88
			27	L.33	81-87, 89-94, 105, 107-108
			28	L.36+L.37	
			29	L.34	103-104, 106, 109
			30	L.35	
			31	L.36	128-139, 147-149
			32	L.37	95-102
			33	L.36+L.43	120-121
				L.36+L.37	110, 112-114, 118, 140, 146
			34	L.36	
			35	L.43	111, 115, 117, 122, 127
			36	L.43	123-124
			37	L.5	125-126
			38	L.16	
			39	L.7	

Tab. 3: archaeological associations in Area 33.

associations detected and the contexts of discovery identified, with the current state of our knowledge, there are at least three (Fig. 15):

1) the kitchens sector in the northern part (cooking and preparation of food) (L.7; L.33, L.36, L.37, L.43) (Figs. 16-31);

2) the stateroom sector in the central-southern part (L.19, L.20, L.21) (Figs. 33-40);

3) the residential sector on a hypothetical upper floor in the central sector of the building (immediately above L.19, L.6, L.10, between W.3, W.8, W.9, W.11, W.12, W.20, W.21, W.22, W.52) (Fig. 31).

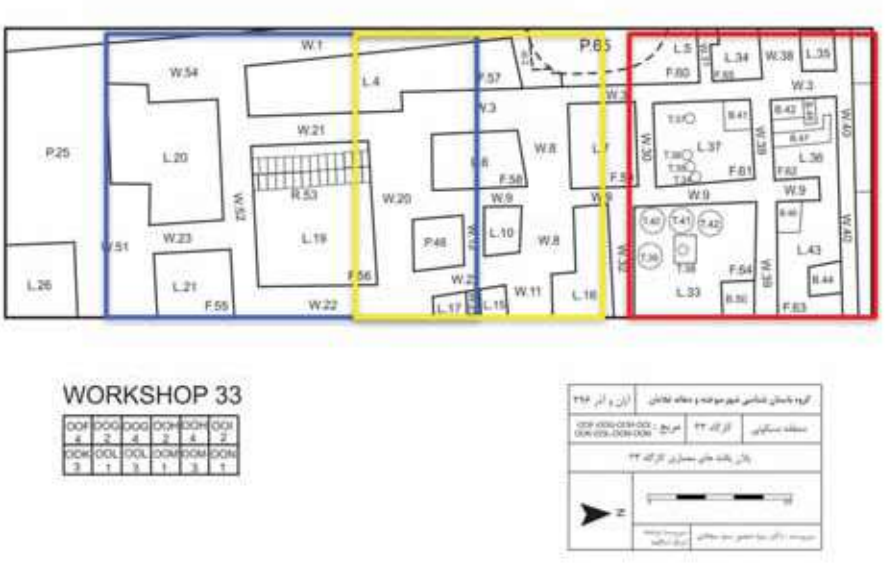


Fig. 15: division of Building 33 into 3 functional sectors.

Locus	Finds	Fixed installations/furnishings
L.4	1 flint arrow head 2 flint fragments 1 flint discard 1 spherical object in bronze 2 loom weights 4 bronze fragments 1 smoothing stone 1 token 1 carnelian bead 1 fragment of an indeterminate stone object	
L.5	1 soapstone seal 3 bronze fragments 1 fragment of a smoothing stone 1 wad of clay 1 sphendonoid weight	
L.6	2 flint blade fragments 1 pestle 3 bronze fragments 2 turquoise beads 1 smoothing stone	
L.7	2 pestles	
L.10		
L.16	1 alabaster bead 1 turquoise bead	
L.19	1 spherical object (a pawn?) 1 indeterminate stone object 1 token	
L.20	1 sphendonoid weight with base 2 lapis lazuli beads 1 flint fragment 1 stone blade 1 stone vessel fragment	
L.21		
L.26	1 carved stone object	
L.33	1 flint discard 2 tokens 1 turquoise bead 1 alabaster vessel fragment	- 5 ovens (T.38-42) - 1 bench (B.50)
L.34		
L.35		

L.36	2 alabaster vessel fragments 5 bronze fragments 1 token 1 zoomorphic clay figurine	- 3 benches (B.42, 47, 49)
L.36+L.37	2 quartz fragments 1 inlaid stone artefact 3 flint blade fragments 1 flint core 1 stone jug handle 10 alabaster vessel fragments 1 bronze awl 1 smoothing stone 1 spherical stone object	
L.36+L.43	12 alabaster vessel fragments 3 pestles 3 tokens 1 flint arrowhead 2 bronze fragments 1 flint core 1 sphendonoid weight with base 1 alabaster bead 1 quartz bead 1 indeterminate stone object	
L.37	1 flint blade fragment 1 grinding stone fragment 1 indeterminate stone object 1 piece of bronze slag	- 4 ovens (T.34-37) - 1 bench (B.41)
L.43	1 token 3 fragments of a smoothing stone 2 fragments of an indeterminate stone object 1 flint blade 1 alabaster vessel fragment	2 bench (B.44, 46)

Tab. 4: archaeological associations in *Building 33*.

Kitchens' sector

The area set aside for the initial processing and cooking of food was identified to the north of the trench, where abundant material was discovered. The sector is mainly organised around 4/5 rooms (L.33, L.36, L.37, L.43 and, given the presence of 2 pestles, perhaps also L.7).[5] Although it has yielded clear evidence of the preparation of food, the situation regarding storage is less clear.

5. It is impossible to determine the function of L.34 and L.35 due to the total absence of material discovered, although they have yet to be fully excavated.

Fig. 17: detail of L.33 from the east.

Fig. 16: L.33 from the east.

Fig. 18: L.34 from the east.

Fig. 19: L.35 from the north.

Fig. 20: L.36 from the north.

Fig. 21: L.36 from the east.

On the basis of what has been excavated, a planning and division of the spaces into functional sectors can also be seen in this macro-unit: the northern wing, composed of L.36 and L.43 (Fig. 32), shows clear traces of the butchering and processing of food including benches and material for cutting (3 smoothing stones, 6 flint blades, 1 bronze awl and numerous metal fragments and indeterminate objects, unfortunately damaged to the point of pulverisation), as well as evidence of crushing and grinding (3 pestles). The presence of accounting aids such as tokens and fragments of stone carved into circular shapes, discovered non-sporadically in both rooms (5 exemplars) suggests a process of accumulation and use of the individual foodstuffs, which were then accounted for in the act of their processing. This form of accounting shows the use of codes and an administration in the hands of kitchen personnel, for whom it perhaps served to organise or quantify their workload. In any case, what has been set out thus far, together with the presence of benches B.42 and B.47 in L.36 and B.44 and B.46 in L.43 (Figs. 20-22; 25-26), provides a fairly consistent picture of the activities performed in this sector, which seems to be connected with (but distinct from) the adjacent area immediately to the south (L.33 and L.37), also designed for the cooking of food. Particularly significant is the presence of 25 alabaster vessel fragments, especially in L.36 and L.43, which document uninterrupted processing and transformation of food, as well as its temporary storage.

Indeed, in addition to two benches plausibly used as work surfaces, L.33 and L.37 have yielded a total of 9 cooking ovens (T.38, T.39, T.40, T.41 and T.42 in L.33 and T.34, T.35, T.36 and T.37 in L.37) (Figs. 22-24; 33-37). One of these (T.38), of a type seen frequently in Shahr-i Sokhta, is composed of a raised platform 20 cm high inside which the combustion chamber can be recognised.

In this reconstruction the north wing (L.36 and L.43) thus appears to be for preparing food prior to the subsequent phase of cooking and combustion (traces of food were extensively found and sampled from the individual combustion spaces). In contrast, the sector immediately to the south should be interpreted as the terminal stage of a process in which the food was first stored, then processed and quantified with the use of accounting tokens, and lastly cooked. This was

Fig. 22: L.37 from the north.

Fig. 23: L.37 from the south.

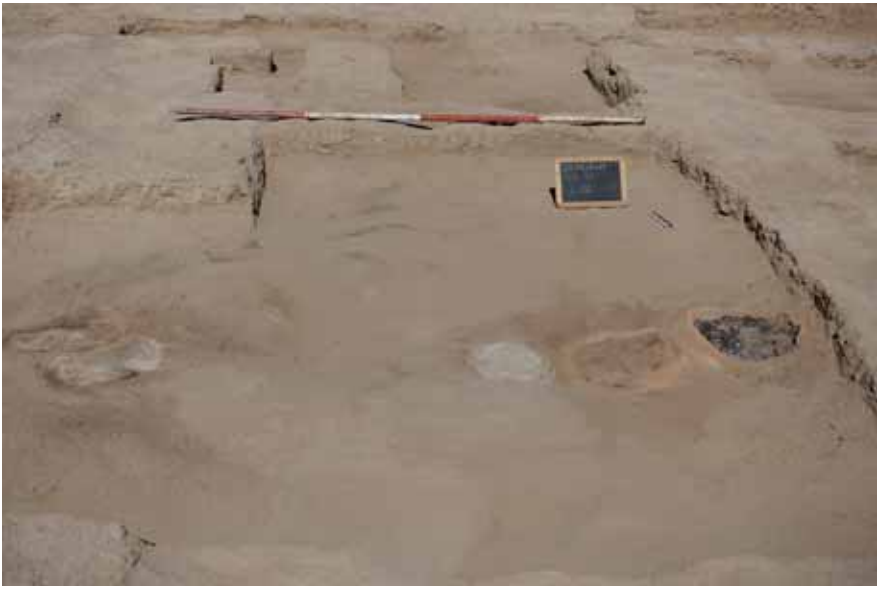


Fig. 24: detail of L.37 from the south.

Fig. 25: L.43 from the north.

Fig. 26: L.43 from the south.

Fig. 27: L.6 from the north.

Fig. 28: L.6 from the west.

Fig. 29: L.10 from the north.

Fig. 30: L.10 from the north-east.

Fig. 31: L.16 from the north.

Fig. 32: functional division of the kitchens sector.

Fig. 33: detail of T.38.

Fig. 34: detail of T.37.

Fig. 35: detail of T.34, T.35 and T.36.

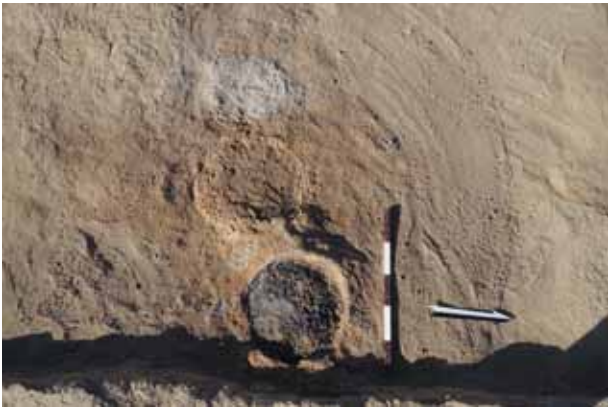


Fig. 36: detail of T.34, T.35 and T.36.

Fig. 37: detail of T.35 and T.36.

clearly a tried and tested system that suggests a food cycle of which only the first phase, that of storage, is missing, although in general it seems to be documented throughout the northern sector of the trench (Fig. 32).

The adhesion to clear cycles as part of a planned repetitive system that required strong procedural standardisation, as shown by the organisation of the spaces, the circulation within them and the contextualisation of the material discovered, provide a consistent picture not only of the organisation of the work and its likely specialisation, but also of the social relations and dynamics that are believed to have existed inside the building. As we will seek to explore below, in a preliminary and non-exhaustive way, the evidence gathered, in all its forms, plausibly points to a specialised and differentiated system with procedural codes and organisational layouts in line with a form of social organisation involving some type of hierarchical structure and hence the presence of an elite group.

Courtyard sector

The central sector can be recognised in the elongated courtyard L.19, around which lie L.20, L.21, L.4 and L.17, in an arrangement with two possible exits, towards either L.20 or L.6 (Figs. 39-45). Indeed, the entire central sector was designed around courtyard L.19 (Figs. 40-43), which, as an open-air structure, is believed to have been used for representation and/or receiving.

That this was a courtyard is clearly shown by the flooring, quite different from the other rooms of the building, which was composed of highly compacted medium-sized stones laid in a layer of beaten earth covered in plaster, a technique usually reserved for open-air spaces. Further evidence can be found in its size (4.10 x 4.90 m, greater than the other rooms), the presence of walls ranging from 1 m to 1.3 m in thickness, and lastly the presence of two rows of glazed mud brick tiles 60 x 30 x 10 cm (R.53), which cross L.19 from south to north, marking a corridor linking the southern and northern parts of the building, whose purpose was to enable the building's occupants to cross the open-air area when it was

Fig. 38: general view of the central section.

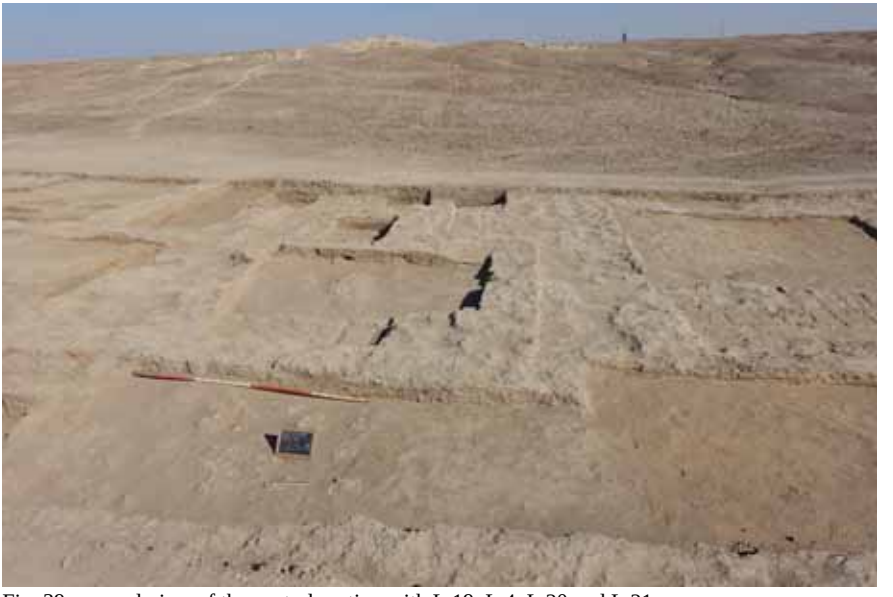


Fig. 39: general view of the central section with L.19, L.4, L.20 and L.21.

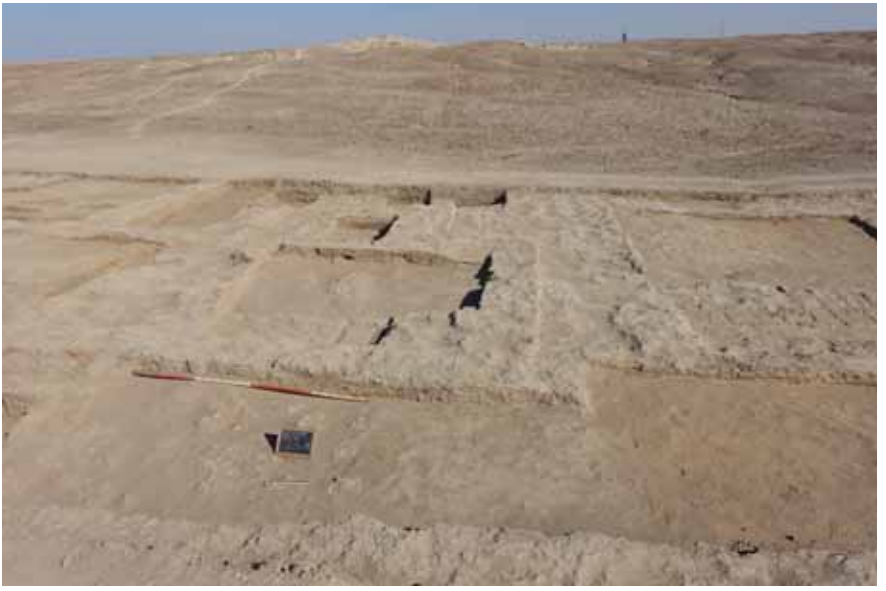


Fig. 40: general view of Building 33 from the south-west.

Fig. 41: L.19 from the north.

Fig. 42: L.19 from the east.

Fig. 43: L.19 from the west.

Fig. 44: L.20 from the north.

Fig. 45: L.20 and L.21 from the east.

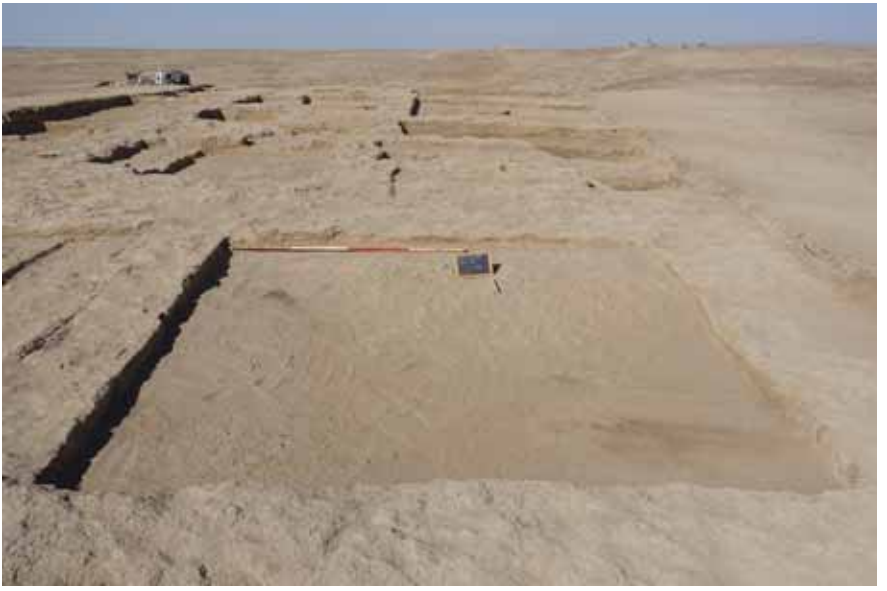


Fig. 46: L.19 from south.

raining (Fig. 46).

The use of a paved corridor crossing the courtyards was to become widespread in later periods, although it must be admitted that our knowledge of public and private architecture in Iran in the 3rd millennium BC is far from complete. Evidence can be found in the excavations conducted by the Iranian mission in sector 26 (Sajjadi - Moradi 2017: 152-158), attributable to the late 3rd and early 2nd millennia BC, where a sort of walkway, with mud brick tiles of similar craftsmanship and dimensions, runs parallel to the outer structures of the architectural complex discovered. Analogies can also be found with sites in more recent western regions, such as the "Governors' Building" of Tell Asmar/ Eshnunna in Diyala, dated to the Neo-Sumerian period (Fig. 47), where a paved corridor was built across the main courtyard of the building (Frankfort - Lloyd - Jacobsen 1940: plate 1); Level IV of Courtyard 1 of the palace of Niqmepa in Alalakh/Tell Atchana (Fig. 48), the courtyard granting access to the palatial complex (Woolley 1955: 113, fig. 44); and the religious complex of Choga Zanbil

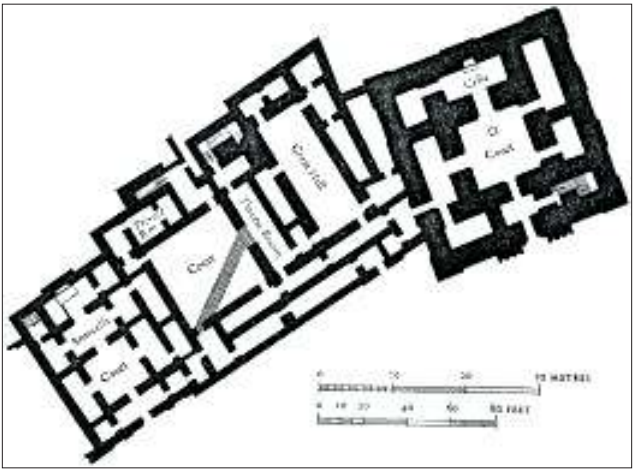


Fig. 47: palace of the Governors of Eshnunna (from Frankfort - Lloyd - Jacobsen 1940: plate 1).

Fig. 48: palace of Niqmepa in Alalakh (from Woolley 1955: 113, fig. 44).

Fig. 49: paved corridor of the temple of Shimut and Belet-Ali in Choga Zanbil.

Fig. 50: paved corridor of the temple of Adad and Shala in Choga Zanbil.

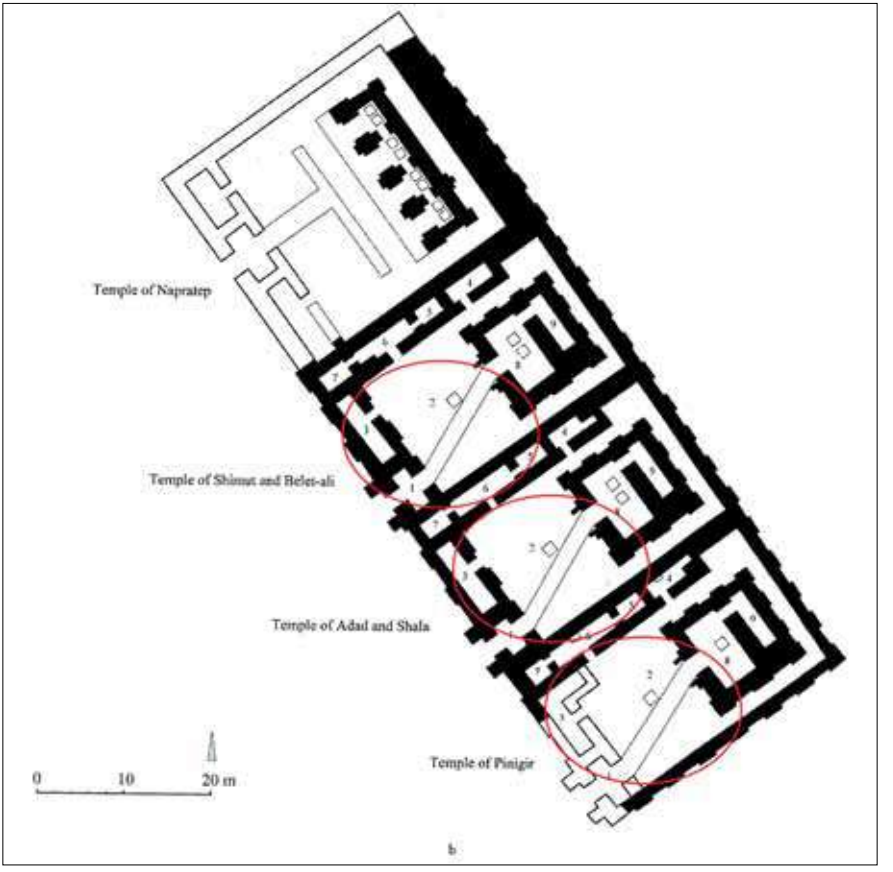


Fig. 51: plan of the complex of the temples of Shimut and Belet-ali, Adad and Shala and Pinigir (Ghirshman 1968: figs. 2-3).

(Figs. 49-51), the courtyards granting access to the sanctuaries of the mid-Elamite complex dedicated to Shimut and Belet-ali, Adad, Shala and Pinigir (Ghirshman 1968: 9-41, figs. 2-3).

This tradition seems to have been particularly widespread in the second half of the 2nd millennium BC in the more western regions, although its presence in buildings and urban layouts in the late 3rd millennium BC, in areas neighbouring Mesopotamia and in Area 26 of Shahr-i Sokhta, helps to contextualise the evidence gathered from Courtyard 19 of *Building 33*. With the current state of

our knowledge, no further comparison is possible with other settlements of the Iranian Plateau, due to the paucity of evidence that might enable more extensive reflections. It appears significant however that this still nascent architectural formula, not yet fully defined, had already been experimented with during the third quarter of the 3rd millennium BC in Shahr-i Sokhta, in a region where wind and rain represented major determinants of architectural specification in a structural sense.

A more wide-ranging analysis that takes account the plan of the architectural structures organised around the courtyard of *Building 33* is hindered by both the absence of comparative material in the adjacent regions and the incomplete nature of our knowledge of the architectural complex as a whole, given that its perimeter has yet to be established. However, preliminary considerations can be made on the basis of certain not-insignificant clues that may be found among the buildings excavated in Shahr-i Sokhta and with reference to tenuous evidence documented in the more western regions, perhaps the best-known in terms of the extent and continuity of the excavations.

The alignment of two passageways and the creation of an axial circulation via a direct linear route without corners (as deduced from the paved corridor in L.19) seems to be a specific feature of the residential complexes of Shahr-i Sokhta, clearly seen in the *House of the Stairs* (in all of its occupational phases dated to Shahr-i Sokhta II and III), *House of the Pit* (Shahr-i Sokhta II), *House of the Foundations* (Shahr-i Sokhta II-III) (Mariani - Tosi 1987: 40), *Building 1* (Sajjadi - Moradi 2014: fig. 5) and *Building 20* (Sajjadi - Moradi 2014: fig. 13). However, with the exception of the more recent buildings excavated by the Iranian team, in the complexes investigated by the Italian mission of Maurizio Tosi the circulation always rather strangely follows a longitudinal alignment with two courtyards, in sharp contrast with the transversal axis of circulation in L.19, where only one courtyard has been identified (Figs. 52-55).

The circulation in L.19, on the short side, through R.53, shows closer comparisons with models known in the Courtyard 191 of the East Complex

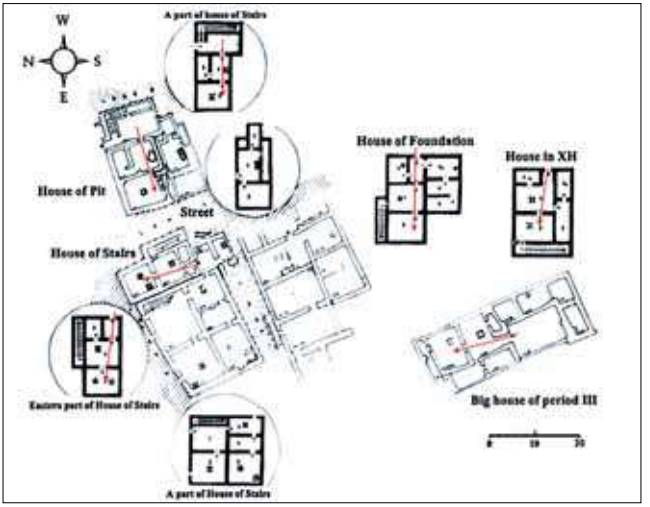


Fig. 52: architectural complexes excavated by the Italian Archaeological Mission headed by M. Tosi (Mariani - Tosi 1987: 40).

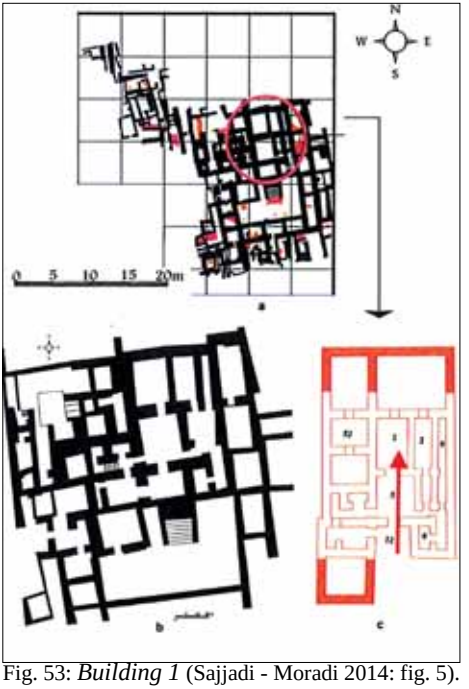


Fig. 53: *Building 1* (Sajjadi - Moradi 2014: fig. 5).

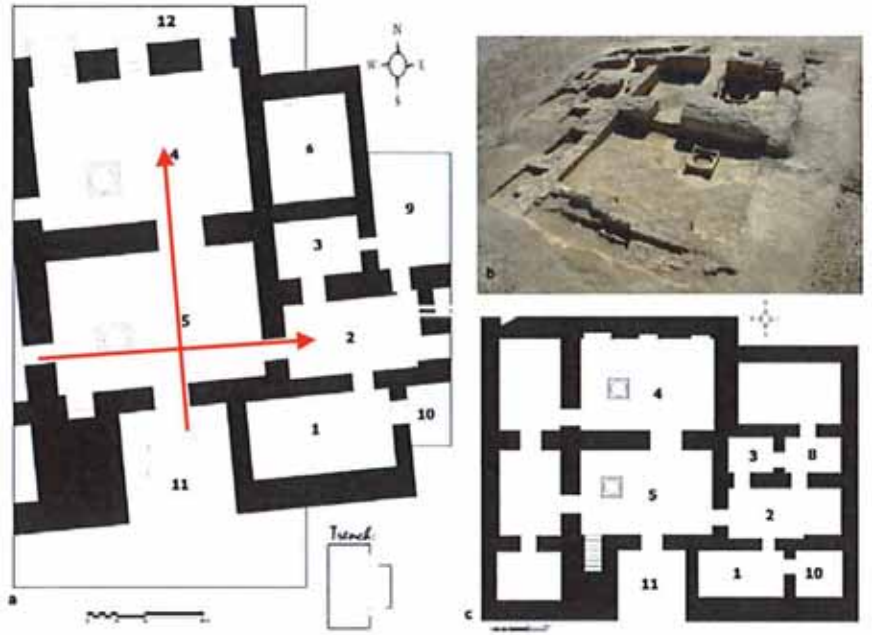


Fig. 54: *Building 20* (Sajjadi - Moradi 2014: fig. 123).

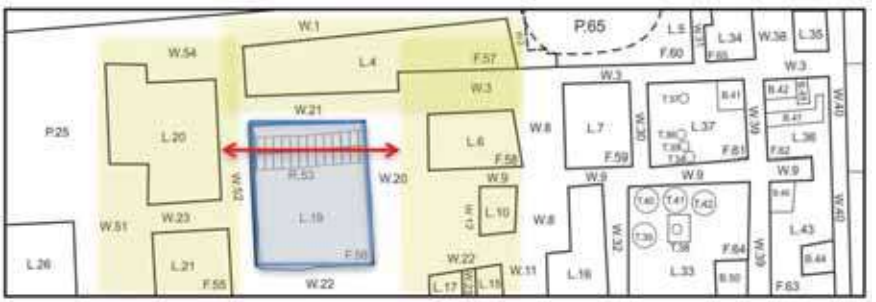


Fig. 55: courtyard L.19.

(AXIV) (Mofidi-Nasrabadi 2018: fig. 25.2b-c) (Fig. 56), the *House of Rabibi* on Level A XII (Steve et al. 1980: fig. 6) (Fig. 57) and Level 2 of the Maison du Culte (AXV) of the Ville Royale in Susa (Mofidi-Nasrabadi 2018: fig. 25.1) (Fig. 58). This type of layout includes the presence, in front of the courtyard, of a room (in our case to the east of W.22, beyond the current limit of the excavation) with an axis perpendicular to the courtyard itself, which has been interpreted as either a residential area or a further stateroom sector (Mofidi-Nasrabadi 2018: fig. 25.3).

Fig. 56: East Complex (AXIV) in Susa (Mofidi-Nasrabadi 2018: 25.2b-c).

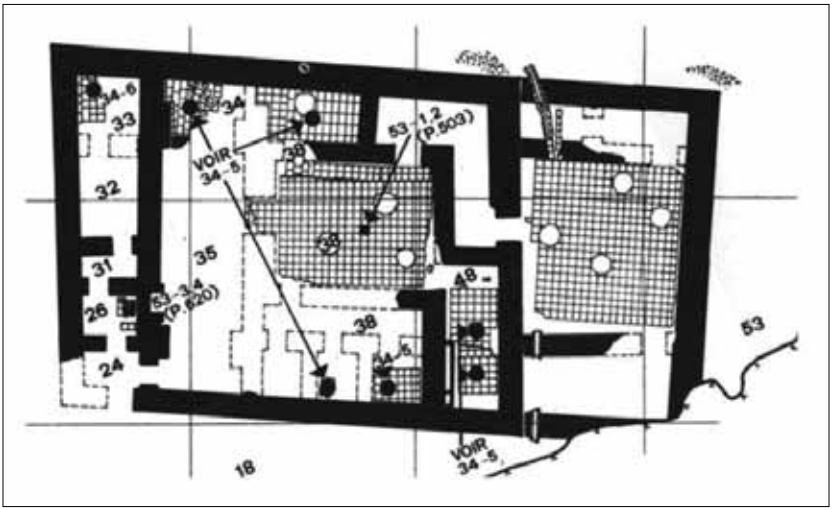


Fig. 57: *House of Rabibi* (AXII) in Susa (Steve *et al.* 1980: fig. 6).

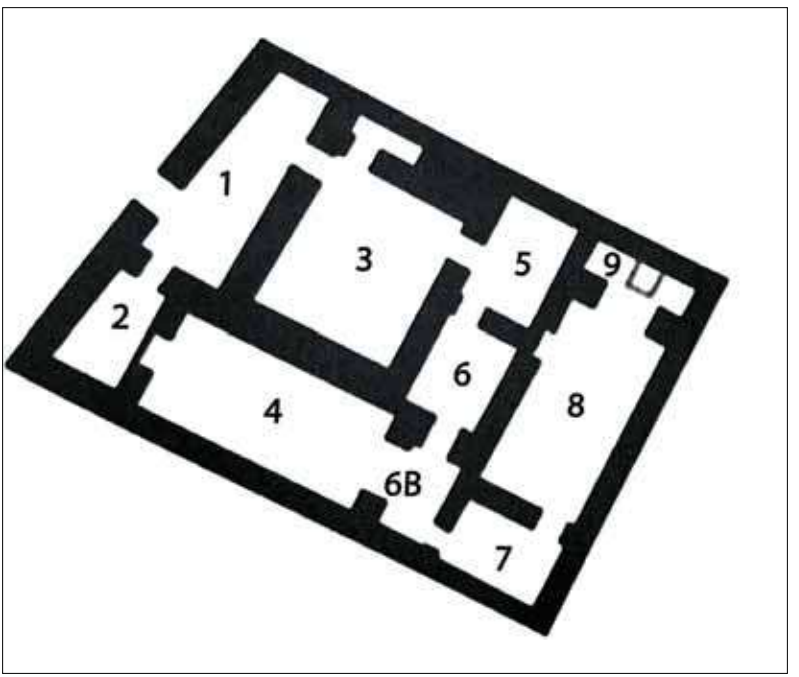


Fig. 58: *Maison du Culte* (AXV) in Susa (Mofidi-Nasrabadi 2018: fig. 25.1).

It should also be pointed out, on the basis of what has been excavated so far, that the typical dwelling type in Shahr-i Sokhta included the juxtaposition of two main rooms, in some cases two courtyards, quadrangular and of similar dimensions, perfectly aligned with each other and with peripheral rooms positioned on their short sides. This type, which envisages direct access on to the first courtyard after an introductory portico, is clearly seen in *Building 20* (in Courtyards 4 and 5) (Fig. 54), *Building 1*, Level E (in Spaces 1 and 5) (Fig. 53), the dwelling units in XH, the *House of the Foundations* and the final phases of the *House of the Stairs* (Fig. 52), which exemplify a specific architectural category, recurring with few variants in the mid 3rd millennium BC, but it is unknown in *Building 33*.

Residential sector

The presence of a residential sector on an upper floor was hypothesised on the basis of a series of clues, mainly structural, including the presence of a courtyard in L.19, the thickness of the walls around the courtyard itself, reaching 2.20 m in places (W.20) and the presence of a quadrangular room (P.48) completely paved with mud brick tiles laid directly on the ground, which seems to be a structural platform on which rested a proposed staircase leading to an upper floor (Fig. 31). A paved platform inside a quadrangular room, of relatively small dimensions (1.90 m square), also appears in Mundigak IV.3 (Casal 1961: fig. 40) (Fig. 59) and Mohenjo-daro, in Area DK, near the southern part ("Intermediate III level") of the building (Mackay 1937: Pl. XVI) (Fig. 60).

If P.48 is recognised as a structural room granting access to a second floor, probably in the central sector above one of the rooms arranged around Courtyard L.19, then it should also be recognised as a residential area, separate from the staterooms and kitchens which occupied the lower part of the building, in accordance with a clearly defined structural plan.

2.2. Final considerations on *Building 33*

The extensive damage to the structures throughout the excavated area, especially the intense washout towards the south, have made it impossible to gather further

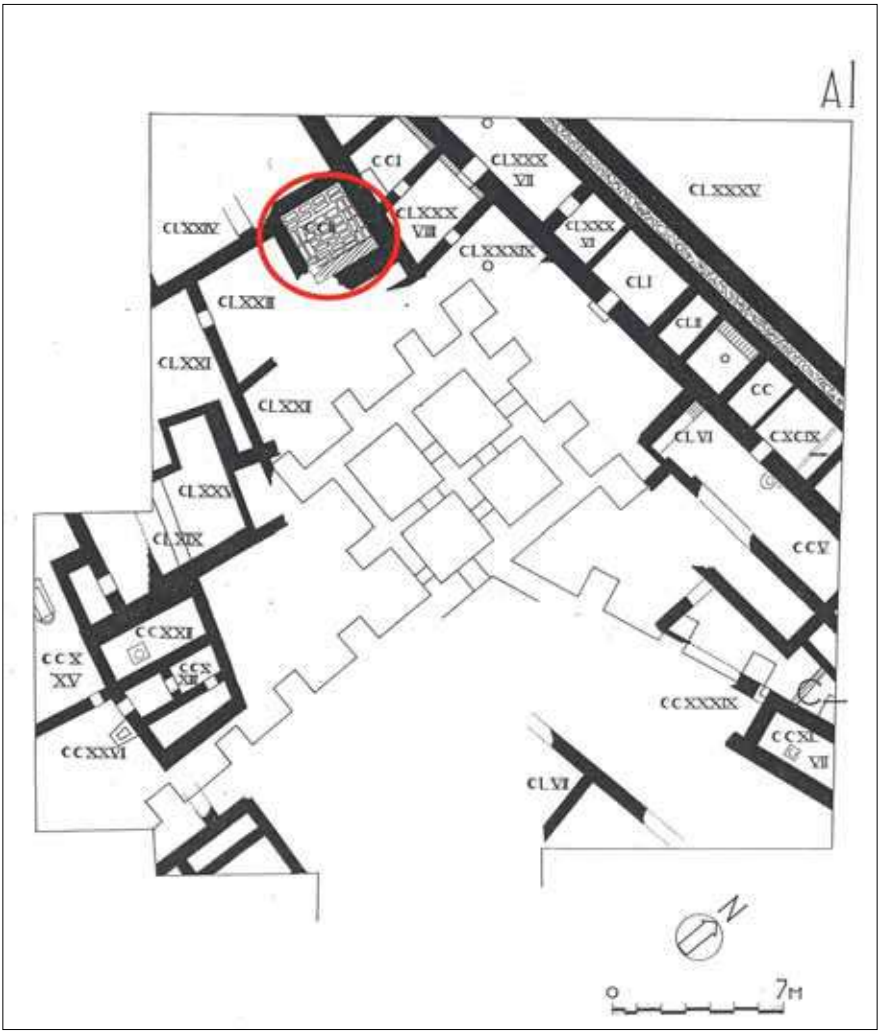


Fig. 59: building in Mundigak IV.3 (Casal 1961: fig. 40).

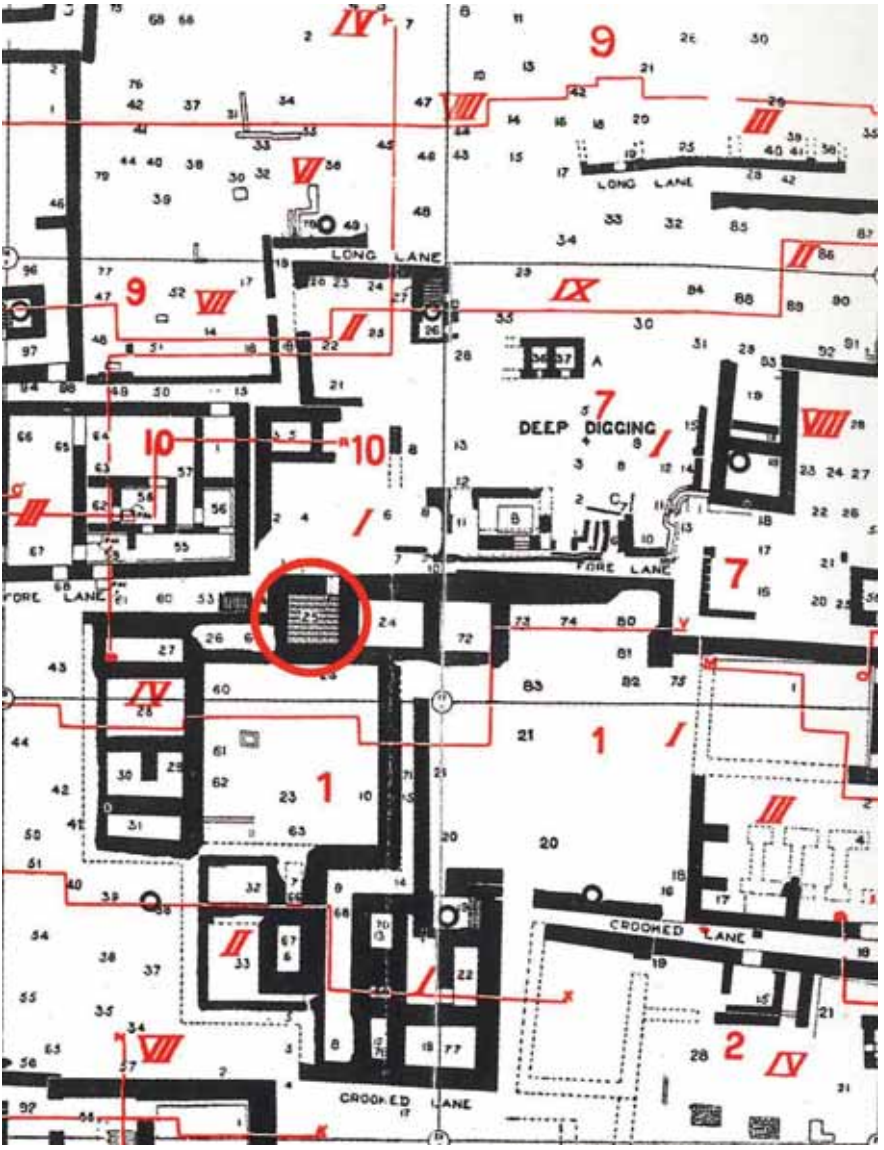


Fig. 60: area DK, in the southern part of the building (“Intermediate III level”)(Mackay 1937: Pl. XVI).

data on the building as a whole and specifically in the southern sector, which exhibits strong erosion and conserves less than half of the profile of one row of mud bricks. It is thus difficult to make considerations that might help to fully determine the significance and plan of *Building 33*. However, on the basis of the evidence gathered and the deductions made, some specific points can be tackled in an attempt to frame *Building 33*, on a preliminary basis, within a broader analysis aimed at the historical reconstruction of the settlement.

The impossibility of establishing the perimeter of *Building 33* impedes any attempt to seek reliable typological analogies. It is hard to hypothesise, much less understand, the organisational layout that may have characterised the areas not yet investigated. The images acquired by the drone (Fig. 5) highlight traces visible on the surface indicating a complex arrangement of rooms in the part near the eastern edge of the trench. However, thanks to the pronounced depression in this sector (as shown by the natural drainage channels), it is uncertain whether the excavated structures are coeval with those simply detected by the drone and the geophysical prospections. Thus, although Layer 1 of *Building 33* was built over structures from the preceding period (Layer 3), as reconstructed by the assays conducted mainly in L.15 and L.17, it remains uncertain whether the superficial structural traces belong to the eastern continuation of *Building 33*.

On the basis of current knowledge, further considerations can be made concerning the building's perimeter and whether W.1 might be interpreted as the western façade of the complex. This is suggested by its distinctive linearity on a south-east/north-west axis, parallel to the orientation of the internal walls of the complex. One of the objectives of the next campaign will be to verify the continuation northwards of W.1 until its assumed meeting with W.40 and to determine the western and northern limits of *Building 33*. This would make a decisive contribution to our understanding of the plan and the architectural aspects of what has been excavated to date.

Building 33 seems to have been built to a carefully thought-out plan governing its spaces and functions, conceived before its construction, which appears to have been guided by pre-established architectural codes that reflect canons not

previously seen in the more complex private and public buildings discovered in Shahr-i Sokhta. Specifically, this architectural complex appears to have been conceived as a well-defined homogeneous structure, which does not include any subsequent additions to the original building. It also appears to have been conceived in its entirety within a topographically free area that enabled a new approach in terms of layout, unencumbered by the topographical factors affecting the surrounding sectors.

This topographical planning is matched by an architectural module, also the fruit of the rationalisation imposed on rooms, spaces and internal circulation, which divides the internal environments of *Building 33* into functional sectors. The archaeological associations and the contexts of discovery reveal distinct functional environments, the expression of precise architectural planning which in turn may be considered a clear indicator of an elite context. Indeed, along with the planning in terms of both the topography (including the relationship of the building to the surrounding urban context) and the architecture (within a closed context), the functional division of the internal space of *Building 33* must be considered further evidence of the building's role and significance. The further division of the kitchens sector into two main areas including one for food processing (to the north in L.36 and L.43) and one for cooking (to the south in L.33 and L.37), the sheer number of places set aside for food preparation (T.34, T.35, T.36, T.37, T.38, T.38, T.40, T.41, T.42) and benches used for this purpose (B.41, B.42, B.44, B.46, B.47, B.49, B.50) and the overall functional specialisation of Building 33 all appear to be clear references to the elite nature of the complex.

Indeed, the deliberately planned concentration of areas with different functions, each of which exhibited further internal diversification, in specific parts of the building, must be considered clear testimony of the pre-eminence and social prestige of those who inhabited the complex. By itself, the elaborate floor plan and size of the kitchens sector, which has yet to be excavated in its entirety, provides us with significant clues as to the nature of the group that resided in Building 33. It is clear that the functional division of an architectural complex is

the expression of a diversification and possible specialisation of labour, as well as indicating the existence of hierarchical social relationships that have yet to be clarified in Shahr-i Sokhta.

To summarise, (1) the rationalisation of the topographical space in which *Building 33* stands, (2) its programmatic architectural code, (3) its monumental character (to date a façade 30 m long running right across the excavated trench has been discovered, although its end point is still unknown), (4) the division of the building into functional sectors and (5) the material of fine craftsmanship that has been discovered inside it (see in particular the alabaster vessels for daily use, all discovered in the northern sector and the numerous beads made of carnelian, alabaster, lapis lazuli and turquoise) are all clues that help to recognise in *Building 33* a monumental building with a clearly pre-eminent role in the social fabric of the settlement. Moreover, the building's residents are believed to have belonged to the elite or one of the elites present in Shahr-i Sokhta, in Phase 4 and the subsequent Phase 3, a period believed to have been characterised by a hierarchical organisational structure on the basis of the investigations conducted in the central part of the necropolis, in burials attributed to Phases 8-7 and then reused in Phase 4-3. Based on the study of the grave goods of G.12, 106, 118, 604, 711, 731 and 1003, these investigations have made it possible to identify a distinct and well-defined social group, known as the "Group of Phase 3" (Piperno - Salvatori 1982; 1983: 177), and have also provided evidence of "morphological-cultural convergences" with cultural manifestations from the west.

The excavated portion of *Building 33* in Shahr-i Sokhta does not permit definitive assessments of a historic or archaeological nature. However, it does provide new starting points for research and open up new fields of intervention that might help to understand the settlement in the mid 3rd millennium BC. Although this is not the place to tackle Shahr-i Sokhta's complex *intra-situ* socio-economic relational dynamics (Ascalone 2020), we can, with our current state of knowledge, propose the presence, in the middle and the third quarter of the 3rd millennium BC, of an elite that is believed to have played a significant role in the processes of control and social development in the biggest settlement in Sistan.

3. The pottery of Area 33

The ceramic sequences presented here are divided by production type and morphological variation on the basis of the diagnostic fragments discovered, which show strong parallels with the stratigraphic sequences excavated in the *Central Quarters*, especially in *Room CDXLV* of the *Big Building* (Salvatori - Vidale 1997: 23-26). The shortage of ceramic evidence from other sites in the region belonging roughly to the same period hinders the search for a chronological benchmark that might give greater precision to the reconstructed sequences, although, as mentioned, the seriations of the nearby *Central Quarters* provide decisive parallels in terms of both morphology and production aspects. The highlighted sequences follow the cultural phases identified by the Italian Mission headed by M. Tosi during a total of nine excavation campaigns conducted from 1968 to 1978. Considering this foundation, in my opinion still generally credible, it was decided to divide Phase 5 of the site into two sub-periods, as suggested by S. Salvatori and M. Vidale (1997: 40). This approach was also supported by the data regarding the ceramic material discovered in Tombs 731 and 725 (Piperno - Salvatori 1982; 1983), in which the late Phase 5 pottery seems to coexist with that of early Phase 4 (Salvatori - Tosi 2005: 286), which began, according to 14C analyses, no later than 2500 BC. The three phases identified in Area 33 must therefore be understood as lasting from a period of transition between late Phase 5/early Phase 4 (Layer 2-3 of Area 33) to a second period of transition between late Phase 4 and the beginning of Phase 3 (Layer 1), the latter represented, albeit sporadically, by specific decorative and morphological markers such as the leaf filled with oblique and parallel lines and the slightly less elongated beakers without decoration, of a cruder craftsmanship than what is seen in Phase 4.

Considering the general framework therefore, two architectural phases (and three stratigraphic sequences) are currently recognised, while their pottery horizons seem to belong to Phases 5 and 3, corresponding to the late Period II and Period III of the site.

3.1. Layer 3 ceramics

The ceramic fragments belonging to Layer 3 of Area 33 are associated with 5 stratigraphic units (SiS.17.33.10-13, 15) corresponding to the excavation of the infill of Rooms L.15, L.16 and L.17 (Ascalone 2019b). Given the limited nature of the survey, the material currently consists of a small number of broadly homogeneous types compared with the subsequent phase, in line with what has been excavated in the *Central Quarters*. The few specimens selected are mostly *Buff Ware*, with just one fragment of *Red Ware*.

The beakers have the distinctive features of Phases 5-4, recognisable in their elongated shape and decoration consisting of oblique bands bounded by two parallel lines (Plate 1: 1-4). In the same vein there are bowls with low carination, also distinctive of Phase 4 of the site (Plate 1: 5), also frequently represented by specimens with an "S" profile, in use in late Period II and early Period III in Shahr-i Sokhta. A single type of jar was found by the surveys, well rooted in the ceramic horizon of Shahr-i Sokhta 5-5b/4 (Plate 1: 7-8) (form J2 in the reconstructed sequences of the *Central Quarters*).

Stratigraphic Units - Layer 3 of Area 33 (Shahr-i Sokhta III - Phases 5b/4) (ca. 2800-2620 BC)
SiS.17.33.10 = L.15; SiS.17.33.11 = L.15; SiS.17.33.12 = L.16; SiS.17.33.13 = L.17; SiS.17.33.15 = L.16.

3.2. Layer 1 ceramics

The ceramic types of *Building 33* appear highly consistent, characterised by extensive use of the wheel and a well purified, homogeneous clay. The morphologies and types of production correspond to Period III, Phase 4 of Shahr-i Sokhta, although some later creations documented exclusively in Phase 3 suggest the existence of a final phase of occupation of *Building 33* plausibly datable to the early 25th century BC, before its definitive abandonment. With the exception of just two fragments of burnished grey ceramics (SiS.17.33.23/5 and

SiS.17.33.5/9), dated to Period IV of the site (see also Salvatori - Vidale 1997: 71) and widely attested in the *Burnt Building*, no specimen of the final phase of occupation has been discovered. The occupation of Area 33 until Phase 3 of the site seems to be proven however by the presence of the so-called "Pear-shaped Beakers", not painted and less tapering than the previous production, seen in Red Ware (Plate 2: 2) and Buff Ware specimens (coexisting with the more traditional Phase 4 specimens), as well as by the presence of decorative types that represent a distinctive feature of Shahr-i Sokhta III:3 (Plate 2: 3, 4-9) and are not seen in Phase 4. As a whole however, the ceramic horizon of the final period of occupation of *Building 33* corresponds to Phase 4. This is confirmed by both a quantitative and statistical analysis of its forms and a study of its decorative types, all of which, on the basis of comparisons with what has already been excavated in Shahr-i Sokhta, can be attributed to Phases 5A and 4, with the sporadic presence of more ancient specimens associated with Phase 6 (see Salvatori - Vidale 1997: figs. 98: 3, 105: 1, 110: 1, 114: 5), such as SiS.17.33.17/2 (Plate 2: 10, see also Salvatori - Vidale 1997: fig. 105: 3).

A total of 33 stratigraphic units were identified and associated with verified contexts, with just one not associated with a specific structure (*locus*).

Stratigraphic Units - Layer 1 of Area 33 (Shahr-i Sokhta III - Phases 4-3) (ca. 2600-2450 BC)

SiS.17.33.2 = L.4; SiS.17.33.3 = L.5; SiS.17.33.4 = L.5; SiS.17.33.5 = L.6; SiS.17.33.6 = L.4; SiS.17.33.7 = L.7;

SiS.17.33.8 = L.6; SiS.17.33.9 = L.10; SiS.17.33.14 = L.10; SiS.17.33.16 = L.4; SiS.17.33.17 = L.19

SiS.17.33.18 = L.20; SiS.17.33.19 = L.20; SiS.17.33.20 = L.21; SiS.17.33.21 = L.5; SiS.17.33.22 = L.26;

SiS.17.33.23; SiS.17.33.24 = L.5; SiS.17.33.25 = L.7; SiS.17.33.26 = L.37; SiS.17.33.27 = L.33

SiS.17.33.28 = L.36+L.37; SiS.17.33.29 = L.34; SiS.17.33.30 = L.35; SiS.17.33.31 = L.36; SiS.17.33.32 = L.37;

SiS.17.33.34 = L.36; SiS.17.33.35 = L.43; SiS.17.33.36 = L.43; SiS.17.33.37 = L.5; SiS.17.33.38 = L.16;
SiS.17.33.39 = L.7

5.2.1. Types

The ceramics of *Building 33* can be classified into three macro-types: *Reddish Ware* (RW), *Buff Ware* (BW) and *Fine Black Painted Grey Ware* (FBGW). With the exception of the latter, all are characterised by similar morphological and decorative classes that are broadly homogeneous in terms of the type of clay and production technique. Within the two main types (RW and BW) the following sub-types can be recognised:

Buff Ware

- Black Painted Buff Ware (= BBW)
- Buff Slipped Reddish Ware (= BSRW)
- Black Painted Buff Slipped Reddish Ware (= BBSRW)
- Red Painted Buff Slipped Reddish Ware (= RBSRW)

Reddish Ware

- Black Painted Reddish Ware (= BRW)
- Red Painted Reddish Ware (= RRW)

Buff Ware

Buff Ware and its black-painted variant are present in high percentages and were produced in Shahr-i Sokhta. It is made of carefully purified clay with small-to-medium sized inclusions and includes both open and closed forms, mostly consisting of the traditional pear-shaped beakers, bowls and jars with and without a high neck.

As sub-categories within this macro-type, it was decided to include Buff Slipped Reddish Ware (BSRW), together with its variants with decorations painted in black (BBSRW) and red (RBSRW), often not recognised as distinct categories

and inserted in a more generic analysis of so-called *Buff Ware*. The colour of the slip on clays ranging from red to reddish is identical to the colour of the BW clay itself, leading to frequent errors of typological classification between the two distinct sub-productions. All these types are common in the ceramic assemblage of Shahr-i Sokhta III.

Concerning the functional aspects, the beakers belong to the tradition of Phase 4, with the exception of some specimens (Plate 3: 3) rooted in the ceramic horizon of Phase 3. The elongated shapes with standardised decoration consisting of continuous zigzag lines forming triangular spaces bounded by two horizontal lines (or two pairs of horizontal lines) running parallel to each other (Plate 3: 1-2, 4) are the best-known type, although filled-in triangles and triangles inserted in metopal spaces alternating with other decorative motifs also appear. More ancient forms include SiS.17.33.11/3 (Plate 1: 4; Phase 5), which however remains an isolated specimen, inserted in a ceramic horizon limited to Phase 4 and in part Phase 3 of the site, as well as the preceding phase 1 of the building.

The open forms also include bowls with flared walls of a more ancient tradition which become frequent from Phase 6, perhaps even Phase 7, of the site (Plate 1: 5; Plate 3: 5-9). They include specimens that curve inwards slightly before flaring at the rim (Plate 4: 1), with the carenation positioned at 1/3 the height of the body of the vessel and walls that are slightly everted (Plate 4: 2-3), nearly vertical (Plate 4: 4-5) and slightly inverted (Plate 4: 6). The first two forms appear to be of an older tradition, which emerged during Period II of the site, while the third seems to be characteristic of Phase 4 of Shahr-i Sokhta.

Bowls with higher carenation, mostly halfway up the height of the body of the vessel, include *S-shaped* specimens (seen in the *Central Quarters* from as early as Phase 6) (Plate 4: 7-9), while specimens SiS.17.33.13/5, SiS.17.33.37/6 and SiS.17.33.34/9 represent less open types (Plate 4: 10-11). To this rather homogeneous horizon may be added two widely produced forms, i.e. bowls with a slight carenation more than halfway up the height of the body of the vessel and a slightly everted rim that gives the profile of the vessel an almost imperceptible S-shape (Plate 4: 12; Plate 5: 1-6) and bowls with low carenation and a slightly

everted rim on a more vertical wall (Plate 5: 7-12; Plate 6: 1-6). These two types, which in statistical terms represent the most widespread forms in the corpora discovered, belong to the ceramic horizon of the first phases of Period III of the site, especially Phases 5b, 4 and 3.

In addition to the above-mentioned pear-shaped beakers, the closed forms include jars with and without a neck (Plate 8: 1-5), with further divisions depending mostly on the profile of the body and the rim. The most common types are the jars with a low neck, on the dividing line between the two macro-classes identified, mostly with everted rims just above the body of the vessel (Plate 7: 6-7; Plate 8: 1-4), the jars with a high vertical neck, which seem to reflect older forms dated to Phases 6 and 5 of the site (Plate 8: 5-9), the jars with a slightly tapering body and inverted neck (Plate 8: 10-12) and especially the jars with a flared neck seen in SiS.17.33.1/1; SiS.17.33.1/5; SiS.17.33.4/2; SiS.17.33.14/1; SiS.17.33.18/8; SiS.17.33.27/3; SiS.17.33.29/1; SiS.17.33.34/10; SiS.17.33.35/2; SiS.17.33.36/1 (Plate 8: 13; Plate 9: 1-9).

Fine Black Painted Grey Ware

Although scattered, this type is attested in the ceramic corpus of *Building 33* and fits into the chronological framework reconstructed for the area. Its presence at Shahr-i Sokhta was previously noted in the *Eastern Residential Area* (Tosi 1968: 53; 1969: 312-313) and the *Central Quarters* (Salvatori - Vidale 1997: 70-72), in which it accounts for around 1% of the total assemblage, in line with what has been documented in Area 33. The historical and terminological issues linked to this ceramic category (*Faiz Mohammed Ware* or *Emir Ware*) have been extensively debated over the years, first by W.A. Fairservis (1956; 1959), then by R. Wright (1984) and most recently by B. Mutin, L.D. Minc, C.C. Lamberg-Karlovsky and M. Tosi (2017), who attributed its production to the period from the late 4th to the mid 3rd millennium BC, partly on the basis of comparisons with the so-called *Shahi-Tump Ware* discovered in the Pakistani Makran (Mutin 2013: 84-90) and also found in Shahr-i Sokhta (Sajjadi 2003: fig. 26; Piperno - Salvatori 2007: figs. 609, 773). Although this type is also seen as being used

exclusively for burial practices (Stein 1931: 94, 98-99), ample evidence of it has been found throughout Shahr-i Sokhta in the main inhabited areas of the settlement. Its spread in south-east Iran is also documented at Tepe Yahya (Potts 2001: figs. 1.6K, 2.25D), Bampur (de Cardi 1970: fig. 22.141), Damin (Tosi 1970: fig. 10a) and Khurab (Mutin *et al.* 2017 145, fig. 3: 13), where it is associated with traditional local ceramic horizons, unlike what seems to be the case in southern Baluchistan and especially in Kech-Makran around Shahi-Tump and Miri-Qalat, where it is part of an endogenous tradition with a broader geographical distribution and time-scale, dating back to the 4th millennium BC.

The FBGW of Shahr-i Sokhta seems to be divided into two main types on the basis of its production features: a coarser, locally produced one (Biscione 1984) and another, finer and plausibly imported, exemplified by specimens from *Building 33*, which mostly consist of open forms, including bowls with flared walls and large flat plates (Plate 9: 10).

On the basis of (a) its distribution in the funerary environments of Shahr-i Sokhta, mostly associated with the richest of the excavated contexts, topographically close to each other (Bonora *et al.* 2000: 505, 512-514, 518), (b) its composition, made from a highly purified clay with no mineral or vegetable inclusions, and (c) its morphological features, with fairly thin walls, this type can be considered the expression of an elite, perhaps with links to the more southerly regions of Baluchistan, as far as the coast of Kech-Makran, at least until the mid 3rd millennium BC.

Reddish Ware

Red ceramics with a slight orientation towards paler tones were a distinctive local product in Shahr-i Sokhta throughout Period III of the site, although they are considerably less abundant than so-called *Buff Ware*. RW includes forms with both black-painted and red-pained decoration, with a further sub-type, of finer craftsmanship, made of well-purified clay with thin walls.

From a functional point of view, although the morphological variables appear to be much more restricted than the more common BW, the forms fall within the

same ceramic horizon, belonging to Phases 4 and 3 of the settlement. Specifically, the classic typological macro-division between open forms (bowls) and closed forms (jars with and without a neck) can also be applied to RW and its sub-types. Among the bowls, older types persist, consisting of open forms with straight flared walls (Plate 10: 1-2), appearing from Period II of the site onwards, forms with low carenation and vertical walls, bowls with a pronounced S-shape (Plate 10: 3) or a slight S-shape (Plate 10: 4-5) and above all bowls with carenation halfway up the height of the body of the vessel and an everted rim, which became widespread at the beginning of Period III (Plate 10: 6).

Among the closed forms, jars without a neck predominate. These include specimens with an ovoid profile (Plate 11: 1-2) and a modest shoulder (Plate 11: 3-4). Among the jars with a neck, those with a barely perceptible neck (Plate 11: 5) and a high flared neck predominate.

Just one specimen of a beaker has been discovered (Plate 11: 6) and there are very few specimens of fine ceramics. A fragment (Plate 11: 7) must be considered an import from the region of Kerman on the basis of its close parallels with the Konar Sandal corpus (see Madjidzadeh 2008: fig. 23, fourth fragment from the left, and fig. 25). There are also parallels with Bampur IV1 (de Cardi 1970: fig. 25: 246), IV3 (de Cardi 1970: fig. 24: 230) and Mundigak IV1 (Casal 1961: figs. 76: 259-260, fig. 80: 285).

The ceramic corpus from Area 33 appears to be fairly homogeneous and consistent if compared with the stratigraphic sequences reconstructed in the *Central Quarters*, which yield a horizon mainly corresponding to Phases 5a, 5b/4 and 3 of the settlement. The forms seem to be limited to the two main macro-types (BW and RW), neither of which are marked by any specific morphological features, with a general tendency among the open forms to have the carenation in the lower part of vessels produced in the later periods, which tend to replace the older forms with straight and flared walls. Leaving aside the beakers, extensively described by M. Vidale (1984), the remaining closed forms point to a more complex framework if included in a broader analysis that seeks to identify common patterns of development throughout the occupation of the site. For

example, jars with an accentuated and flared neck seem to be more frequent than forms without a neck, although morphologically older forms can be recognised in many specimens already attested in Period II of the site.

The presence, albeit limited, of FBGW and forms imported from the Halil and Bampur valleys seems to shift the site's cultural centre of gravity towards the more southern regions, especially the more complex civilisations of Jiroft and the Makran coast, parallels with which can be recognised in Konar Sandal and Miri Qalat.

The objective of the next few years will be to link the reconstructed ceramic sequences with the planned isotopic analyses in order to provide a reliable chronological framework for the types detected that can support the most recent studies conducted by S. Salvatori and M. Tosi (2005). The challenge for the future will be to provide, together with a reliable ceramic sequence, anchored to the stratigraphic units excavated, an absolute chronology of reference that can serve as a benchmark for the individual stratigraphic units and consequently all of the remaining material discovered in archaeological association.

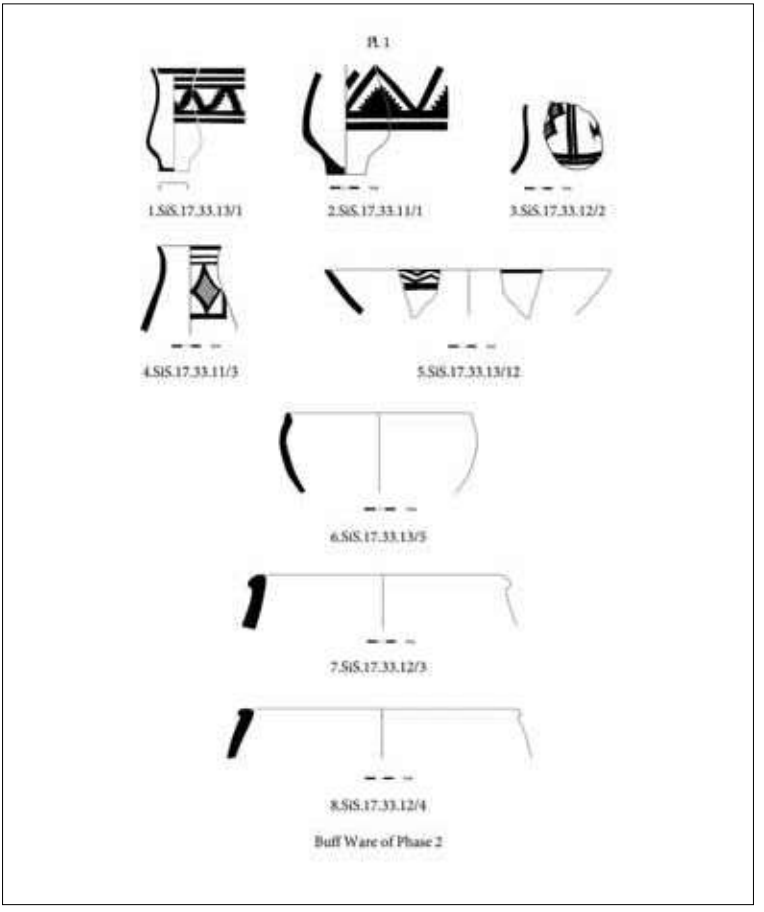
4. The finds of Area 33

A total of 149 objects were discovered during the excavation campaign conducted in Shahr-i Sokhta in November-December 2017, five of which belonged to the building's oldest phase of occupation, discovered below the flooring in L.15, L.16 and L.17 (Ascalone 2019c). Although this is not the place in which to conduct an analysis and study of the individual artefacts,[6] we shall make some simple and preliminary considerations and give a brief presentation of the corpus of objects discovered.[7]

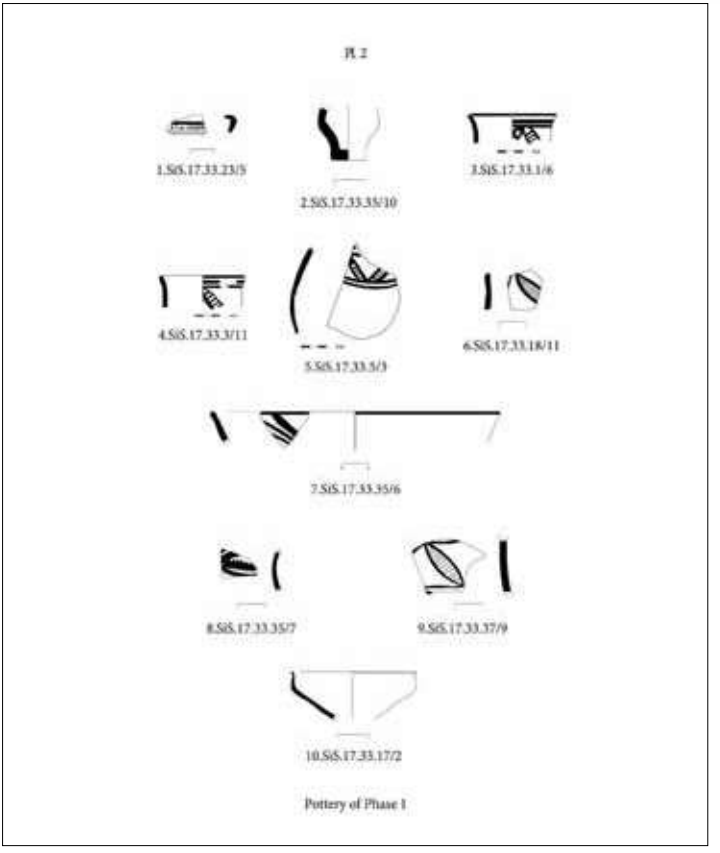
6. In addition to the palaeobotanical, archaeozoological, anthropological topographical and environmental studies, monographs on individual classes of object have been assigned to members of the mission: the bone awls to Alberto Potenza, the alabaster vessels to Silvia Festuccia and the seals and weights to the author. I would like to thank S.M.S. Sajjadi, who supported and made available the study of the material gathered by the mission which he has headed since 1997.

7. The nomenclature used to identify the excavated objects follows an overall and consecutive order which specifies the site (SiS), the year of discovery (17), the area of provenance (33) and its progressive excavation number.

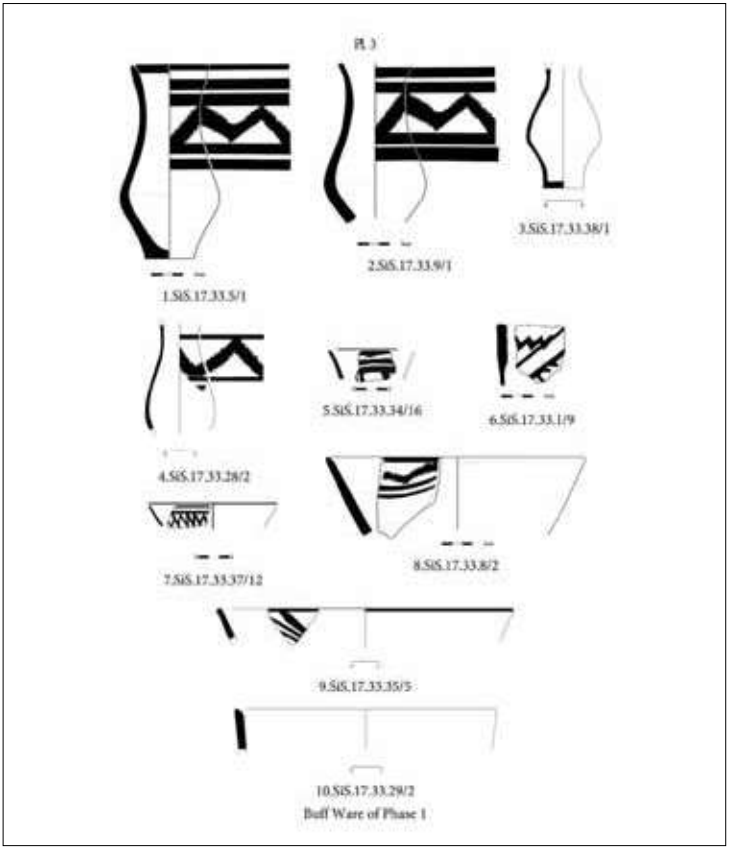
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.13/1	2	L.17	Wheel	High	10YR 7/4	Bu Slip Br Paint
2	SiS.17.33.11/1	2	L.15	Wheel	High	7.5YR 7/4	Bu Slip Br Paint
3	SiS.17.33.12/2	2	L.16	Wheel	High	10YR 7/4	Br Paint
4	SiS.17.33.11/3	2	L.15	Wheel	High	2.5Y 7/4	Bu Slip Br Paint
5	SiS.17.33.13/12	2	L.17	Wheel	Medium	10YR 8/2 (out.) 7.5YR 7/4 (in.)	Bu Slip Br Paint
6	SiS.17.33.13/5	2	L.17	Wheel	High	7.5YR 6/6	Bu Slip
7	SiS.17.33.12/3	2	L.16	Wheel	High	10YR 8/2	
8	SiS.17.33.12/4	2	L.16	Wheel	High	10YR 8/3	



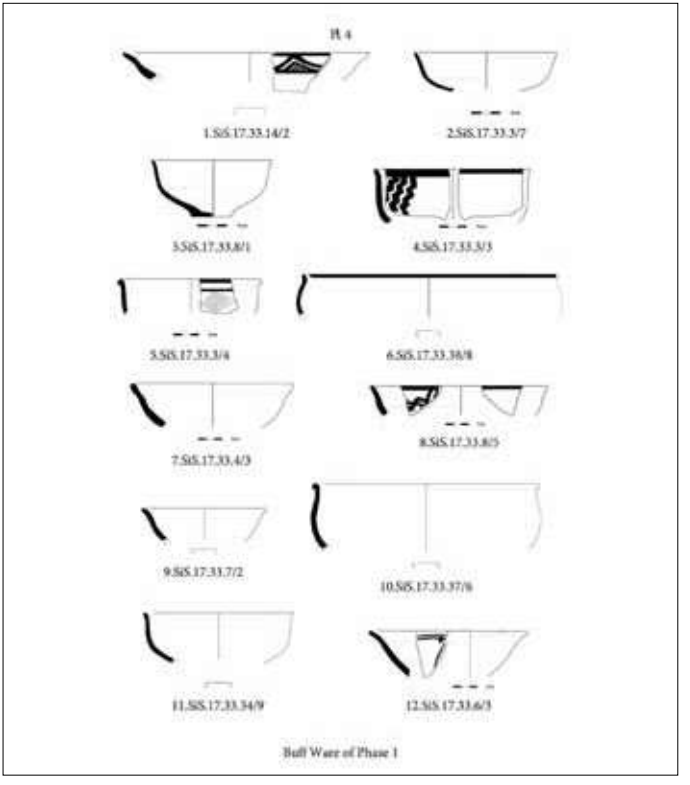
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.23/5	1	Surface	Wheel	High	5Y 5/1	Bl Paint
2	SiS.17.33.35/10	1	L.43	Wheel	High	10YR 7/3	
3	SiS.17.33.1/6	1	Surface	Wheel	High	7.5YR 6/4	W Slip Br Paint
4	SiS.17.33.3/11	1	L.5	Wheel	High	10YR 6/4	W Slip Br Paint
5	SiS.17.33.5/3	1	L.6	Wheel	High	5YR 6/6	R Slip Br Paint
6	SiS.17.33.18/11	1	L.20	Wheel	High	2.5Y 7/4	Br Paint
7	SiS.17.33.35/6	1	L.43	Wheel	High	10YR 7/3	Br Paint
8	SiS.17.33.35/7	1	L.43	Wheel	High	10YR 7/4	W Slip Bl Paint
9	SiS.17.33.37/9	1	L.5	Wheel	High	5YR 5/4	W Slip Br Paint
10	SiS.17.33.17/2	1	L.19	Wheel	High	7.5YR 7/4	W Slip



No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.5/1	1	L.6	Wheel	High	2.5Y 6/6	Bu Slip Br Paint
2	SiS.17.33.9/1	1	L.10	Wheel	High	7.5YR 7/4	Br Paint
3	SiS.17.33.38/1	1	L.16	Wheel	High	10YR 8/4	
4	SiS.17.33.28/2	1	-	Wheel	High	2.5YR 6/6	Bu Slip Br Paint
5	SiS.17.33.34/16	1	L.36	Wheel	High	10YR 7/3	Bu Slip Bl Paint
6	SiS.17.33.1/9	1	Surface	Wheel	High	2.5Y 7/4	Bu Slip Br Paint
7	SiS.17.33.37/12	1	L.5	Wheel	High	2.5Y 6/1	Bl Paint
8	SiS.17.33.8/2	1	L.6	Wheel	High	2.5Y 8/4	Bu Slip Br Paint
9	SiS.17.33.35/5	1	L.43	Wheel	High	2.5Y 8/2	Br Paint
10	SiS.17.33.29/2	1	L.34	Wheel	High	5YR 7/4	

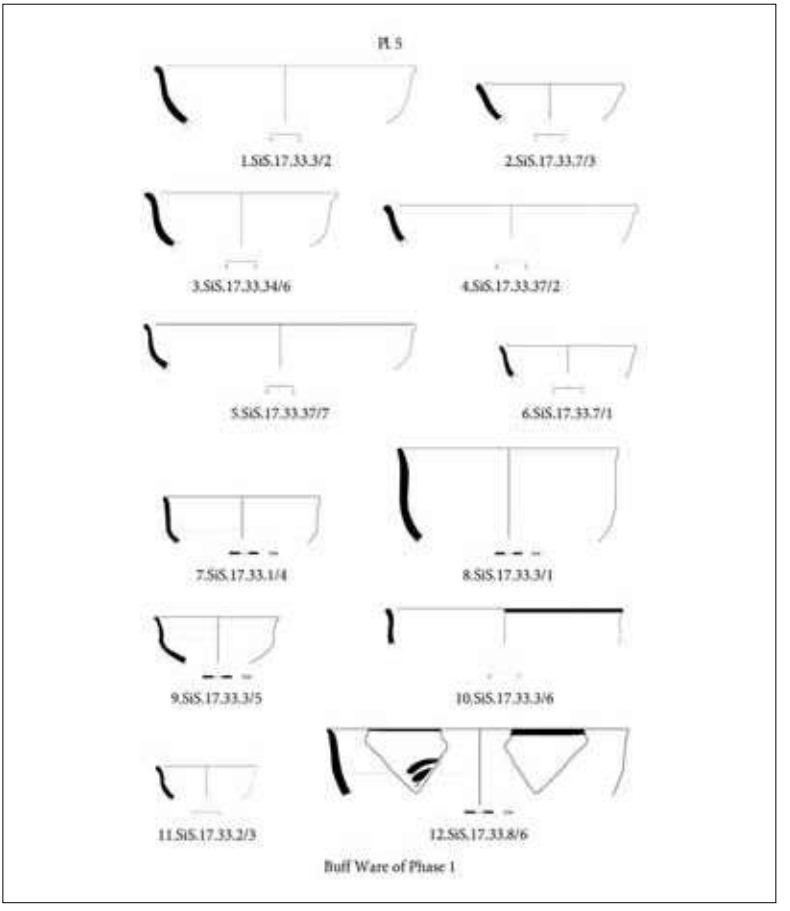


No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.14/2	1	L.10	Wheel	High	10YR 8/2	Bu Slip Br Paint
2	SiS.17.33.3/7	1	L.5	Wheel	High	2.5Y 7/4	
3	SiS.17.33.8/1	1	L.6	Wheel	High	2.5Y 7/3	Bu Slip
4	SiS.17.33.3/3	1	L.5	Wheel	High	2.5Y 6/3	Bu Slip Br Paint
5	SiS.17.33.3/4	1	L.5	Wheel	High	2.5Y 7/4	Br Paint
6	SiS.17.33.38/8	1	L.16	Wheel	High	2.5Y 8/3	Bu Slip Br Paint
7	SiS.17.33.4/3	1	L.5	Wheel	High	10YR 6/6	
8	SiS.17.33.8/5	1	L.6	Wheel	High	2.5Y 7/3	Bu Slip Br Paint
9	SiS.17.33.7/2	1	L.7	Wheel	High	10YR 6/4	
10	SiS.17.33.37/6	1	L.5	Wheel	Medium	10YR 7/4 (out.) 5YR 6/6 (in.)	Bu Slip
11	SiS.17.33.34/9	1	L.36	Wheel	High	10YR 8/3	
12	SiS.17.33.6/3	1	L.4	Wheel	High	2.5Y 7/3	Bu Slip Br Paint



Buff Ware of Phase 1

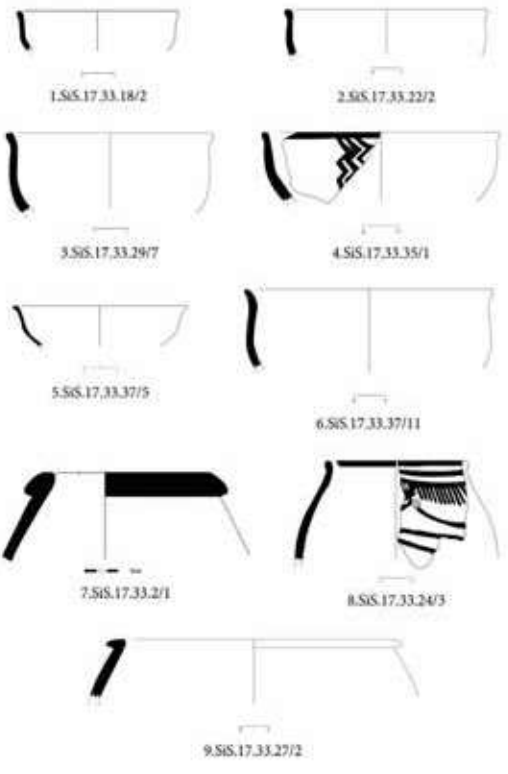
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.3/2	1	L.5	Wheel	High	5YR 6/6	Br Paint
2	SiS.17.33.7/3	1	L.7	Wheel	High	2.5Y 7/4	Bu Slip Br Paint
3	SiS.17.33.34/6	1	L.36	Wheel	High	7.5YR 6/4	Bu Slip
4	SiS.17.33.37/2	1	L.5	Wheel	High	7.5YR 7/4	Bu Slip
5	SiS.17.33.37/7	1	L.5	Wheel	High	5Y 7/2	
6	SiS.17.33.7/1	1	L.7	Wheel	High	2.5Y 6/4	Bu Slip
7	SiS.17.33.1/4	1	Surface	Wheel	High	7.5YR 6/4	
8	SiS.17.33.3/1	1	L.5	Wheel	High	5YR 6/6	
9	SiS.17.33.3/5	1	L.5	Wheel	High	2.5Y 8/2	
10	SiS.17.33.3/6	1	L.5	Wheel	High	2.5Y 7/4	
11	SiS.17.33.2/3	1	L.4	Wheel	High	2.5Y 7/3	Bu Slip Bl Paint
12	SiS.17.33.8/6	1	L.6	Wheel	High	2.5Y 8/4	Br Paint



Buff Ware of Phase 1

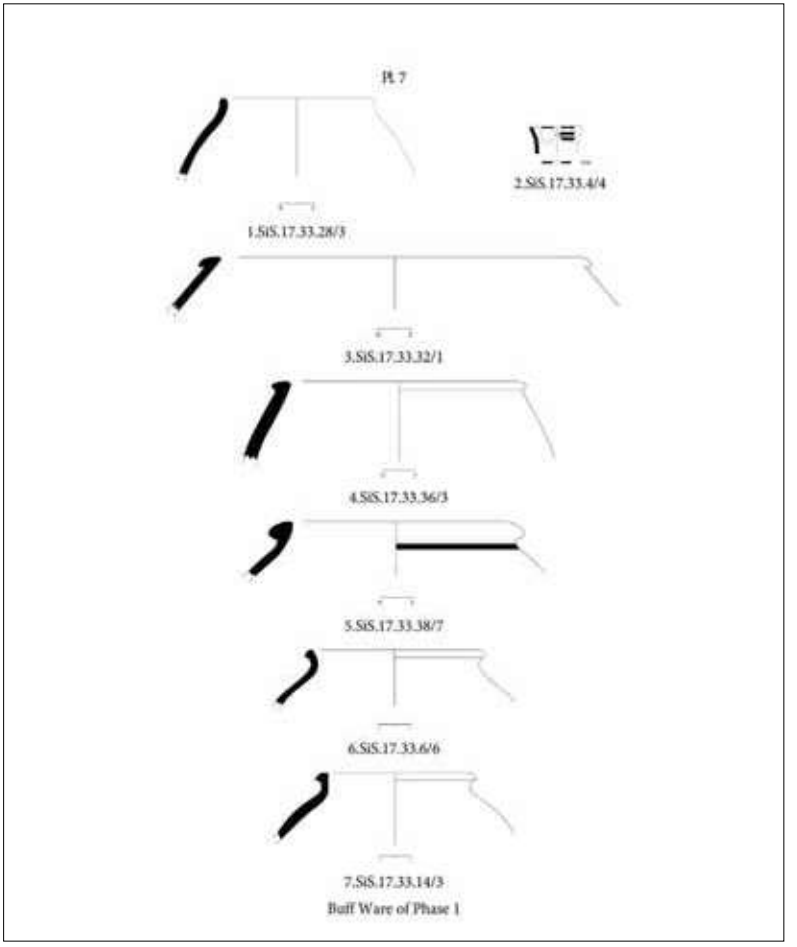
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.18/2	1	L.20	Wheel	High	7.5YR 6/6	Incised
2	SiS.17.33.22/2	1	L.26	Wheel	High	7.5YR 7/4	R Paint
3	SiS.17.33.29/7	1	L.34	Wheel	High	10YR 7/4	Bu Slip
4	SiS.17.33.35/1	1	L.43	Wheel	High	5YR 5/6	Bu Slip Br Paint
5	SiS.17.33.37/5	1	L.5	Wheel	High	5Y 7/1	
6	SiS.17.33.37/11	1	L.5	Wheel	High	10YR 8/3	R Paint
7	SiS.17.33.2/1	1	L.4	Wheel	High	2.5Y 7/3	
8	SiS.17.33.24/3	1	L.5	Wheel	High	10YR 8/3	Br Paint
9	SiS.17.33.27/2	1	L.33	Wheel	High	7.5YR 6/3	Bu Slip

Pl. 6

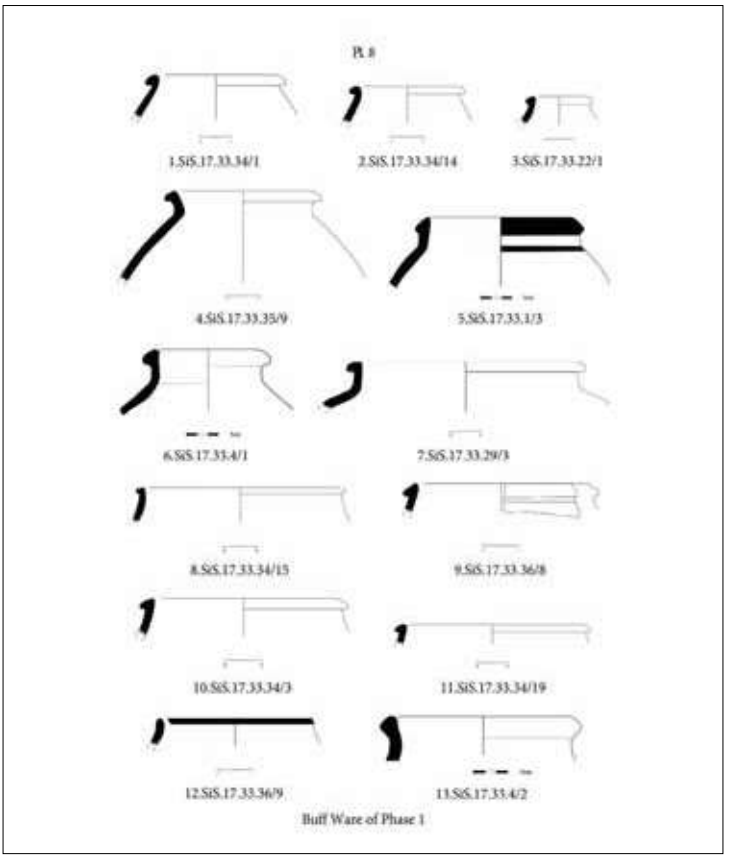


Buff Ware of Phase 1

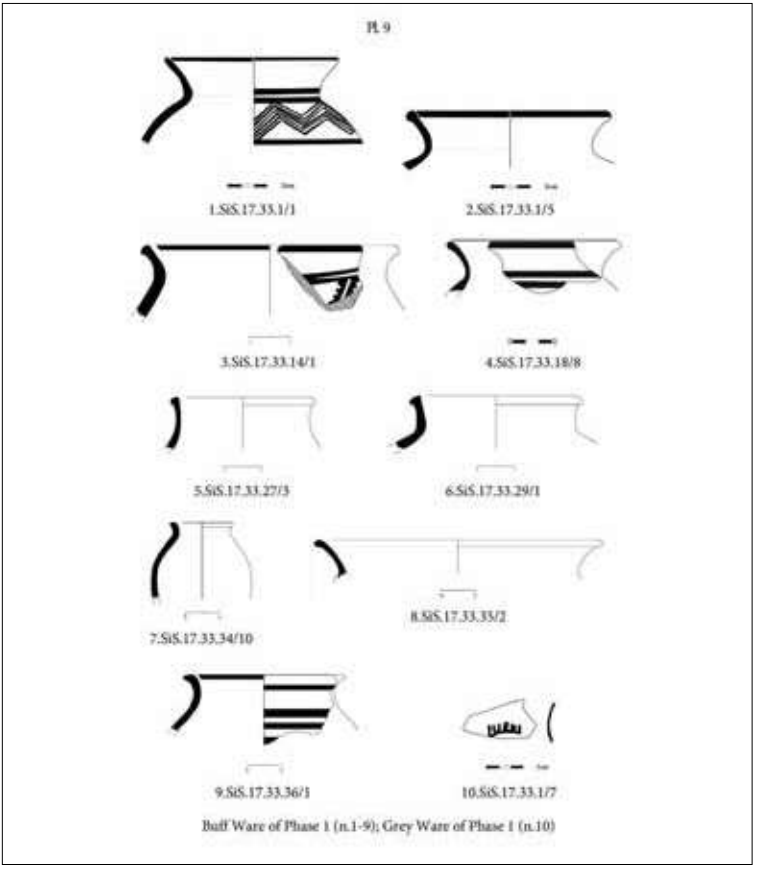
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.28/3	1	-	Wheel	High	7.5YR 7/6	
2	SiS.17.33.4/4	1	L.5	Wheel	High	10YR 7/4	Bu Slip Br Paint
3	SiS.17.33.32/1	1	L.37	Wheel	High	2.5Y 8/3	
4	SiS.17.33.36/3	1	L.43	Wheel	High	10YR 8/2	
5	SiS.17.33.38/7	1	L.16	Wheel	High	2.5Y 7/2	Bu Slip Br Paint
6	SiS.17.33.6/6	1	L.4	Wheel	Medium	2.5Y 7/4 (out.) 5YR 8/1 (in.)	Bu Slip
7	SiS.17.33.14/3	1	L.10	Wheel	High	10YR 7/2	



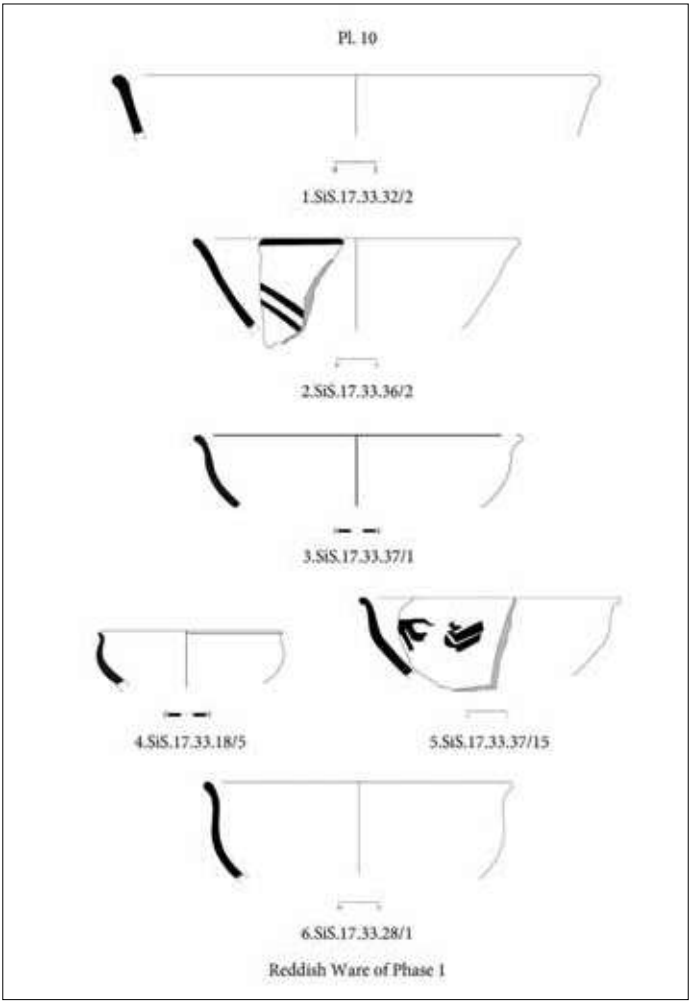
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.34/1	1	L.36	Wheel	High	2.5Y 7/3	
2	SiS.17.33.34/14	1	L.36	Wheel	High	10YR 8/2	Bu Slip
3	SiS.17.33.22/1	1	L.26	Wheel	High	2.5Y 8/3	
4	SiS.17.33.35/9	1	L.43	Wheel	High	10YR 8/3	
5	SiS.17.33.1/3	1	Surface	Wheel	High	7.5YR 6/4	Bu Slip Br Paint
6	SiS.17.33.4/1	1	L.5	Wheel	High	10YR 7/3	
7	SiS.17.33.29/3	1	L.34	Wheel	High	5Y 8/3	
8	SiS.17.33.34/15	1	L.36	Wheel	High	10YR 7/3	Bu Slip
9	SiS.17.33.36/8	1	L.43	Wheel	High	7.5YR 7/4	Br Paint
10	SiS.17.33.34/3	1	L.36	Wheel	High	7.5YR 7/4	Bu Slip
11	SiS.17.33.34/19	1	L.36	Wheel	High	2.5Y 8/3	
12	SiS.17.33.36/9	1	L.43	Wheel	High	2.5Y 8/2	Br Paint
13	SiS.17.33.4/2	1	L.5	Wheel	High	10YR 7/3	



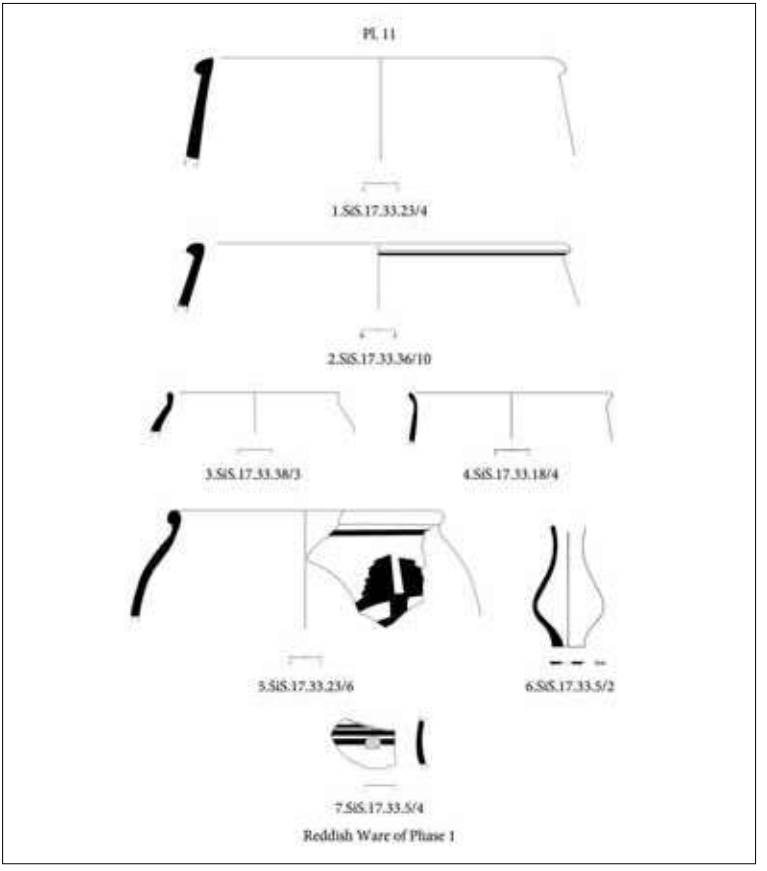
No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.1/1	1	Surface	Wheel	High	10YR 6/4	Bu Slip Bl Paint
2	SiS.17.33.1/5	1	Surface	Wheel	High	2.5Y 7/4	Br Paint
3	SiS.17.33.14/1	1	L.10	Wheel	Medium	10YR 7/4 (out.) 5YR 7/4 (in.)	Bu Slip Bl Paint
4	SiS.17.33.18/8	1	L.20	Wheel	High	10YR 7/3	Bu Slip Bl Paint
5	SiS.17.33.27/3	1	L.33	Wheel	High	5YR 6/6	Bu Slip
6	SiS.17.33.29/1	1	L.34	Wheel	High	2.5Y 8/3	
7	SiS.17.33.34/10	1	L.36	Wheel	High	10YR 7/3	
8	SiS.17.33.35/2	1	L.43	Wheel	High	7.5YR 6/4	Bu Slip
9	SiS.17.33.36/1	1	L.43	Wheel	High	7.5YR 6/4	Bu Slip Bl Paint
10	SiS.17.33.1/7	1	Surface	Wheel	High	5Y 5/1	Bl Paint



No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf.treat.
1	SiS.17.33.32/2	1	L.37	Wheel	High	10YR 7/4	
2	SiS.17.33.36/2	1	L.43	Wheel	High	5YR 7/4	W Slip Br Paint
3	SiS.17.33.37/1	1	L.5	Wheel	High	7.5YR 7/4	
4	SiS.17.33.18/5	1	L.20	Wheel	High	5YR 6/6	R Paint
5	SiS.17.33.37/15	1	L.5	Wheel	High	10YR 7/3	R Paint
6	SiS.17.33.28/1	1	-	Wheel	Medium	2.5Y 8/2 (out.) 10YR 8/3 (in.)	



No.	Pottery No.	Phase	Context	Techn.	Firing	Fabric color	Surf. treat.
1	SiS.17.33.23/4	1	Surface	Wheel	Medium	2.5Y 8/3 (out.) 10YR 7/4 (in.)	W Slip
2	SiS.17.33.36/10	1	L.43	Wheel	High	10YR 7/4	
3	SiS.17.33.38/3	1	L.16	Wheel	Medium	10YR 7/4 (out.) 10YR 8/3 (in.)	W Slip
4	SiS.17.33.18/4	1	L.20	Wheel	High	5YR 6/4	R Paint
5	SiS.17.33.23/6	1	Surface	Wheel	High	5YR 6/4	W Slip Bl Paint Br Paint Incised
6	SiS.17.33.5/2	1	L.6	Wheel	High	2.5Y 6/6	
7	SiS.17.33.5/4	1	L.6	Wheel	High	2.5YR 5/8	R Slip Bl Paint



In addition to the alabaster vessel fragments (see in this volume the paper by Silvia Festuccia), numerous fragments of worked flint (blades, arrowheads, debitage and cores) were discovered, making 24 objects in all (SiS.17.33.1-4, 11, 13, 18-19, 27, 32, 43, 49, 53-54, 56, 61, 63, 72-73, 83-85, 90, 114). Almost all of these were discovered in the northern sector of *Building 33*, which was used for preliminary food processing and subsequent cooking, together with numerous fragments of bronze, unfortunately so badly damaged (in some cases pulverised) as to prevent precise identification, with the exception of the awl SiS.17.33.92). Of special interest are the beads, discovered in a variety of archaeological contexts but typologically homogeneous, divided into two main shapes, one perfectly cylindrical, made of soapstone (SiS.17.33.50), alabaster (SiS.17.33.33, 66, 124), quartz (SiS.17.33.70, 144), carnelian (SiS.17.33.41) and turquoise (SiS.17.33.30, 80), and one ovoid, exemplars of which include SiS.17.33.46 (lapis lazuli) and SiS.17.33.123 (turquoise). At the current stage of the research, there are no exemplars of types recognised in the course of past excavations, whose forms are mainly discoid, rhomboid and lenticular (see Tosi 1969: 373-375; Sajjadi 2003: 79-80).

In addition to the weights discovered (SiS.17.33.58, 64 and 127, all three sphendonoids, two with a base), which will be dealt with separately (see also Ascalone 2019d), a stamp seal made of chlorite/soapstone belongs to a typological class that is widely attested in Shahr-i Sokhta, throughout the valley of the Hirmand and around the oases of Margiana. The seal (SiS.17.33.24), quadrangular but not perfectly square, which measures 3.7 x 4.0 cm with a thickness of 0.6 cm, was discovered in L.5, in an area near the kitchens sector (L.33, L.36, L.37, L.43) bordering L.34 and L.35, two rooms of fairly modest dimensions. In the absence of archaeological material due to their as-yet incomplete investigation (the two rooms are positioned beyond the current limit of the excavation), the structural characteristics of L.34 and L.35 support their interpretation as areas intended for the storage of the foodstuffs used in the adjacent rooms immediately to the east of the complex.

The morphology of the seal and the material it is made from embody a type that is widely attested in Shahr-i Sokhta, where seals with geometric, linear,

rhomboid, circular, square and cross decoration, mostly in chlorite with two holes on the back, are well known (Piperno - Salvatori 2007: 209; Tosi 1968: fig. 95; 1969: fig. 264, 266-273; Sajjadi 2003: 78, fig. 36; 2004: 4; 2009: 240). Seals of the same type have been identified in Mundigak, specifically four specimens from Periods III.5, III.6 and IV of the site (Casal 1961: 256-257, plate 45: z3, 5, 7), Margiana (in Dashly 1, Togolok, Gonur South, Taip 1, but see also Sarianidi 1986: nos. 1675.1-2; 1676.1-2, 1729.1 and Salvatori 2008: 103, fig. 7.7.1),[8] Shahdad (Salvatori - Vidale 1982; Hakemi 1987) and Sibri in Baluchistan (Jarrige 1985: fig. 5). The Shahr-i Sokhta seal seems to be of local production, its craftsmanship recognisably associated with the valley of the Hirmand, perhaps Margiana, where however quadrangular soapstone seals, often bifacial, exhibit a more elaborate iconographic development, with animal and mythological figures represented on the surface. This aniconic approach, with no mythological meaning supported by figurative or narrative descriptions, together with the geometric and linear style on a quadrangular base, carved in soapstone in which two holes can be seen on the reverse of the specimen, is a feature of the so-called 'Hirmand civilisation'. This cultural feature characterises all the regions through which the river Hirmand flows, with Shahr-i Sokhta and Mundigak at opposite extremes in cultural and probably political terms as well as geographically. It is hard to make more detailed historic considerations on the aniconic approach in the glyptic tradition of Hirmand, just as it appears decidedly premature to seek a relationship between the geometric glyptics of Shahr-i Sokhta (including its types) and the settlement's dominant classes. However, there may well have been a link between the human groups present in Shahr-i Sokhta and the (fairly stereotyped and repetitive) geometric patterns on the above-mentioned seals.

Confirming the consistent cultural horizon regarding glyptics along the course of the river Hirmand, a seal was discovered in Mundigak, identical in terms of morphology, craftsmanship and decoration (Casal 1961: 257, pl. 45: 9). The presence of material used to fill or embellish the grooves carved on the surface of this seal suggests that this was also originally the case with SiS.17.33.24. The Mundigak seal comes from non-specified layers belonging to Period IV of the

8. For the bibliography of reference, see Salvatori 2000: 132.

site, which corresponds chronologically to the phases verified for *Building 33*, i.e. Phase 4 early Phase 3 of Period III in Shahr-i Sokhta.

An identical specimen was found in Tomb 311 of Shahr-i Sokhta, where a multiple burial characterised by at least two uses in separate phases was excavated (Piperno - Salvatori 2007: 205-209). The seal, made of lapis lazuli and smaller in size (1.6 x 1.45 x 0.4 cm), has the same morphology, with holes allowing it to be hung, and in terms of decoration is fairly similar to our specimen. The seal was discovered in archaeological association with polychromatic ceramics of Period II in Shahr-i Sokhta, numerous conical beakers of Phase 5, Period II and two specimens belonging to Phase 4, Period III. On the basis of the stratigraphic contexts and the archaeological associations of our seal, the seal from Tomb 311 should also be seen in relation to the more elongated versions of the so-called "Pear-shaped Beakers", forms that began to be seen only in Phase 4 of the site, just after the midpoint of the 3rd millennium BC (see also Vidale 1984). In the same way, our seal was discovered in archaeological association with a high-necked beaker (SiS.17.33.4/4) which in typological terms should undoubtedly be ascribed to Phase 4 of the settlement, characterised by a clear typological break with the preceding Phase 5, belonging to Period II of the site.

To summarise, on the basis of the identified parallels and the reconstructed archaeological associations, Seal SiS.17.33.24 should be considered an autochthonous product, unambiguously rooted in the cultural fabric of Shahr-i Sokhta and the entire glyptic horizon of the valley of the Hirmand, datable with a fair degree of reliability to the period 2500-2400 BC (Shahr-i Sokhta III.4).

Excluding debitage, which includes numerous fragments of carnelian, the pestles (SiS.17.33.28, 38, 67, 125, 126, 145, 147-148), loom weights (SiS.17.33.23, 42), fragments of grinding stones (SiS.17.33.76), smoothing stones (SiS.17.33.93, 113, 119, 146) and counting tokens (SiS.17.33.25, 60, 65, 69, 74-75, 107, 110-111, 141-143) paint a fairly consistent picture of the activities performed inside the building, which seem to cover every single necessity

associated with daily life, confirming the total independence of *Building 33* with respect to the surrounding urban fabric. Indeed, the entire building seems to exhibit strong sectoral differentiation (see the chapter by the current author on the architectural and functional analyses of the building), appearing to be an elaborate and carefully structured complex that served to gather and organise, on a fully autonomous basis, the main activities typical of a residential complex with clearly central status.

The catalogue of the objects found is designed to give a list of all the artefacts excavated during the 2017 campaign. In the following captions the data are given following the following order:
Figure; date; object; material; condition; length; width; thickness; area; square; US/locus; level; layer; period of the site; chronology.

Fig. 61: SiS.17.33.1; 04.11.2017; flint blade debitage; flint; fragmentary; 2.6 cm; 1.7 cm; 0.9 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.2; 04.11.2017; blade; flint; fragmentary; 2.5 cm; 1.4 cm; 0.4 cm; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.3; 04.11.2017; blade; flint; fragmentary; 2.8 cm; 1.5 cm; 0.4 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.4; 04.11.2017; arrowhead; flint; excellent; 3.7 cm; 1.6 cm; 0.4 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 62: SiS.17.33.5; 04.11.2017; carved object (reject); carnelian; fragmentary; 1.5 cm; 1.0 cm; 1.1 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.6; 04.11.2017; carved object (reject); carnelian; fragmentary; 1.0 cm; 1.0 cm; 0.6 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.7; 04.11.2017; carved object (reject?); carnelian; fragmentary; 1.3 cm; 1.0 cm; 1.0 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.8; 04.11.2017; carved object (reject?); carnelian; fragmentary; 1.3 cm; 1.1 cm; 0.9 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.9; 04.11.2017; carved object (reject?); carnelian; fragmentary; 1.4 cm; 1.2 cm; 0.4 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.
SiS.17.33.10; 04.11.2017; carved object (reject?); carnelian; fragmentary; 0.9 cm; 0.8 cm; 0.3 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 63: SiS.17.33.11; 04.11.2017; blade; flint; good; 3.3 cm; 2.2 cm; 0.5 cm; 33; OOH+OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 64: SiS.17.33.12; 04.11.2017; indeterminate spherical object; bronze; slightly eroded; 1.6 cm; 33; OOH2+OOG4; L.4; 0.10 cm; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 65: SiS.17.33.13; 04.11.2017; core; flint; fragmentary; 2.1 cm; 1.5 cm; 0.3 cm; 33; OOH2+OOG4; L.4; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 66: SiS.17.33.14; 04.11.2017; carved object (reject?); carnelian; fragmentary; 1.3 cm; 1.4 cm; 0.8 cm; 33; OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

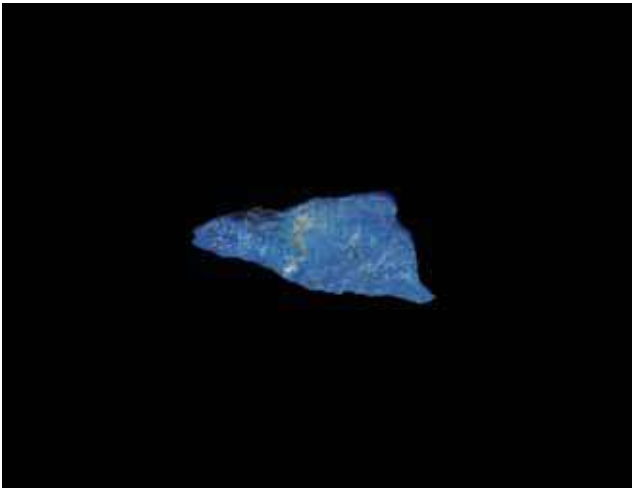


Fig. 67: SiS.17.33.15; 05.11.2017; carved object; lapis lazuli; fragmentary; 1.0 cm; 0.4 cm; 0.2 cm; 33; OOM; surface; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.16	
Date	05.11.2017
Object	fragment of vessel
Material	alabaster
Condition	fragmentary
Length	2.2 cm
Width	1.1 cm
Thickness	0.6 cm
Area	33
Square	OOM
US/Locus	surface
Level	0.05 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.17	
Date	05.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	3.7 cm
Width	4.2 cm
Thickness	0.8 cm
Area	33
Square	OOM
US/Locus	surface
Level	0.05 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 68: SiS.17.33.18; 05.11.2017; blade; flint; good; 2.9 cm; 1.5 cm; 1.0 cm; 33; OOH2+OOG4; L.4; 0.05 m; 1; III (Phase 4-3); 2600-2450 BC.

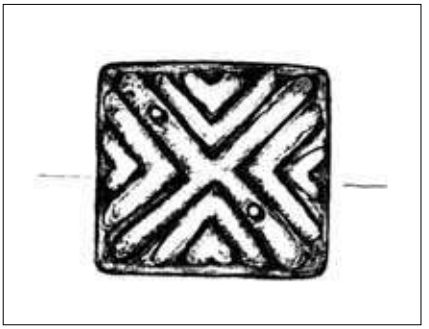
Fig. 69: SiS.17.33.19; 05.11.2017; fragment of an object (debitage); flint; fragmentary; 2.3 cm; 1.5 cm; 0.4 cm; 33; OOH2+OOG4; L.4; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 70: SiS.17.33.20; 05.11.2017; smoothing stone; soapstone; excellent; 9.9 cm; 1.6 cm; 1.0 cm; 33; OOH2+OOG4; L.4; 0.17 m; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.21	
Date	05.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	3.1 cm
Thickness	0.4 cm
Area	33
Square	OOH2+OOG4
US/Locus	L.4
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.22	
Date	05.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary almost pulverised
Area	33
Square	OOH2+OOG4
US/Locus	L.4
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 71: SiS.17.33.23; 05.11.2017; loom weight; ceramics; half conserved; 3.4 cm; 1.7 cm; 1.0 cm; 33; OOH2+OOG4; L.4; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.



Figs. 72-73: SiS.17.33.24; 06.11.2017; stamp seal; soapstone; excellent; stamp seal using a single side, with two holes enabling possible applications on the reverse side. The seal bears geometric decorations based on a cross-type scheme widely attested in the site of Shahr-i Sokhta; 3.7 cm; 4.0 cm; 0.6 cm; 33; OOH4; L.5; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 74: SiS.17.33.25; 06.11.2017; flat ovoid object with smoothing marks on the surface, perhaps due to deliberate polishing; limestone; slightly chipped; 2.5 cm; 2.2 cm; 0.8 cm; 33; OOH2+OOG4; L.4; 0.30 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.26	
Date	06.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	2.5 cm
Width	2.0 cm
Thickness	1.0 cm
Area	33
Square	OOH2+OOG4
US/Locus	L.4
Level	0.30 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 75: SiS.17.33.27; 06.11.2017; flat ovoid object with signs of grinding; flint; good; 4.9 cm; 4.2 cm; 0.9 cm; 33; OOH2+OOM1; L.6; 0.30 m; 1¸ III (Phase 4-3); 2600-2450 BC.

Fig. 76: SiS.17.33.28; 06.11.2017; pestle; limestone; slightly chipped; 5.8 cm; 5.0 cm; 3.7 cm; 33; OOH2+OOM1; L.6; 0.30 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.29	
Date	06.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	3.0 cm
Width	2.7 cm
Thickness	1.4 cm
Area	33
Square	OOH2+OOM1
US/Locus	L.6
Level	0.35 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

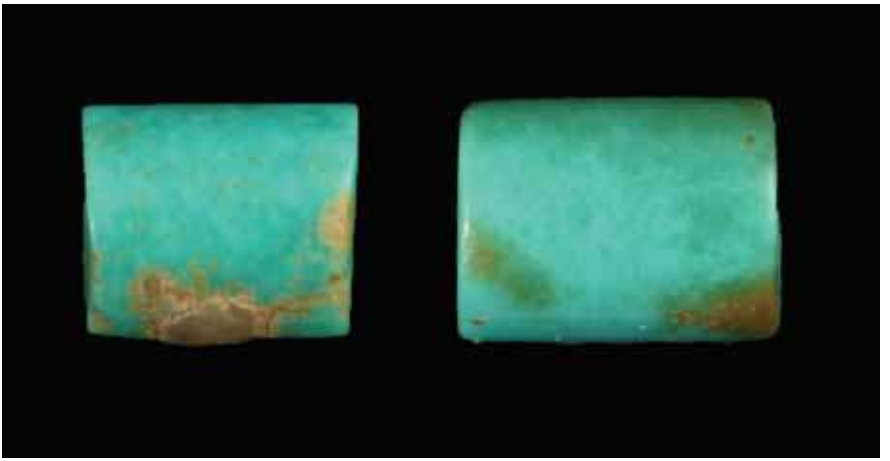


Fig. 77: SiS.17.33.30; 07.11.2017; two beads; turquoise; excellent; 0.4 cm x 0.3 cm; 0.3 x 0.2 cm; 33; OOH2+OOM1; L.6; 0.35 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.31	
Date	07.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	3.0 cm
Width	2.7 cm
Thickness	1.4 cm
Area	33
Square	OOH2+OOM1
US/Locus	L.6
Level	0.35 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 78: SiS.17.33.32; 07.11.2017; blade; flint; good; 2.5 cm; 2.0 cm; 0.6 cm; 33; OOH2+OOM1; L.6; 0.35 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.33	
Date	07.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	4.1 cm
Width	3.1 cm
Thickness	1.2 cm
Area	33
Square	OOM3+OOM1
US/Locus	L.6
Level	0.15 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 79: SiS.17.33.34; 08.11.2017; smoothing stone; limestone; shows clear signs of abrasion from grinding on the surface; 33; OOH2+OOM1; L.6; 0.40 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.35	
Date	10.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	1.9 cm
Width	1.7 cm
Thickness	0.5 cm
Area	33
Square	OOM1
US/Locus	L.15
Level	0.47 m
Layer	3
Period of the site	III (Phase 5a)
Chronology	2850-2620 BC

Fig. 80: SiS.17.33.36; 10.11.2017; indeterminate carved object (fragment of a vessel?); quartz; fragmentary; 2.1 cm; 1.0 cm; 0.8 cm; 33; OOM1; L.15; 0.33 m; 3; III (Phase 5a); 2800-2620 BC.

Fig. 81: SiS.17.33.37; 10.11.2017; smoothing stone; limestone; good; 10.5 cm; 2.7 cm; 1.7 cm; 33; OOM1; L.17; 0.48 m; 3; III (Phase 5a); 2800-2620 BC.

Fig. 82: SiS.17.33.38; 10.11.2017; pestle; breccia; good with signs of percussion on the base; 6.3 cm; 4.3 cm; 3.4 cm; 33; OOM1; L.15; 0.47 m; 3; III (Phase 5a); 2800-2620 BC.

SiS.17.33.39	
Date	10.11.2017
Object	slag
Material	bronze
Length	2.5 cm
Width	2.1 cm
Height	1.8 cm
Area	33
Square	OOM3+OOM1
US/Locus	L.16
Level	0.48 m
Layer	3
Period of the site	III (Phase 5a)
Chronology	2800-2620 BC

Fig. 83: SiS.17.33.40; 11.11.2017; indeterminate spherical object; limestone; small parts missing; 1.1 cm; 33; OOG4+OOL3; L.19; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 84: SiS.17.33.41; 11.11.2017; cylindrical bead; carnelian; fragmentary; 0.7 cm; 0.6 cm; 0.7 cm; 33; OOH2+OOG; L.4; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 85: SiS.17.33.42; 12.11.2017; loom weight; clay; half conserved; 5.1 cm; 2.2 cm; 0.6 cm; 33; OOH2+OOG4; L.4; 0.15 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 86: SiS.17.33.43; 12.11.2017; debitage; flint; fragmentary; 2.5 cm; 2.5 cm; 0.7 cm; 33; OOH2+OOG4; L.4; 0.15 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.44	
Date	12.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	2.2 cm
Width	1.5 cm
Thickness	1.7 cm
Area	33
Square	OOH2+OOG4
US/Locus	L.4
Level	0.35 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.45	
Date	12.11.2017
Object	indeterminate
Material	limestone
Condition	good
Length	4.3 cm
Width	3.5 cm
Thickness	1.7 cm
Area	33
Square	OOG4+OOL3
US/Locus	L.19
Level	0.15 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 87: SiS.17.33.46; 13.11.2017; cylindrical bead slightly narrowing at each end; lapis lazuli; good; 0.4 cm; 0.3 cm; 33; OOF+OOK; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 88: SiS.17.33.48; 13.11.2017; blade; stone; fragmentary; 5.5 cm; 4.0 cm; 0.5 cm; 33; OOF+OOK; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 89: SiS.17.33.49; 13.11.2017; debitage; flint; fragmentary; 2.4 cm; 1.3 cm; 0.5 cm; 33; OOF; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 90: SiS.17.33.50; 13.11.2017; cylindrical bead; soapstone; fragmentary; 0.6 cm; 1.0 cm; 33; OOF; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.51	
Date	14.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	2.7 cm
Width	2.4 cm
Thickness	1.2 cm
Area	33
Square	OOE+OOG
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.52	
Date	14.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	1.7 cm
Width	1.7 cm
Thickness	0.6 cm
Area	33
Square	OOE+OOG
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.53	
Date	14.11.2017
Object	blade
Material	flint
Condition	fragmentary
Length	2.6 cm
Width	1.6 cm
Thickness	1.6 cm
Area	33
Square	OOE+OOG
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.54	
Date	14.11.2017
Object	core
Material	flint
Condition	fragmentary
Length	3.4 cm
Width	2.7 cm
Thickness	2.5 cm
Area	33
Square	OOE+OOG
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.55	
Date	14.11.2017
Object	indeterminate
Material	limestone
Condition	highly fragmentary
Area	33
Square	OOG4+OOL3
US/Locus	surface
Level	0.15 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 91: SiS.17.33.56; 15.11.2017; arrowhead; flint; excellent; 3.1 cm; 1.4 cm; 0.5 cm; 33; OOE+OOG; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 92: SiS.17.33.57; 15.11.2017; indeterminate; limestone; fragmentary; 6.5 cm; 3.6 cm; 1.7 cm; 33; OOH2+OOG4; L.4; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 93: SiS.17.33.58; 15.11.2017; ovoid weight; stone; good; 4.8 cm; 2.0 cm; 1.9 cm; 33; OOG2+OOL1; L.20; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.59	
Date	15.11.2017
Object	indeterminate
Material	stone
Condition	fragmentary
Length	3.1 cm
Width	2.9 cm
Height	2.9 cm
Area	33
Square	OOK3
US/Locus	L.26
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.60	
Date	16.11.2017
Object	token
Material	limestone
Condition	good
Length	3.0 cm
Width	3.0 cm
Thickness	0.5 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 94: SiS.17.33.61; 16.11.2017; arrowhead; flint; good; 2.8 cm; 2.2 cm; 0.6 cm; 33; OOI+OON; L.36+L.43; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.62	
Date	16.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	2.2 cm
Width	1.5 cm
Thickness	1.0 cm
Area	33
Square	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.63	
Date	16.11.2017
Object	core
Material	flint
Condition	fragmentary
Length	5.0 cm
Width	2.5 cm
Thickness	0.8 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	2
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 95: SiS.17.33.64; 16.11.2017; ovoid weight with base; limestone; good; 4.2 cm; 1.5 cm; 3.1 cm; 33; OOI+OON; L.36+L.43; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.65	
Date	16.11.2017
Object	token
Material	limestone
Condition	good
Length	3.0 cm
Width	2.2 cm
Thickness	0.4 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 96: SiS.17.33.66; 18.11.2017; bead; alabaster; fragmentary, half missing; 1.5 cm; 0.6 cm; 33; OOI+OON; L.36+L.43; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.67	
Date	18.11.2017
Object	pestle
Material	limestone
Condition	good
Length	4.3 cm
Width	3.2 cm
Height	3.1 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.68	
Date	18.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	7.9 cm
Width	0.7 cm
Height	0.7 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.69	
Date	04.11.2017
Object	token
Material	stone
Condition	good
Length	5.1 cm
Diameter	4.0 cm
Thickness	0.5 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.70	
Date	04.11.2017
Object	bead
Material	quartz
Condition	good
Height	2.1 cm
Diameter	0.6 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.71	
Date	04.11.2017
Object	indeterminate
Material	stone
Condition	fragmentary
Height	3.4 cm
Length	3.2 cm
Width	1.9 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 97: SiS.17.33.72; 19.11.2017; blade; flint; 3.9 cm; 1.6 cm; 0.9 cm; 33; OOH4; L.37; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.73	
Date	19.11.2017
Object	debitage
Material	flint
Length	3.4 cm
Width	1.7 cm
Thickness	0.8 cm
Area	33
Square	OON1+OOM3
US/Locus	L.33
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 98: SiS.17.33.74; 18.11.2017; token; limestone; good; 1.9 cm; 1.9 cm; 1.2 cm; 33; OON1+OOM3; L.33; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 99: SiS.17.33.75; 19.11.2017; token; soapstone; good; 3.1 cm; 1.7 cm; 0.7 cm; 33; OON1+OOM3; L.33; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 100: SiS.17.33.76; 19.11.2017; grinding stone; basalt; fragmentary; 6.9 cm; 5.1 cm; 1.7 cm; 33; OOH4; L.37; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.77	
Date	19.11.2017
Object	indeterminate
Material	stone
Condition	highly fragmentary
Length	6.9 cm
Width	4.9 cm
Thickness	2.5 cm
Area	33
Square	OOH4
US/Locus	L.7
Level	0.30 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.78	
Date	19.11.2017
Object	indeterminate
Material	bronze
Condition	fragmentary
Length	1.8 cm
Width	1.5 cm
Thickness	1.1 cm
Area	33
Square	OOH4
US/Locus	L.5
Level	0.30 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.79	
Date	19.11.2017
Object	slag
Length	6.5 cm
Width	5.8 cm
Thickness	2.5 cm
Area	33
Square	OOI+OON
US/Locus	L.36+L.43
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.80	
Date	19.11.2017
Object	bead
Material	turquoise
Condition	good
Diameter	0.25/0.22 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.81	
Date	20.11.2017
Object	indeterminate
Material	quartz
Condition	fragmentary
Length	2.2 cm
Width	1.8 cm
Thickness	0.6 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.82	
Date	20.11.2017
Object	inlaid ornament
Material	stone
Condition	good
Length	2.3 cm
Width	2.1 cm
Thickness	0.3 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 101: SiS.17.33.83; 20.11.2017; blade; flint; fragmentary; 3.9 cm; 1.6 cm; 0.8 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 102: SiS.17.33.84; 20.11.2017; blade; flint; fragmentary; 1.7 cm; 1.8 cm; 0.8 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 103: SiS.17.33.85; 20.11.2017; core or unfinished blade; flint; fragmentary; 5.8 cm; 4.2 cm; 1.8 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.86	
Date	20.11.2017
Object	handle
Material	stone
Condition	fragmentary
Length	3.9 cm
Width	1.5 cm
Thickness	0.9 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.88	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	1.6 cm
Width	1.2 cm
Thickness	0.5 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 104: SiS.17.33.87; 20.11.2017; indeterminate; quartz; fragmentary; 2.5 cm; 2.1 cm; 0.7 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 105: SiS.17.33.90; 20.11.2017; blade; flint; fragmentary; 2.0 cm; 2.3 cm; 0.4 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 106: SiS.17.33.92; 20.11.2017; awl; bronze; good; 7.2 cm; 4.8 cm; 0.7 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.89	
Date	20.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	3.7 cm
Width	2.9 cm
Thickness	0.6 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.91	
Date	20.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	2.7 cm
Width	2.3 cm
Thickness	0.4 cm
Area	33
Square	OOI2+OOH4
US/Locus	L.36+L.37
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 107: SiS.17.33.93; 20.11.2017; smoothing stone; stone; good; 6.4 cm; 3.1 cm; 2.8 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 108: SiS.17.33.94; 20.11.2017; pebble; limestone; good; 3.0 cm; 2.3 cm; 2.2 cm; 33; OOI2+OOH4; L.36+L.37; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.95	
Date	20.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	7.2 cm
Width	4.8 cm
Thickness	0.7 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.96	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	4.2 cm
Width	3.4 cm
Thickness	0.7 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.97	
Date	20.11.2017
Object	base of a vessel
Material	alabaster
Condition	fragmentary
Length	2.6 cm
Width	2.2 cm
Thickness	0.8 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.98	
Date	20.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	3.2 cm
Width	1.9 cm
Thickness	0.8 cm
Area	33
Square	OOI2+OOH4
Level	surface
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.99	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	3.3 cm
Width	2.3 cm
Thickness	1.2 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.100	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	3.5 cm
Width	1.4 cm
Thickness	1.3 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.101	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Description attached to SiS.17.33.95	3.3 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	2
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.102	
Date	20.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	2.7 cm
Width	1.4 cm
Thickness	1.2 cm
Area	33
Square	OOI2+OOH4
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.103	
Date	21.11.2017
Object	base of a vessel
Material	alabaster
Condition	fragmentary
Height	1.9 cm
Thickness	0.3/0.4 cm
Area	33
Square	OOI2
US/Locus	L.36
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.104	
Date	21.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Area	33
Square	OOI2
US/Locus	L.36
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.105	
Date	21.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	2.8 cm
Width	2.5 cm
Height	1.7 cm
Area	33
Level	0.10 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.106	
Date	21.11.2017
Object	two indeterminate objects plausibly belonging to the same artefact
Material	bronze
Condition	highly fragmentary
Length 1)	1.1 cm;
Length 2)	1.2 cm
Width 1)	0.9 cm;
Width 2)	0.8 cm
Thickness 1	0.8 cm;
Thickness 2	0.6 cm
Area	33
Square	OOI2
US/Locus	L.36
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.108	
Date	04.11.2017
Object	indeterminate
Material	bronze
Condition	fragmentary
Length	1.1 cm
Width	0.8 cm
Thickness	0.6 cm
Area	33
Square	OOI2
Level	0.15 cm
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 109: SiS.17.33.107; 21.11.2017; token; stone; good; 3.0 cm; 2.9 cm; 0.6 cm; 33; OOI2; 0.10 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.109	
Date	21.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	1.0 cm
Thickness	0.6 cm
Area	33
Square	OOI2
US/Locus	L.36
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.110	
Date	22.11.2017
Object	token
Material	breccia
Condition	good
Length	1.3 cm
Width	1.1 cm
Thickness	1.0 cm
Area	33
Square	OON1
US/Locus	L.43
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 110: SiS.17.33.111; 22.11.2017; token; limestone; good; 2.9 cm; 2.1 cm; 0.9 cm; 33; OOH4; L.5; 0.25 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.112	
Date	22.11.2017
Object	indeterminate
Material	stone
Length	3.6 cm
Width	3.3 cm
Thickness	2.0 cm
Area	33
Square	OON1
US/Locus	L.43
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.113	
Date	22.11.2017
Object	smoothing stone
Material	stone
Condition	fragmentary
Length	2.5 cm
Width	1.8 cm
Thickness	1.6 cm
Area	33
Square	OON1
US/Locus	0.25 m
Level	L.43
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.115	
Date	22.11.2017
Object	two indeterminate fragments plausibly belonging to the same utensil
Material	bronze
Condition	highly fragmentary
Length 1)	0.7 cm;
Length 2)	1.5 cm
Width 2)	1.3 cm
Thickness 1)	0.7 cm;
Thickness 2)	1.0 cm
Area	33
Square	OOH4
US/Locus	L.5
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.116	
Date	22.11.2017
Object	two indeterminate fragments plausibly belonging to the same utensil
Material	bronze
Condition	highly fragmentary
Length 1)	2.5 cm;
Length 2)	1.1 cm
Width 1)	1.1 cm;
Width 2)	0.6 cm
Thickness 1)	1.0 cm;
Thickness 2)	0.4 cm
Area	33
Square	OOI2
US/Locus	L.36
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 111: SiS.17.33.114; 22.11.2017; blade; flint; good; 3.6 cm; 2.0 cm; 2.6 cm; 33; OON1; L.43; 0.25 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.118	
Date	22.11.2017
Object	indeterminate
Material	stone
Condition	fragmentary
Length	4.7 cm
Width	2.6 cm
Thickness	2.1 cm
Area	33
Square	OON1
US/Locus	L.43
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 112: SiS.17.33.117; 22.11.2017; triangular piece of stone used as a support for cooking pots on a hearth; limestone; fragmentary; 5.2 cm; 4.9 cm; 3.5 cm; 33; OON1; L.43; 0.25 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.119	
Date	22.11.2017
Object	smoothing stone
Material	stone
Condition	fragmentary
Length	3.7 cm
Width	3.2 cm
Thickness	2.1 cm
Area	33
Square	OON1
US/Locus	L.43
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 113: SiS.17.33.120; 22.11.2017; zoomorphic fictile figurine; clay; fragmentary; 4.7 cm; 2.6 cm; 2.1 cm; 33; OOI2; L.36; 0.25 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.121	
Date	22.11.2017
Object	indeterminate
Material	bronze
Condition	highly fragmentary
Length	1.5 cm
Width	0.9 cm
Thickness	0.5 cm
Area	33
Square	OOI2
US/Locus	L.36
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.122	
Date	22.11.2017
Object	indeterminate
Material	bronze
Condition	pulverised
Area	33
Square	OOH4
US/Locus	L.5
Level	0.20 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 114: SiS.17.33.123; 23.11.2017; ovoid bead; turquoise; excellent; 3.5 cm; 0.9 cm; 0.5 cm; 33; OOM3+OOM1; L.16; 0.20 m; 1; III (Phase 4-3); 2450/2400-2350/2300 BC.

Fig. 115: SiS.17.33.124; 23.11.2017; cylindrical bead; alabaster; excellent; 5.5 cm; 1.0 cm; 0.5 cm; 33; OOM3+OOM1; L.16; 0.10 m; 1; III (Phase 4-3); 2450/2400-2350/2300 BC.

Fig. 117: SiS.17.33.126; 23.11.2017; pestle; limestone; excellent, with clear signs of percussion on the base; 7.0 cm; 4.3 cm; 2.3 cm; 33; OOH4; L.7; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 116: SiS.17.33.125; 23.11.2017; pestle; limestone; excellent, with clear signs of percussion on the base; 5.4 cm; 4.4 cm; 3.2 cm; 33; OOH4; L.7; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 118: SiS.17.33.127; 23.11.2017; sphendonoid weight; limestone; highly eroded and broken; 6.0 cm; 4.4 cm; 2.0 cm; 33; OOM3+OOM1; L.16; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.128	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	9.4 cm
Width	8.0 cm
Thickness	1.2 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.129	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	3.6 cm
Width	3.7 cm
Thickness	0.8 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.130	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	3.5 cm
Width	3.7 cm
Thickness	0.9 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.131	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	3.2 cm
Width	1.6 cm
Thickness	0.7 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.132	
Date	30.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	6.3 cm
Width	4.1 cm
Thickness	1.2 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.133	
Date	30.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	4.9 cm
Width	2.9 cm
Thickness	1.0 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.134	
Date	30.11.2017
Object	base of a vessel
Material	alabaster
Condition	fragmentary
Length	6.2 cm
Width	1.9 cm
Thickness	1.0 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.135	
Date	30.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	6.3 cm
Width	4.9 cm
Thickness	1.2 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.136	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	2.5 cm
Width	1.8 cm
Thickness	0.4 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.137	
Date	30.11.2017
Object	vessel
Material	alabaster
Condition	fragmentary
Length	4.2 cm
Width	3.7 cm
Thickness	1.5 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.138	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	5.5 cm
Width	4.5 cm
Thickness	1.5 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.139	
Date	30.11.2017
Object	rim of a vessel
Material	alabaster
Condition	fragmentary
Length	2.7 cm
Width	2.0 cm
Thickness	0.4 cm
Area	33
Square	OOI2+OON1
Locus	L.36+L.43
Level	surface
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

SiS.17.33.140	
Object	vessel
Material	alabaster
Condition	fragmentary
Length	2.7 cm
Width	1.4 cm
Thickness	1.2 cm
Area	33
Square	OON1
US/Locus	L.43
Level	0.25 m
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 119: SiS.17.33.141; 16.11.2017; token; limestone; good; 3.1 cm; 2.2 cm; 0.4 cm; 33; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 120: SiS.17.33.142; 16.11.2017; token; limestone; good; 1.1 cm; 33; OOG4+OOL3; L.19; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 121: SiS.17.33.143; 18.11.2017; token; breccia; good; 5.1 cm; 4.0 cm; 0.5 cm; 33; OON1; 0.20 m; 1; III (Phase 4-3); 2600-2450 BC.

SiS.17.33.144	
Date	18.11.2017
Object	bead
Material	quartz
Condition	good
Length	2.1 cm
Width	1.8 cm
Thickness	0.8 cm
Area	33
Square	OON1
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 122: SiS.17.33.145; 23.11.2017; pestle; limestone; excellent, with clear signs of percussion on the base; 4.3 cm; 3.3 cm; 3.1 cm; 33; OON1; 1; III (Phase 4-3); 2600-2450 BC

SiS.17.33.146	
Date	23.11.2017
Object	smoothing stone
Material	breccia
Condition	good
Length	3.7 cm
Width	3.2 cm
Height	2.1 cm
Area	33
Square	OON1
US/Locus	L.43
Layer	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC

Fig. 123: SiS.17.33.147; 23.11.2017; pestle; breccia; good; 8.1 cm; 6.9 cm; 1.5 cm; 33; OOI2+OON1; L.36+L.43; surface; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 124: SiS.17.33.148; 23.11.2017; pestle; breccia; good; 7.2 cm; 6.0 cm; 4.6 cm; 33; OOI2+OON1; L.36+L.43; surface; 1; III (Phase 4-3); 2600-2450 BC.

Fig. 125: SiS.17.33.149; 23.11.2017; indeterminate; volcanic stone; fragmentary; 3.4 cm; 3.2 cm; 2.5 cm; 33; OOI2+OON1; L.36+L.43; surface.

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Topographical Research in Shahr-i Sokhta: Preliminary Report

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The research conducted in Shahr-i Sokhta by the Laboratory of Ancient Topography and Photogrammetry of the University of the Salento began in 2017 with the aim of reconstructing the ancient landscape of the valley of the Hirmand and establishing the organisational layout of the entire upland on which the protohistoric site lay, using both traditional and innovative methods of investigation. Advanced non-invasive instruments and technologies were employed to enrich the framework of archaeological knowledge that could be gleaned from the terrain, making it possible to tackle the main historical and archaeological issues regarding the transformation of the site and its internal organisation in the most effective way.

The investigations were however affected by two factors concerning the topographical documentation of the site: the lack of an archaeological map containing all the archaeological and geo-environmental information relating to the upland and the total absence of an archive of aerial photographs.

The initial activities conducted by the research group consisted mainly of retrieving the relevant published documentation, with the aim of ascertaining the main characteristics of the site, assessing the cartography thus far produced (topographical maps, excavation plans, thematic maps) and conducting brief instrumental surveys to support the positioning of the excavation areas and vertex points of the general grid of the upland (Fig. 1).

Although the available maps of Shahr-i Sokhta were helpful during the initial attempts to orient ourselves within an unknown site, it proved to be unsatisfactory in various ways. For example, there was no archaeological data showing the correct position of the excavation areas and the visible traces of the ruins on the ground, and the altimetric data was insufficiently detailed, which are both fundamental features of archaeological cartography. The need to create an archaeological map thus arose in response to the lack of fully-fledged digital topographical cartography that could be managed in a GIS environment and thus updated over time.

However, the difficulty of obtaining the base maps that usually provide the starting point in the drawing up of archaeological documentation represented a considerable obstacle. As seen in similar situations, one way to resolve this lack is the acquisition and processing of satellite images. This remote sensing tool has been widely used in areas of the Middle East for the creation of high-scale maps of the exact geographical location of archaeological sites and for positioning the archaeological investigations conducted there (Di Giacomo *et al*. 2011).

However, the use of satellite images is not limited to providing cartographic support. The absence of (or the difficulty of obtaining) aerial images of zones belonging to nations where access to this type of material is considerably difficult represents a severe obstacle to the systematic study of the landscape and topographical and geo-archaeological investigations. For this reason, since the 1980s, but especially since the beginning of the century (Campana 2004), the use of satellite images for the observation of the earth has grown considerably. Such images make it possible to discover and investigate not just archaeological sites,

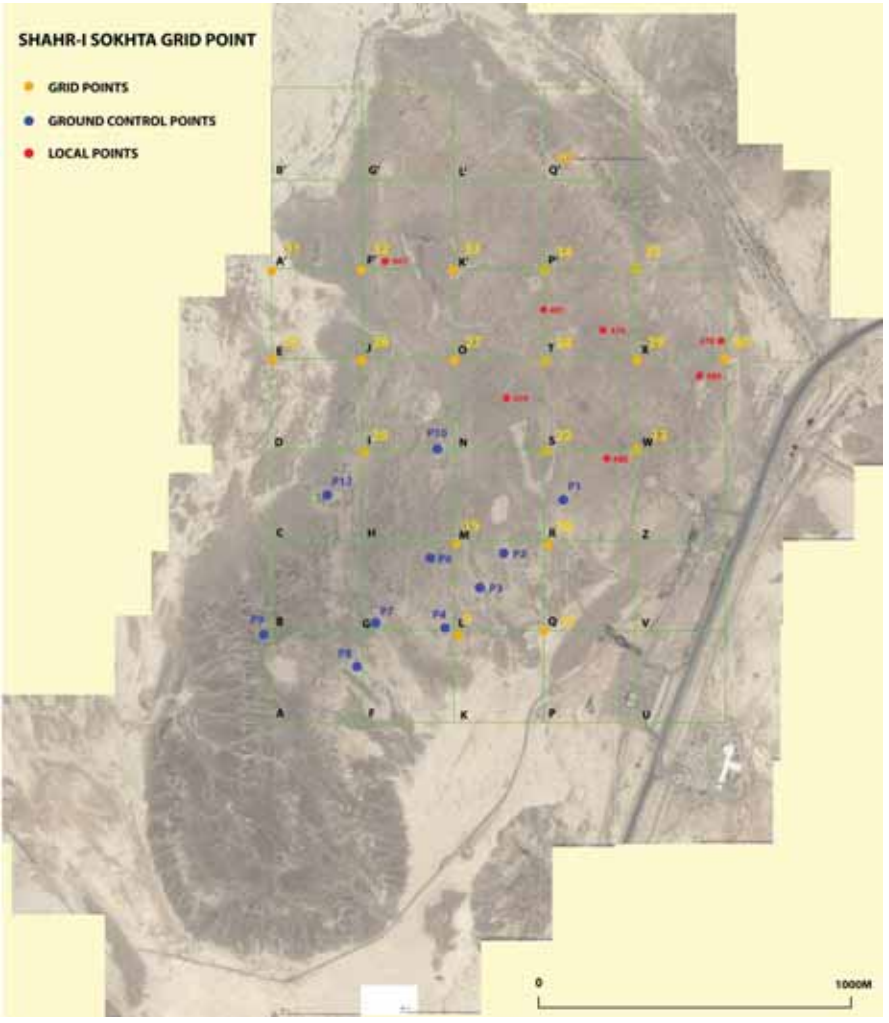

Fig. 1: general grid of the upland of Shahr-i Sokhta, currently being updated.

but also entire regions, with the aim of studying the dynamics of the landscape in question in terms of its history, pattern of settlement and evolution.

For the site of Shahr-i Sokhta and the surrounding area, this obstacle was perceived from the very start of the archaeological research conducted by the Italian mission in the region of Sistan. For this reason, in order to be able to conduct a thorough study, in morphological as well as archaeological terms, of the valley of the Hirmand and southern Sistan in general, in the late 1990s (Forte *et al*. 1998) Landsat TM optical satellite images were obtained. Despite their modest spatial resolution, these provided a promising base for an initial geo-archaeological reconstruction of the region. Roughly 30 years later however, the rather precarious state of the cartographic and aerial-photographic documentation prompted the researchers to seek new satellite images.

The first step was to ascertain and assess the satellite documentation available for the area of Sistan and the valley of the Hirmand in particular. This entailed consideration of all the obtainable resources, starting with material that was free, including the Landsat 8, Landsat 7 ETM+ and 4-5 TM images.[1] Also considered were Sentinel 2 optical satellite images, of which only two datasets are currently available,[2] and Sentinel 1 radar satellite images. The review of the available satellite documentation obviously also took account of the images provided by the American spy satellites of the CORONA missions, of which two strips from the KH-4A mission (with a resolution of 2.80 m on the ground)[3] and two strips from the KH-4B mission (with a resolution of 1.80 m on the ground)[4] are available.

In terms of commercial satellite images, numerous images provided by Quickbird, GeoEye 1, WorldView 1 and WorldView 2, the property of Digital Globe, are available for the area in question.[5] Lastly, the Airbus France catalogue has high-resolution Pléiades images and a SPOT 6 stereopair. Of this range of

1. The images were provided by the earth explorer site of the USGS.
2. The dates of acquisition of the Sentinel 2 images are 5/10/2018 and l'8/10/2018. At the time of writing, Sentinel 2 scenes for southern Sistan were not available.
3. One acquired on 03/05/1965 and the other on 24/05/1965.
4. Both acquired on 26/05/1972. This historic satellite material is still in the procurement phase.
5. This group of images is currently being analysed in view their purchase and processing.

material, it was decided in this first phase to use two high-resolution Pléiades images and the SPOT 6 stereopair.[6]

The high-resolution Pléiades images, already used for archaeological purposes (Malinverni *et al.* 2017), are particularly effective thanks to the sensitivity of the sensor in distinguishing objects in the shade and identifying pale elements in particularly brightly lit environments.[7] In addition, their high resolution (0.5 m) means we have two highly detailed images not only of the site of Shahr-i Sokhta but also of the surrounding area, unheard of for this geographical context and useful for identifying places of interest not just within the ancient city but also in the area around it.

Specifically, two scenes, provided by Pléiades sensor 1A, dated 16/08/2012, and Pléiades sensor 1B, dated 25/08/2017[8] (Fig. 2) were purchased in bundle mode. Both are composed of a panchromatic image[9] and a multispectral image[10] with spatial resolutions of 0.5 m and 2.0 m respectively. The preliminary study of the satellite material began with the scene provided by the Pléiades 1B satellite. The first step was to create a pansharpened image to join the spatial information of the panchromatic image with the spectral resolution of the multispectral image. Among the various algorithms available for the creation of such images, the following methods were used: Brovery, Gramschmidt, IHS and Principal Component Analysis (Lasaponara - Masini 2012) (Fig. 3). Each of these provides different information that can accentuate the resolution on the ground and the multispectral data depending on the case.[11] The preliminary processing also sought to combine the bands to form a colour composite, thereby emphasising elements that can indicate the presence of archaeological evidence (Fig. 4).

6. The Pléiades satellite images and the SPOT 6 stereo images were provided by ESA (European Space Agency), as Third Party Missions Data.
7. This is the result of the 12 bit pixel depth.
8. The Pléiades satellite group is composed of two satellites equipped with high-resolution sensors: Pléiades 1A, launched in 2011 and Pléiades 1B, launched in 2012. They follow a heliosynchronous orbit and have a temporal resolution of 26 days.
9. The panchromatic image has a single greyscale band covering wavelengths of 0.47 to 0.83 mm.
10. The multispectral image has four spectral bands with the following wavelengths: B0 (blue): 0.43-0.55 mm; B1 (green): 0.50-0.62 mm; B2 (red): 0.59-0.71 mm; B3 (near-infrared): 0.74-0.94 mm.
11. The best processing method is still being evaluated.

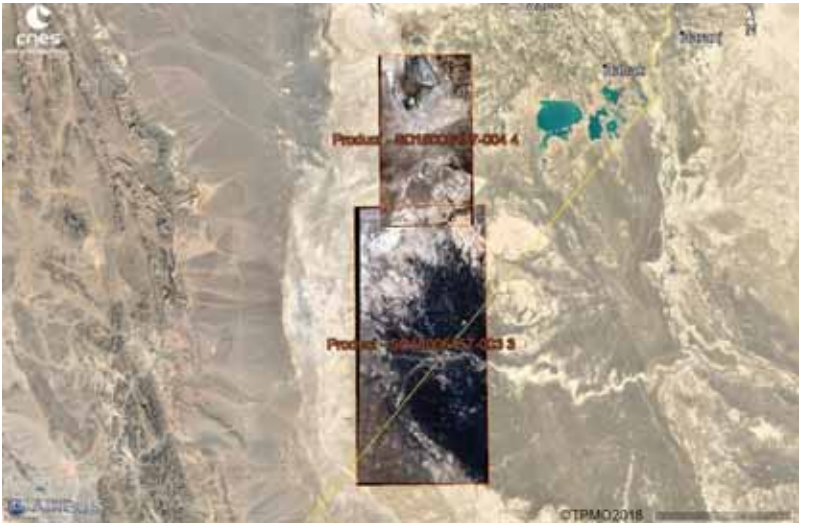

Fig. 2: positioning of the Pléiades images.

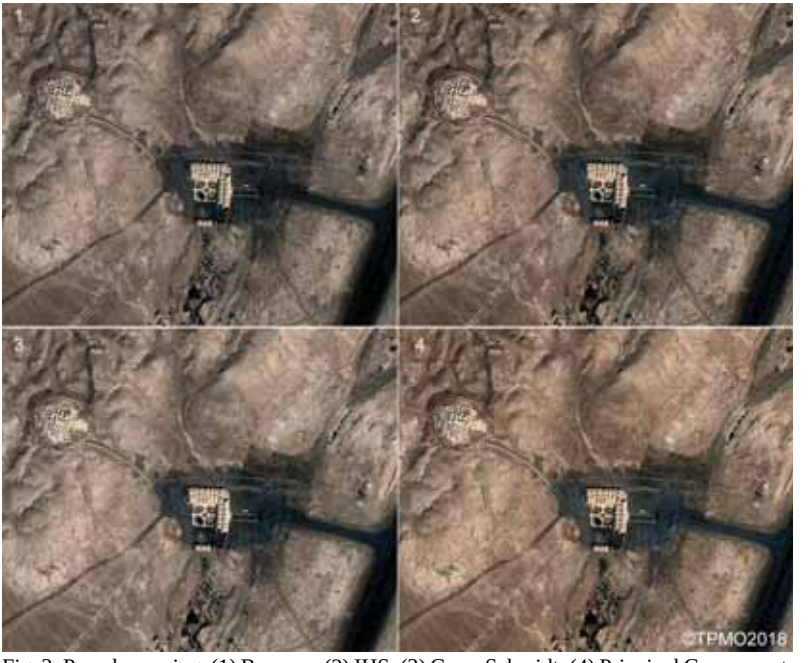

Fig. 3: Pan-sharpening. (1) Brovery; (2) IHS; (3) Gram Schmidt; (4) Principal Component.

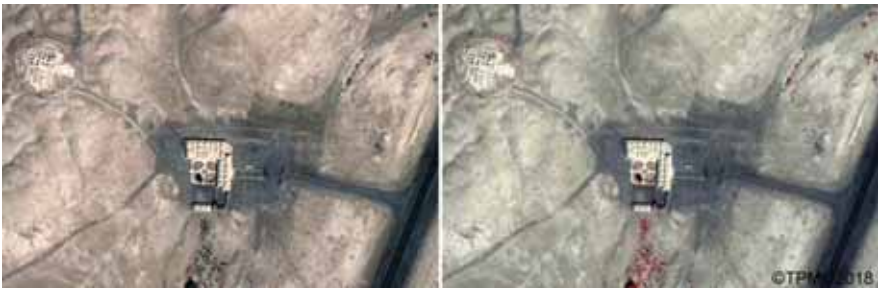

Fig. 4: Colour Composite. Left: natural colours (RGB 321); right: false colours (RGB 432).

In addition to the preliminary processing of the high-resolution images, a DEM of the plateau of Shahr-i Sokhta and the surrounding area was created from the SPOT 6 stereo images of 14/02/2016. This material is in bundle format and includes a panchromatic image and a multispectral image with spatial resolutions of 1.5 m[12] and 6 m[13] respectively. They were acquired in stereo mode and the two images (StereoA and StereoB) were processed using ERDAS IMAGE© and ERDAS eATE© software. In order to obtain a DEM with a reliable spatial resolution, the panchromatic image was used. The autocorrelation of the images with the terrain was performed using Rational Polynomial Coefficients (RPCs),[14] which are included as accessory information in the dataset of the images. After creating the tie-points between the two images, the software produces an initial output (an anaglyph) that shows the superimposition of the stereo images with the signalled tie-points (Fig. 5). The subsequent phase involved the creation of the DEM (Fig. 6), which, with a resolution of about 5 m on the ground, is the best DEM currently available for both the protohistoric site and the surrounding area, helping to accurately reconstruct the transformation of the landscape in the valley of the Hirmand.[15]

12. The panchromatic image has a single greyscale band covering wavelengths of 0.450 to 0.740 mm.
13. The multispectral image has four bands covering the following spectra: Blue (0.455-0.5225 mm); Red (0.530-0.590 mm); Green (0.625-0.695 mm); infrared (0.760-0.890 mm).
14. RPCs contain information on the way in which the satellite images were acquired. These data were used as it was not possible to obtain all the Ground Control Points on the ground needed for this operation.
15. The DEM generated and presented here represents an initial attempt to provide a reliable geomorphological support that will be revised and improved as the research moves forward.

As well as the use of satellite images, part of the work concerns the post-processing of aerial photographs taken by Unmanned Aerial Vehicles (UAVs).[16] The UAV-acquired images used in the present study were obtained from video footage of the upland of Shahr-i Sokhta: in addition to the residential and craft areas already excavated, numerous archaeological traces of buried structures are visible (Fig. 7).

Specifically, some stills show traces of broad areas of the ancient city that have not yet been investigated near the excavated sectors, such as those arranged around Area 26, which has been interpreted as a market, or near the Central Quarters. What is seen in these traces is the alteration of the composition of the terrain arising from the disintegration of the mud bricks and hence the clay of which they are composed (Fig. 8). Identification of the numerous archaeological traces, identified in aerial photographs acquired by drones, is helping to update and enrich our knowledge of the general plan of the site.

The post-processing of the UAV images involved first and foremost selecting still photographs from the video footage with sufficient overlap to allow them to be arranged in sequence. However, it was also possible to perform image-based 3D modelling, which makes it possible to generate measurements and 3D models from digital images. In the first place, the stills obtained from the video footage were tiled with the use of photomerging software, which makes it possible to develop a three-dimensional model of the area in question, in this case the excavation sector known as the “Monumental Area”, from the overlapping images.

The procedure for generating a 3D model consists of three fundamental steps:

mesh: after generating the dense points cloud the next step is to join up the vertices, edges, corners and faces that determine the shape of an object, creating a mesh of polygons that together form the surface of the digital volume.

16. The authors thank Dr Media Rahmani, of the Iranian research group, for granting us permission to use the aerial photographs taken by her.

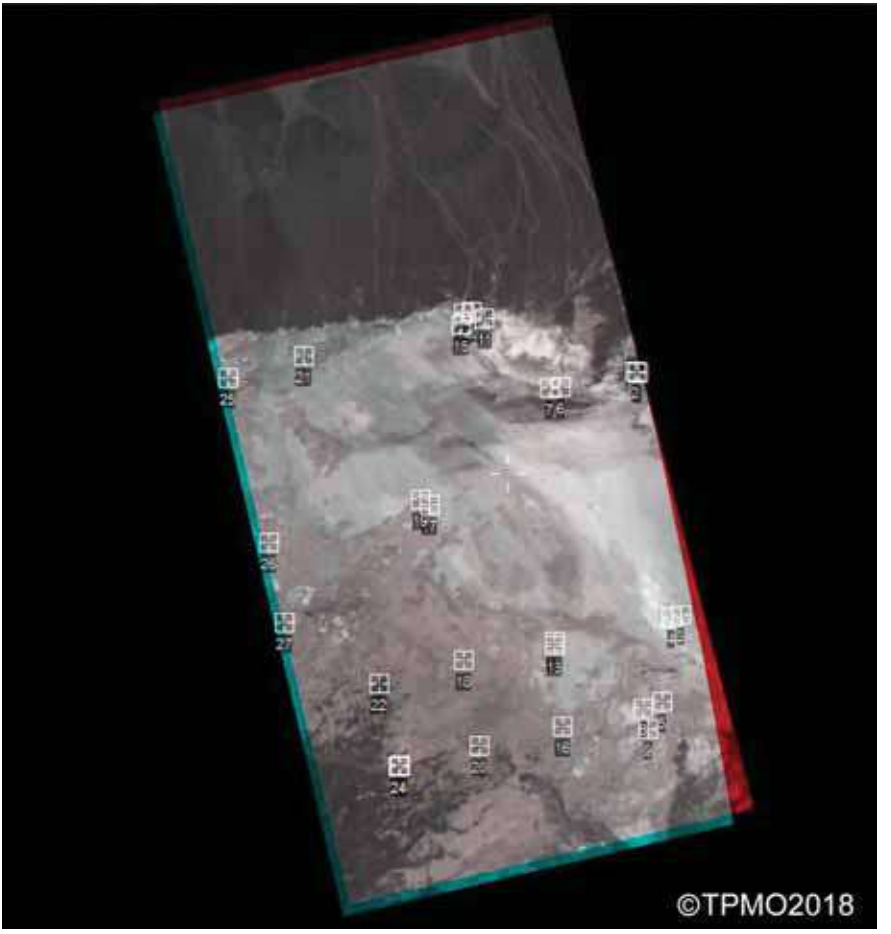

Fig. 5: anaglyph of the SPOT 6 stereo images with the identification of the tie-points.

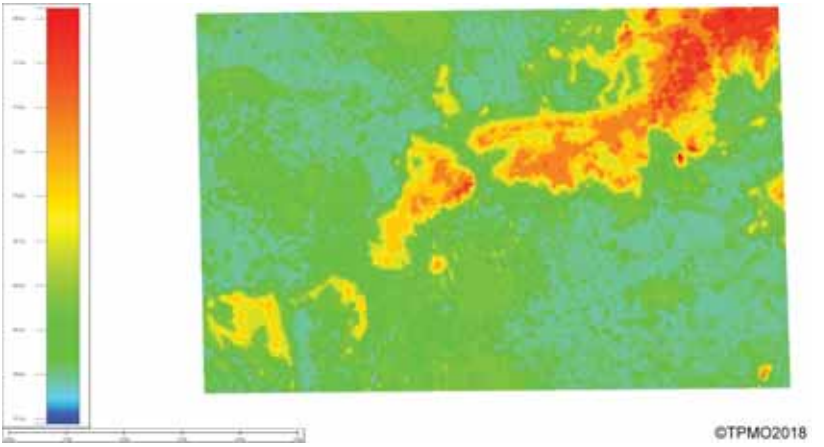

Fig. 6: DEM of the upland of Shahr-i Sokhta.

Fig. 7: upland of Shahr-i Sokhta: the arrows indicate traces of buried structures near excavation sectors.

Fig. 8: example of a trace arising from alteration of the composition of the terrain.

texture: in the texturing phase, the colour images are mapped on to the polygonal model (mesh), i.e. the geometrical 3D surface (Fig. 9: 2).

The model created is correctly repositioned in space with the help of Ground Control Points (and thus the three coordinates X, Y, Z), located in the field by Total Station. The use of GCPs makes it possible to rapidly extrapolate a perfectly georeferenced orthophoto (Fig. 9.3), which can be managed in a GIS environment. This in turn makes it possible to vectorise the traces identified, or even the excavation area if no site plan of this is available, enabling the rapid characterisation of the structures.

From the georeferenced orthophoto, and thus using the elevation (Z) assigned to each GCP, it is possible to obtain a DEM with contours at manageable distances (in this case 0.5 m between one isoline and the next). In dark red is the highest area, corresponding to the high part of the tepe on which the building was constructed; in blue are the areas with lower elevations. Note that the areas in pale red (to the

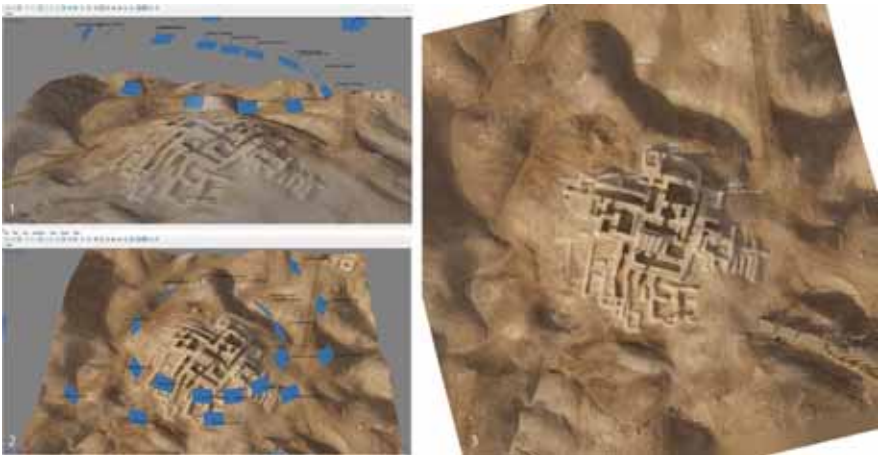

Fig. 9: post-processing of the drone images: from the points cloud (1) to the texturised model (2) and the processing of a georeferenced orthophoto (3).

north of the tepe) are characterised by uniform elevation, favourable to human occupation. This is highlighted by the creation of a path profile, which shows the altimetric profile of the area. Indeed, the aerial photographs of this sector show the traces of buildings that have yet to be excavated (Fig. 10). It emerges that the so-called "Monumental Area" was larger than previously assumed, or was flanked by other structures that occupied the highest flat parts of the tepe.

The images that yielded a high number of soil-marks were processed by applying various photographic filters in order to emphasise the traces (Fig. 11). The traces visible in the vertical photographs were vectorised in a GIS environment (Fig. 12).

Those visible in the diagonal images, which could not be vectorised, were used to document the areas that were richest in traces. In this way, it was possible to map the most interesting areas in which to conduct targeted UAV flights for the acquisition of aerial photographs in the future.

The information from both satellite images and images acquired by drones constitutes the basis of the GIS of Shahr-i Sokhta. Although the work is still in its infancy, it has been possible to map not only the excavated sectors but also the areas that have yielded the most evidence of buried structures. This mapping,

currently being updated, provides a starting point for planning and orienting future research activities. These will involve the acquisition of new satellite images, especially a satellite stereopair with greater spatial resolution from which to derive further information on the anthropised area, thereby improving the DEM. In addition, low-elevation aerial-photographic flights will be conducted, since the images used for the considerations set out in this chapter do not contain any of the parameters that are indispensable for the post-processing of the data.

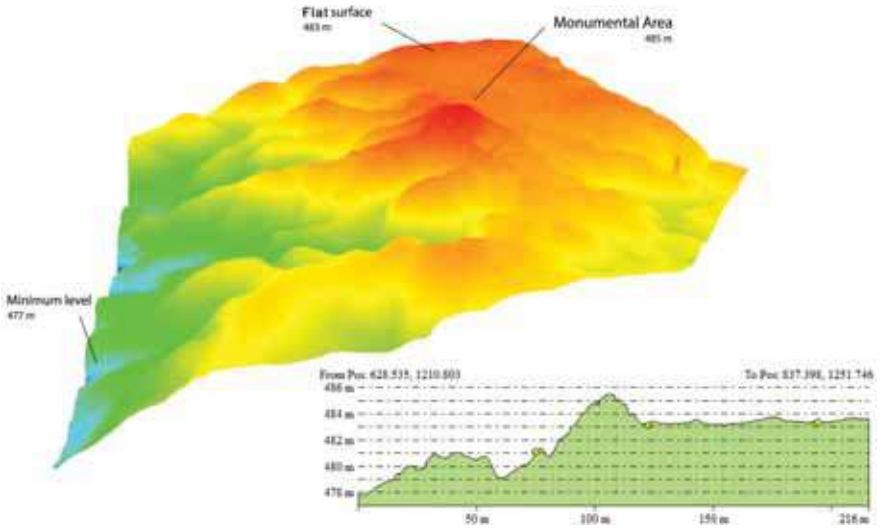

Fig. 10: DEM of the so-called Monumental Area with the relative path profile.

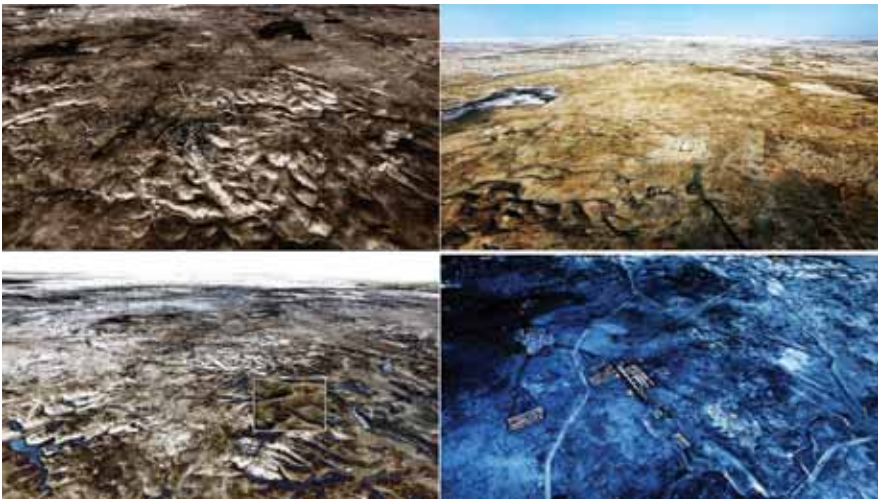

Fig. 11: examples of the application of photographic filters (by G. Murro).

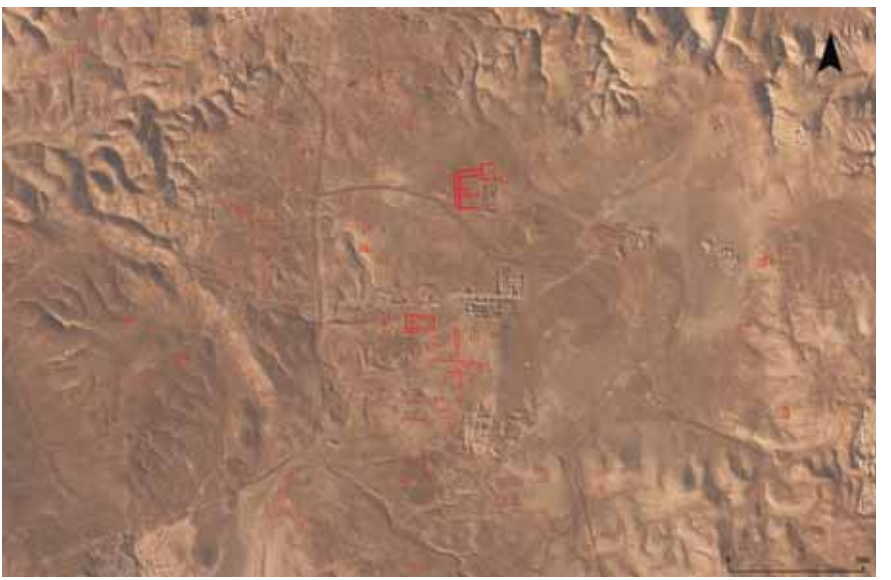

Fig. 12: vectorisation of the traces visible near Area 26.

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The Development and Expansion of Shahr-i Sokhta during Period IV

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1. Introduction

In Eastern Iran during the late 4th and early 3rd millennia BC, indications of economic development and an increase in the quantity and quality of practical and luxury goods can be observed (Tosi 1979: 153). Shahr-i Sokhta, with an area of more than 150 hectares, is one the largest archaeological sites on the eastern Iranian plateau. The site is located in the Sistan plain, some 57 Km from the city of Zabol, and it was first excavated by the Italian Archaeological Expedition led by IsMEO between 1967-1978 (Tosi 1968; 1969; 1983; Salvatori 1979). Since 1997 it has been investigated by the Iranian Archaeological Expedition led by RICCHT (Sajjadi 2008; 2014). The 3rd millennium BC saw spatial and topological specialization in both architectural structure and the urban fabric. Field studies show that the city was composed of three main sectors: the *Residential Area*, the Necropolis and the *Craftsmen's Area* (Mariani 1992: 183). The *Residential Area* reached its maximum expansion during the mid-3rd millennium BC, exceeding over 80 hectares, which is considered to be one of the largest urban settlements on the eastern Iranian plateau (Tosi 1977: fig. 5). Studying the reasons and nature of this expansion in 3rd millennium BC sites by means of archaeological

excavations and field studies will help to better understand the processes that led to the development of urban textures in Eastern Iran (Fig. 1).

2. Evaluation of archaeological evidence from Period IV (last century of 3rd and early 2nd millennia BC)

The predominant perception before the 2013 and 2014 excavations was that by the start of Period IV, Shahr-i Sokhta had become a small village and the process of its destruction had already begun. Finally, at the end of Phase 0 of Period IV (ca. 1800 BC) the site was totally abandoned, after a millennium of occupation (Salvatori - Tosi 2005). Environmental changes (Fouache *et al*. 2009), together with a large fire at the burnt building were the final blows that ended the life of the settlement (Fig. 2: 6).

Thanks to the excavations in Building 1 of the Residential Area, the Craftsmen's Area, the Central Quarters and workshops in various parts of the site (Fig. 3), it is now possible to gain a broader perspective on daily life in the settlement and its persistence in the last quarter of the 3rd and early 2nd millennia BC (Sajjadi - Moradi 2016: 150). It seems that the large structures and buildings brought to light by the excavations in fact reflected urban spatial and topological development at that time. Aerial photos taken by drones indicate large-scale constructions in the *Eastern Residential Area* and around *Building 1*.

It seems that in the last quarter of the 3rd millennium BC, urban development in Shahr-i Sokhta extended to previously unused sections of the site, with more intensive use of the *Central Quarters*, which is topographically lower than *Building 1*, and the *Eastern Residential Area* (Sajjadi - Moradi 2016: fig. 1). Layers 2 and 3 in Workshop 28 and layer 1 in Workshop 26 are probably related to this extensive construction activity in the last quarter of the 3rd millennium BC (Sajjadi - Moradi 2018: 112). Architectural evidence, along with mobile finds from Period IV, has been found in some excavated areas of Shahr-i Sokhta. Evidence of Period IV is found in phase F of *Building 1*; in the first and second layers of *Building 20*; in the first layer of Workshop 5 in the *Craftsmen's Area*; in two layers (0 and 1) of Workshop 26; in the first layer of Workshop 28; inside the

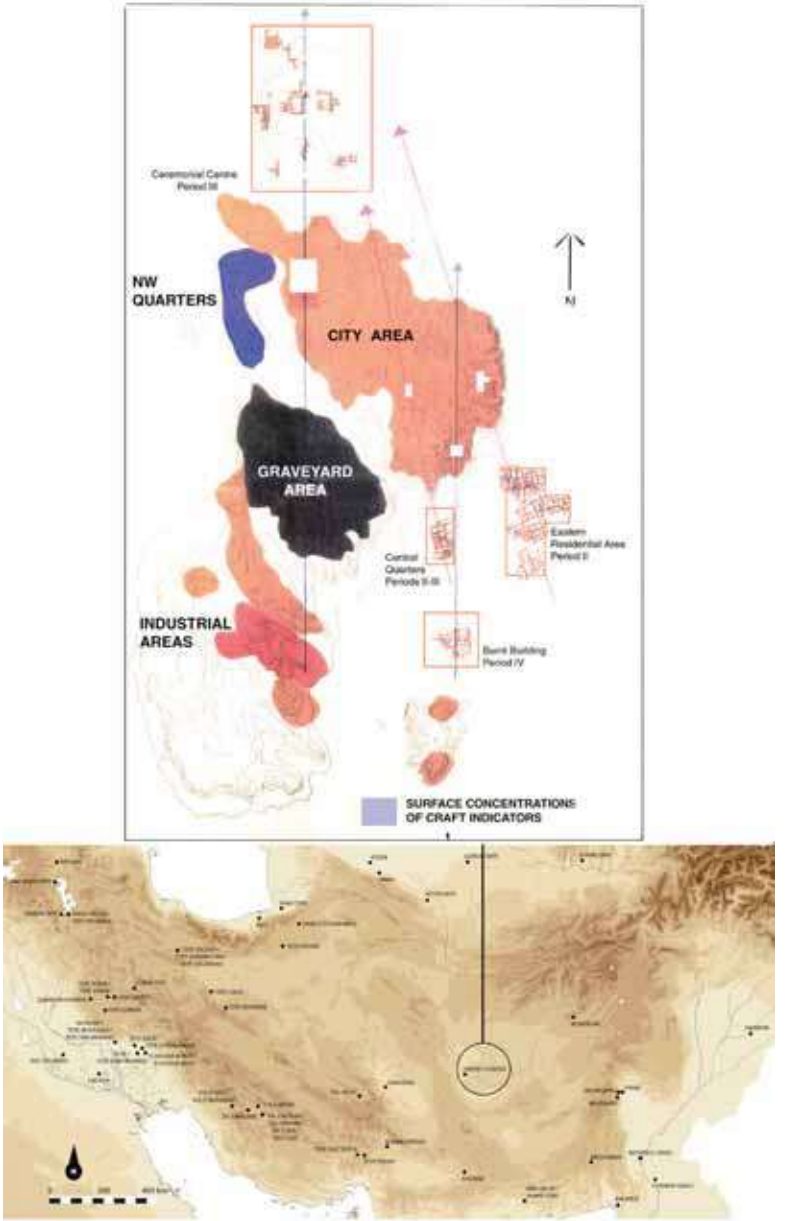

Fig. 1: the location of Shahr-i Sokhta in western Asia and the different sectors of the city according to their function (Mariani 1979; Desset 2014).

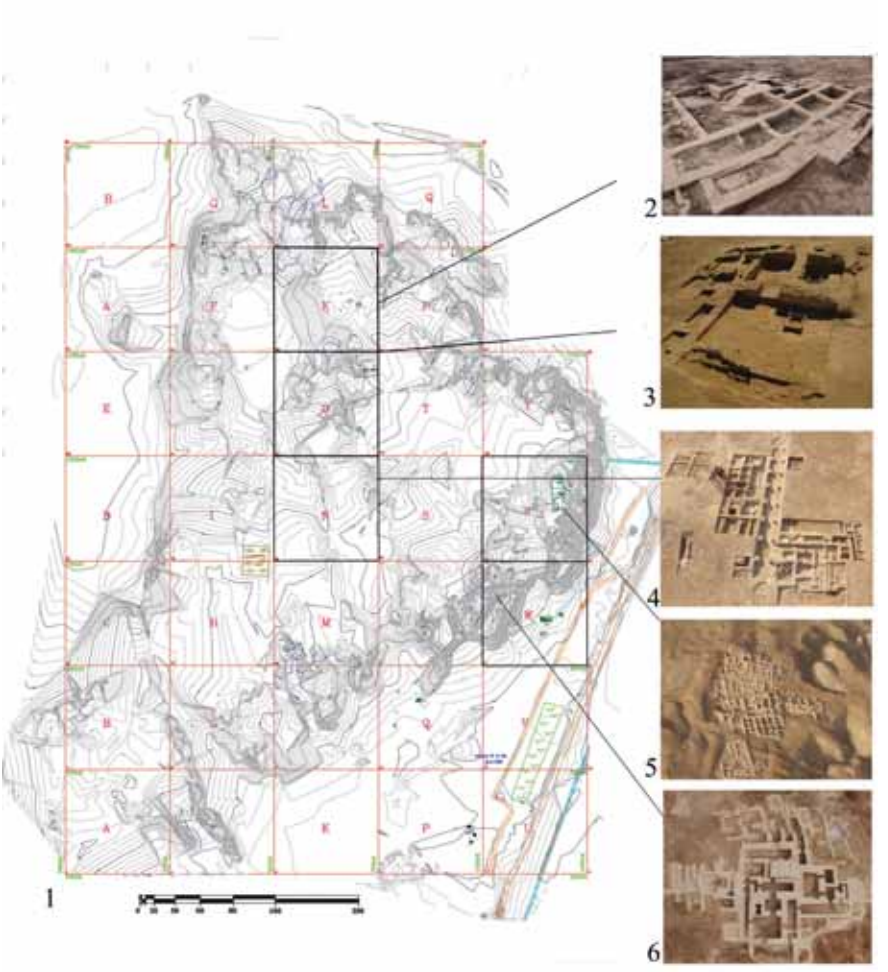

Fig. 2: topographic map of Shahr-i Sokhta and an aerial photo with remnants of period IV (Sajjadi - Moradi 2015).

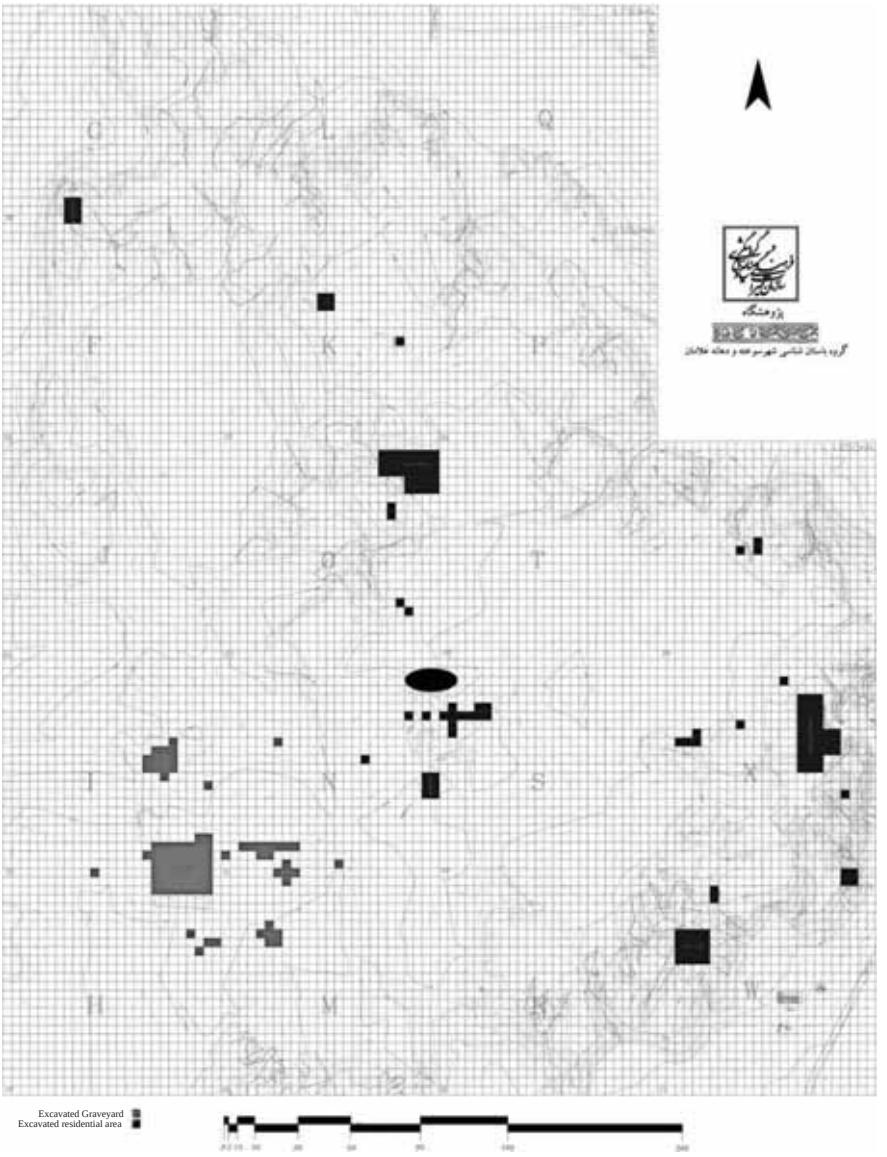

Fig. 3: Shahr-i Sokhta, general map of the site: brown color: residential areas; purple: graveyard.

excavated passageway in Workshop 29; and in the *Craftsmen's Area* in the west of the site. To all these may be added the Period IV layers of the *Burnt Building* in the very southeast of the site (Fig. 2).

Burnt Building (Period IV)

The predominant assumption was once that Shahr-i Sokhta became a small village in Period IV, which was marked by a process of decline and destruction. Finally, at the end of this period, corresponding to Phase 0 (ca. 1800 BC) the city perished and was abandoned after more than a thousand years (Fig. 4).

Building 1: layer F

Building 1, in the monumental section of the *Residential Area*, is one of the largest excavated structures in Shahr-i Sokhta. Excavations of this building started in 1979 and ended in 2012. An area of almost 1600 square metres of this building, located in square "O", has been excavated (Fig. 5). Of the six layers unearthed, five belong to Periods II and III of the site, while the last layer, phase "F" of the building, can be attributed to the end of Period III and Early Period IV (Sajjadi - Moradi 2014: 89) (Fig. 6).

In this phase no architectural structure related to Period IV has been found, but a considerable quantity of buff ware vessels made of red paste with everted rims and red slip, characteristic of period IV, have been recovered. Phase F is the terminal phase of *Building* 1, after which it was completely abandoned. This phase may be recognized in the large southern staircase (Fig. 7), the blocked entrances and Space 41a. It seems that in this phase or even earlier, the building was deliberately filled in and the floor plan of phase E was used for a new structure. Some indications of this phase can be observed around the building and in Workshops 18 and 19. In these two workshops, next to *Building 1*, traces of mud brick pavements, probably related to phase F of *Building 1* and Period IV of Shahr-i Sokhta, are visible (Fig. 8) (Sajjadi - Moradi 2012).

Fig. 4: aerial photo of the Burnt Building (photo M. Rahmani).

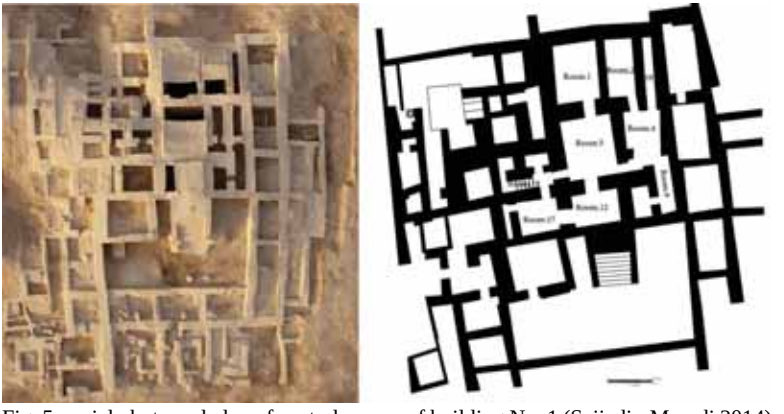

Fig. 5: aerial photo and plan of central spaces of building No. 1 (Sajjadi - Moradi 2014) (photo Rahmani).

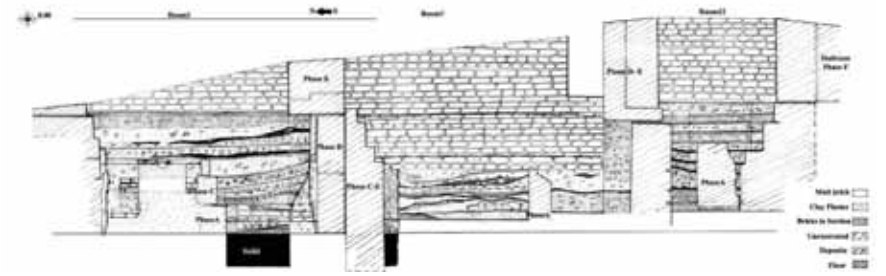

Fig. 6: Shahr-i Sokhta North-South section of central part of *Building 1* (Sajjadi - Moradi 2014).

Fig. 7: *Building 1*. Large staircase (Phase F).

Workshop 5: layer 1

Workshop 5 is located on the north-western edge of the site, north of the *Craftsmen's Area*. A vast mud brick pavement (Fig. 9) was found in the upper layer, which is characteristic of Period IV architecture in Shahr-i Sokhta and similar to the mud brick pavement that had already been found in the *Burnt Building* and *Building 1*. Associated with this layer were architectural structures including rooms and a mud brick platform, as well as a large number of standard Period IV pottery fragments, including shallow bowls made of red paste with a brownish slip and everted rims. Many of these items had angular bodies, which is a characteristic of Phases 0 and 1 of Period IV.

Fig. 8: Workshop 19, mud brick pavement.

Fig. 9: Workshop 5, mud brick pavement.

Building 20: layer 1

Building 20 is a singular architectural complex. Although this building has some similarities with *Building 1* and the architecture of Shahr-i Sokhta more generally, the presence of some architectural elements extends its function beyond that of a simple house, in a way that suggests it served as a temple in late Period III and early IV (Fig 10).

Although excavations in this building have not yet finished, present evidence shows it was a single-period structure, which means that the building was used for a specific time span and then abandoned (Sajjadi - Moradi 2014: 85). Chronologically, the ceramics found here are categorized into two groups including Plain Buff Ware and Painted Buff Ware. These types are both common in various periods of Shahr-i Sokhta, but all the samples found here are from Period III. The Painted buff ware from this building is decorated with crosshatched leaves and other linear motifs that were common in Phase 3 of Period III. Another group of pottery fragments is composed of Plain Buff Ware bowls with everted rims that are morphologically similar to Sistan specimens from the historical period. These bowls were all found in the top layer of *Building 20* (Fig. 11). Analogous ceramics have been unearthed in Workshop 26 on the eastern edge of the site. These are plain, made of dark buff paste with thick brownish slip (Fig 11: 15). Generally, it seems that *Building 20* was used in a certain period, which according to ceramic evidence may be late Period III and early Period IV.

Building 26 (Layers 0-1, Squares SDD, SDG, SDI, SDN, SDR, SDS, SDT, SDX, SEP)

Workshop 26 is located in the *Central Residential Area*, on the western side of the large depression and north of the *Residential Area*, at a distance of 50 metres from the trenches excavated by the Italian Expedition (Salvatori 1979: 141-144; Salvatori - Vidale 1997) (Fig. 12). Three layers of architectural remains are recognized in this workshop, including layers 1, 0 and the “upper layer” (Fig. 15). The most significant excavated sections belong to layer 1. The architectural elements of layer 1 include three main parts: a corridor with buttresses, storage

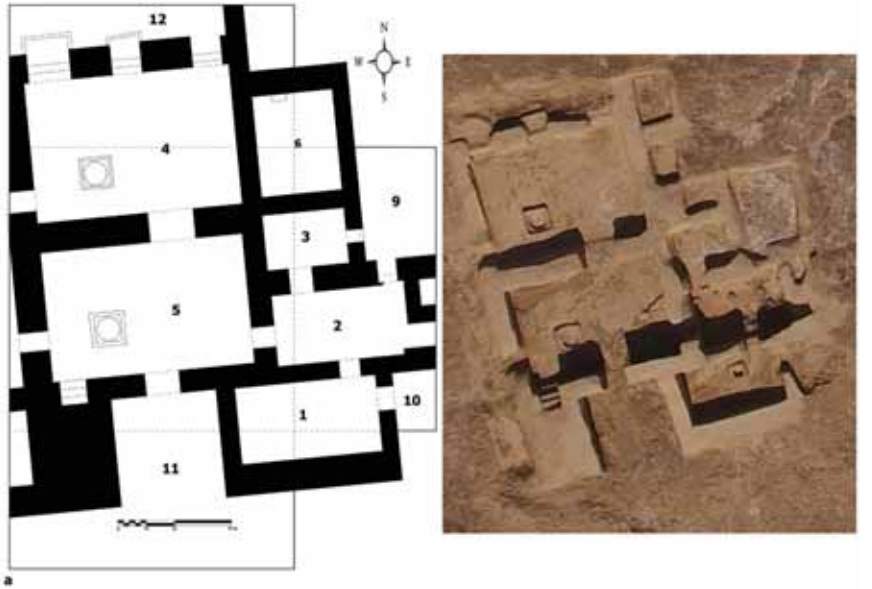

Fig. 10: *Building 20*: Aerial photo and plan (photo M. Rahmani).

rooms, and a southern residential section known as the burnt rooms, which are preserved better than elements in the other layers (Fig. 13). Found next to one of the buttresses were 18 small jars made of red and grey paste with a thick brown/ochre slip (Fig. 14), which are comparable to Shahr-i Sokhta IV and Mundigak IV ceramics in terms of slip and form (Biscione 1974: fig. 12, n. 737; 1979: fig.4).

Other pottery fragments from layer 1 are also comparable with typical bowls from Period IV (Fig. 16).

In squares SDG and SDR, layer 0 above layer 1 includes scattered architectural remnants in various sections of trench, mostly single rooms with internal installations such as a stove (Fig. 15). In some cases, the rooms are connected to the adjacent room by a doorway. No recognizable architectural complex has been completely excavated in this layer, but the ceramic finds suggest a connection with Period IV. Plain buff ware consisting mainly of carinated bowls was found on the mud brick pavement (Fig. 10). The ceramics of this layer and the upper

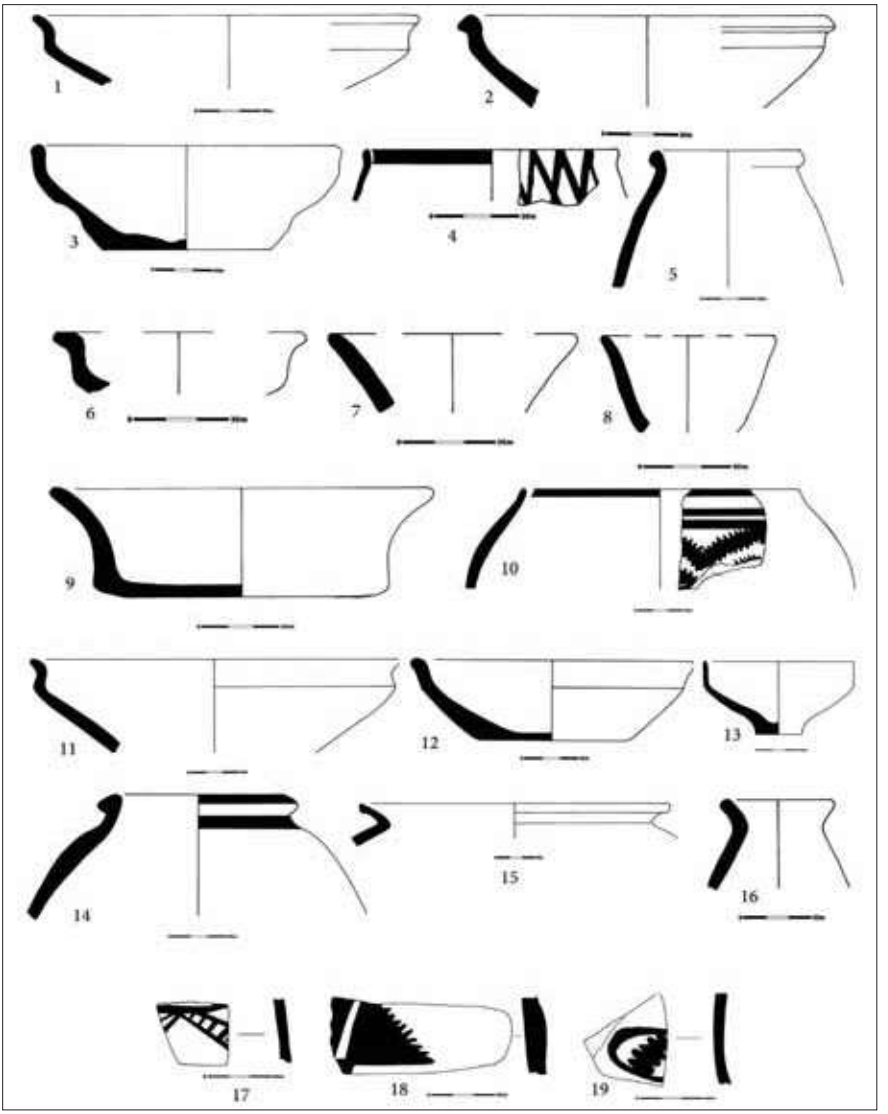

Fig. 11: *Building 20*: plain Red Ware items with brown to reddish paste and body, wheel made (Nos. 1, 2, 6, 11 bowls; 8. Flower vase; 9, Basin; 15, wide mouth jar; plain Buff Ware items with buff color slip and body. Wheel made (Nos. 3, 7, 12, 13 Bowls; 5, 16 Wide mouth, small jar); painted Buff Ware items with buff color paste and body, black paint, geometric designs, wheel made (No. 10, close mouth jar; 14, wide mouth jar; 17-19, body fragments); Painted Grey Ware item with grey paste and body. Wheel made, black paint (No. 4, wide mouth jar).

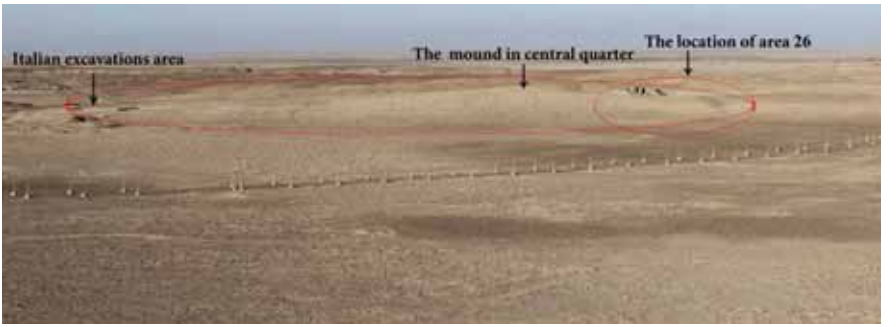

Fig. 12: Location of Workshop 26.

Fig. 13: *Building 26*. Aerial photo (photo M. Rahmani).

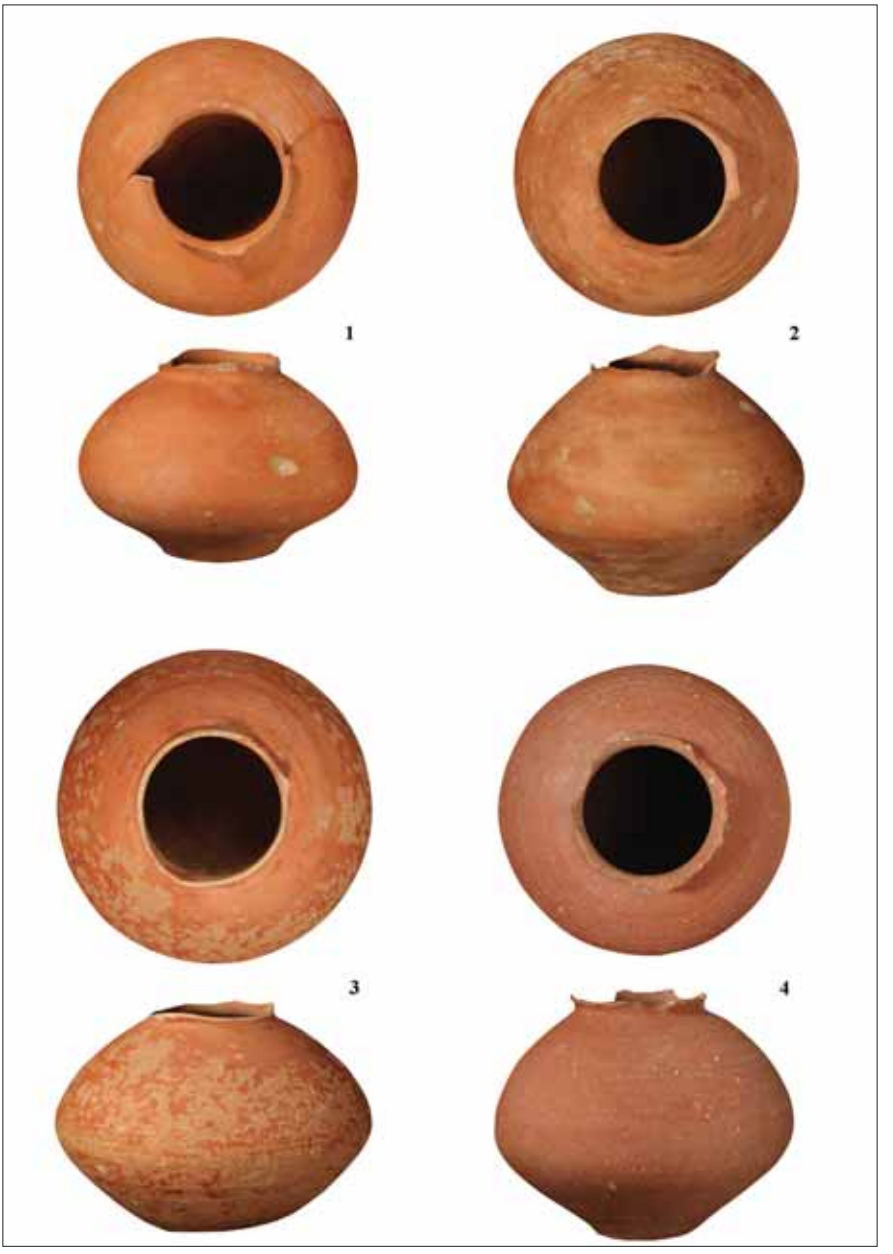

Fig. 14: Workshop 26, Trench SDI, Layer 1, Cut. 5. Red Ware small jars.

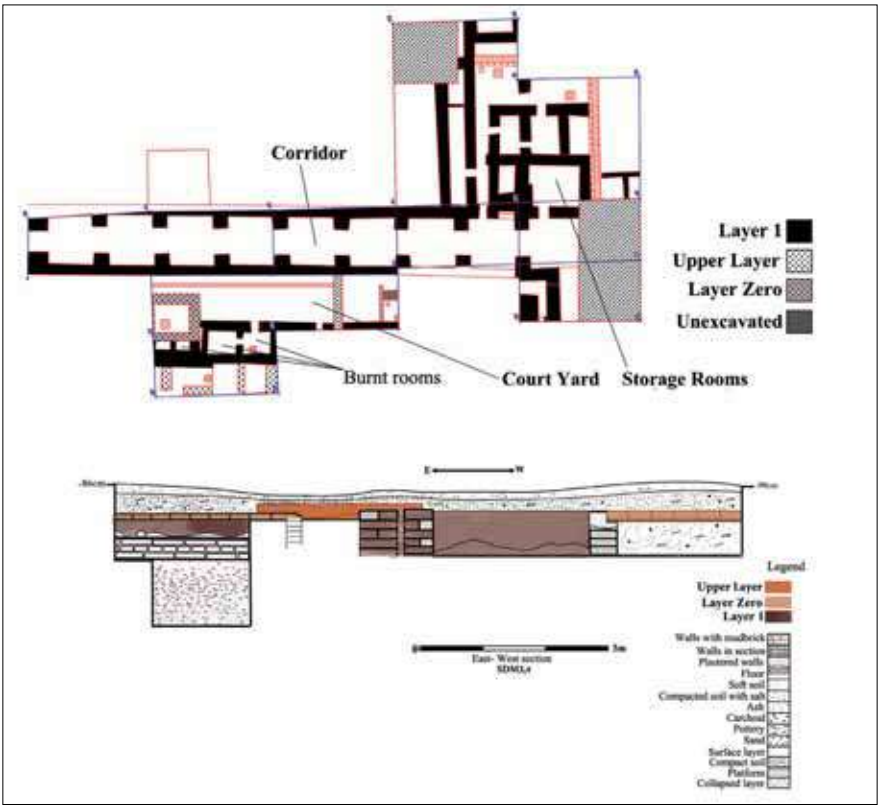

Fig. 15: *Building 26*. Plan and section (Sajjadi - Moradi 2016).

layer are chronologically more clearly related to Period IV. The paucity of painted fragments is one of the characteristics of the pottery assemblage in this layer (Fig. 17).

Traces of scattered walls have been found on the southern and eastern edges of the workshop (squares SDR and SEP, Figs. 18 and 19). This assemblage consists of walls that together form one or two rectangular spaces. Some pottery samples from this layer are related to Period III of Shahr-i Sokhta, but the predominant form is plain buff pottery, sometimes with ochre slip, which is characteristic of Period IV (Biscione 1979: 295-297) (Fig. 20).

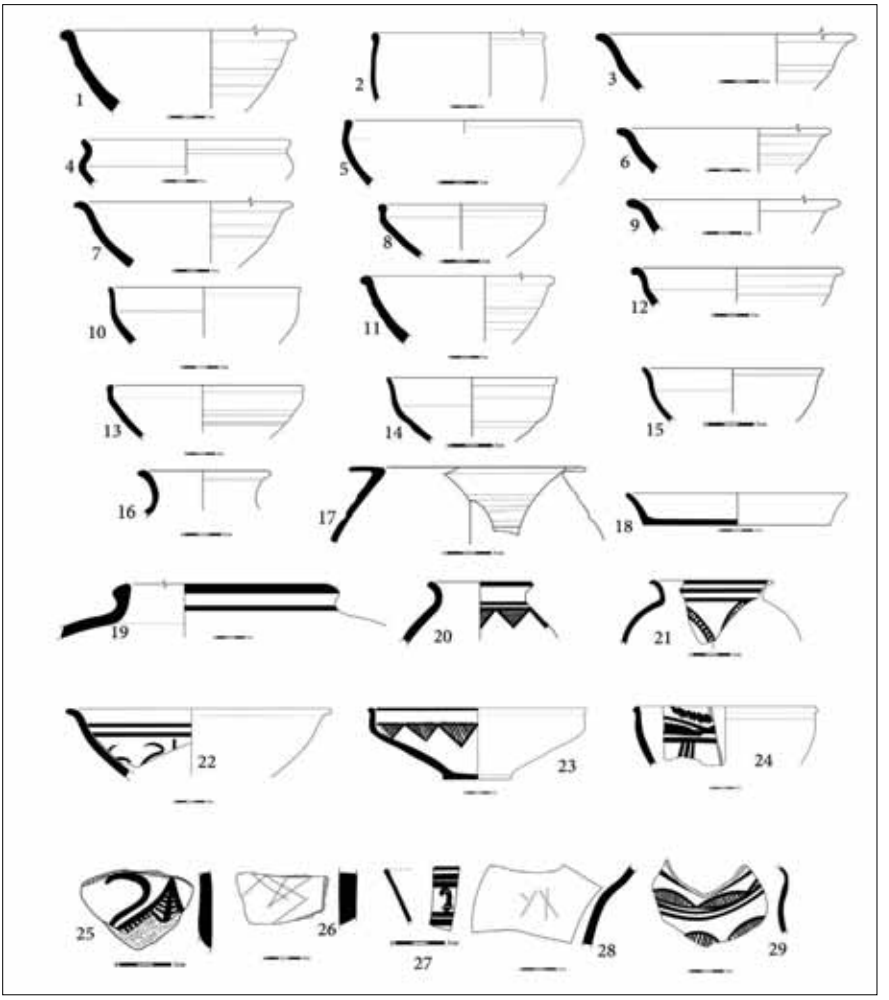

Fig. 16: *Building 26*, Layer 1. Plain Red Ware items with red paste and body, wheel made (Nos. 4, 5, 6, 8, 9 Bowls; 17 Close mouth jar; 18, Wide mouth basin), plain Reddish Ware items with light red paste and body, wheel made (Nos. 3, 7, 10-13); plain Buff Ware items with buff paste and body, wheel made (Nos.1, 2, 14, 15 bowls; 16 Wide mouth jar); plain Buff Ware items with buff paste and body, wheel made with potter's mark (Nos. 26, 28); painted Red Ware items with red paste, dark red color slip , brown paint, wheel made (Nos. 22. Bowl: geometric design inside; No. 25. Body fragment with floral design): painted Grey Ware items with light grey and red paste. Black paint, wheel made (Nos. 23. Bowl with geometric design inside; 27. Deep beaker with zoomorphic design); painted Buff Ware items with buff paste and body, brown geometric paint, wheel made (Nos. 19, 20, 21, 29 Wide mouth jar; 24, Bowl).

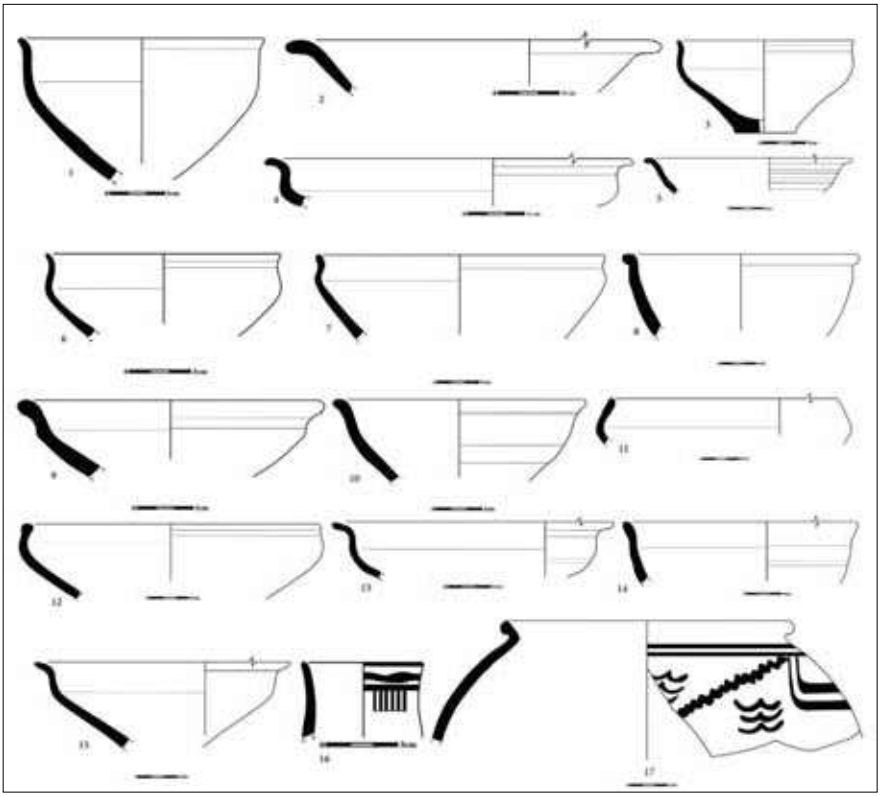

Fig. 17: Workshop 26. Square SDR, layer 0. Plain Buff Ware items with buff paste and body, wheel made (Nos. 1, 3, 6, 8, 11, 14 bowls); plain Red Ware items with red paste and body, wheel made (Nos. 2, 7, 15, deep wide mouth bowls) (4, 9, 13, shallow wide mouth bowls) (12, close mouth bowl); plain Reddish Ware items with red paste and body, wheel made (Nos. 5, 10 bowls); painted Buff Ware items with buff paste and body, geometric brown designs wheel made (Nos. 16 beaker; 17 jar).

Workshop 28

Layer 1

Workshop 28 is located north of the *Central Residential Area*, 50 metres north of Workshop 26, and has three structural layers: 3; 2; and 1 (Fig. 21). The walls excavated in layer 3 generally consisted of one row of mud bricks (Fig. 22). The bricks were badly worn and difficult to recognize during the excavation. The ceramics included painted and unpainted vessels, most of which have characteristics typical of Period IV (Fig. 23). A bowl with cross-hatched leaves

Fig. 18: Workshop 26: Square SDH, Upper layer architecture remnants.

Fig. 19: Workshop 26: Square SDR, Upper layer architecture remnants.

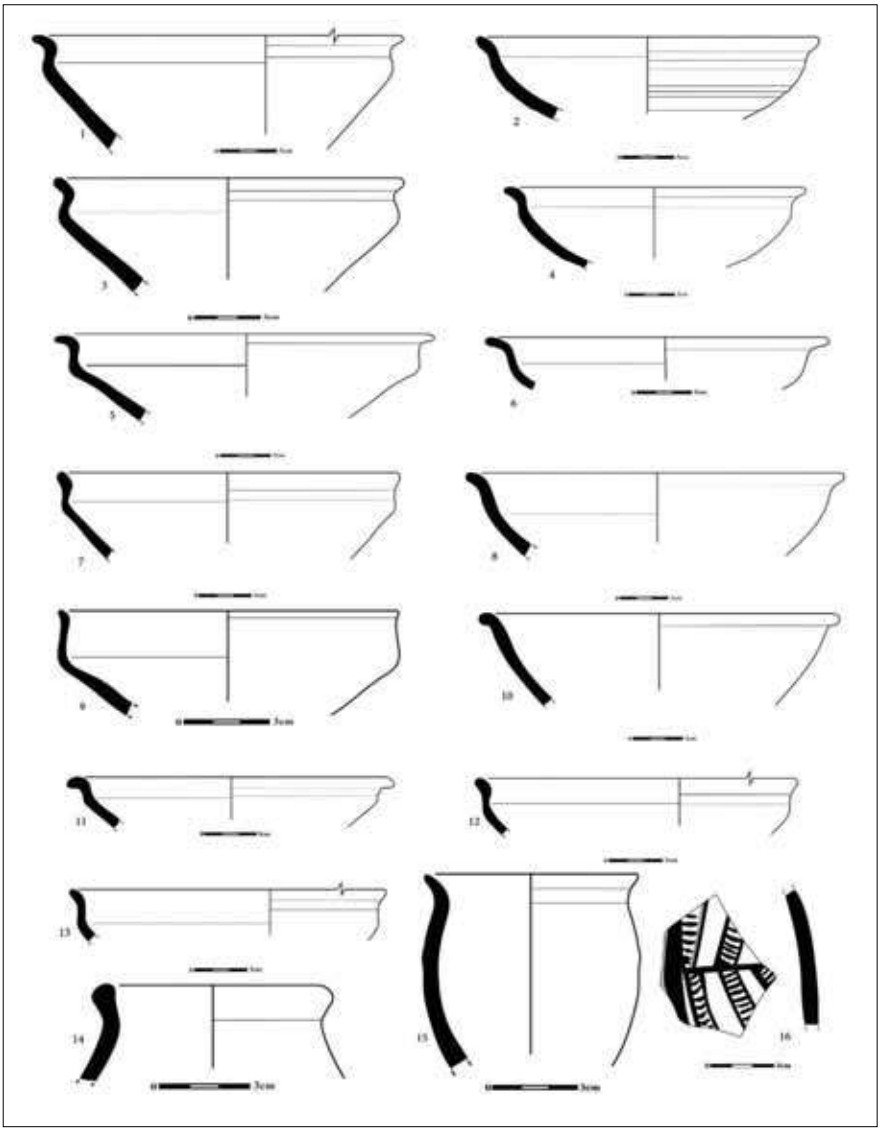

Fig. 20: Workshop 26: plain Reddish Ware items with light red paste and body, wheel made (Nos. 1, 2, 8, 9, 12, 13 bowls); plain Red Ware items with red paste and body, wheel made (Nos. 3, 5, 6, 7, 11 bowls); plain Buff Ware items with buff paste and body, wheel made (Nos. 4, 10, bowls; 14, 15, jars); painted Buff Ware items with brown color floral design, buff paste and body, wheel made (No. 16 Body fragment).

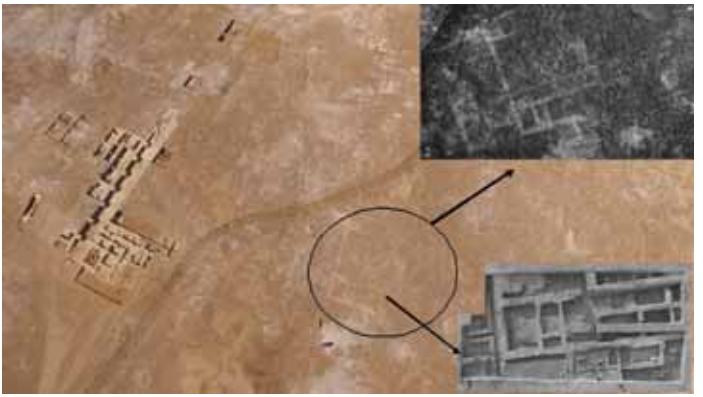

Fig. 21: Workshop 28 before and after excavation (photo M. Rahmani).

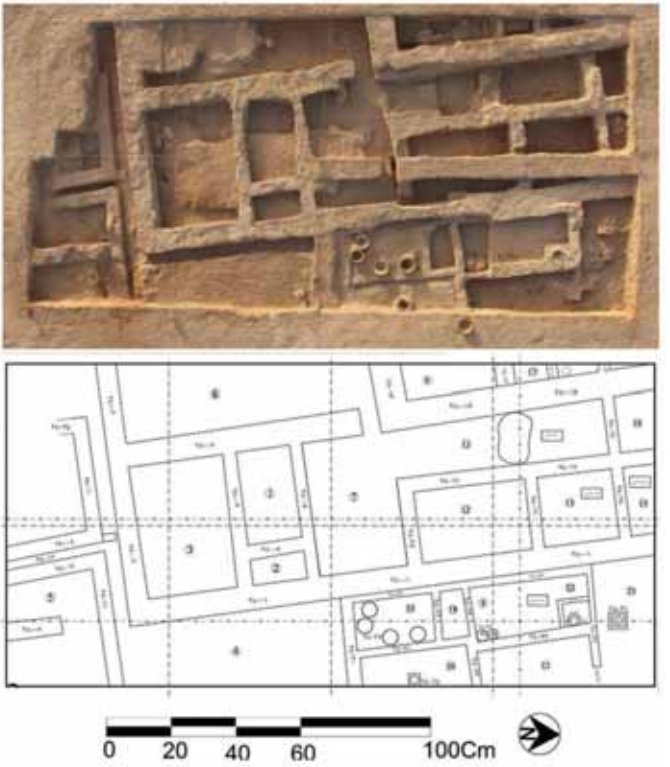

Fig. 22: Workshop 28. General map.

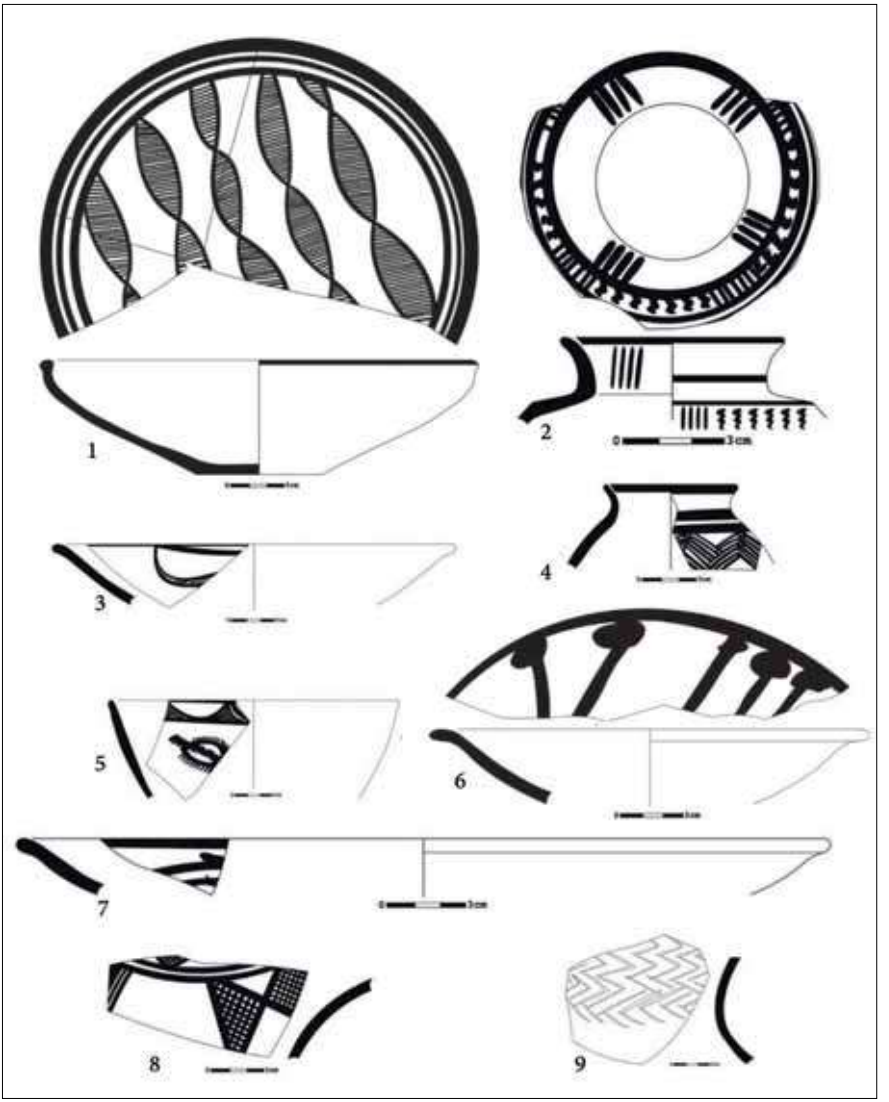

Fig. 23: Workshop 28. Painted Grey Ware items with black geometric motifs (Nos. 1 Bowl; 2. Jar); painted Buff Ware items with brown color geometric motives (Nos. 4, jar; 5, deep bowl; 6, 7, shallow bowl; 8 and 9, fragments (No. 9 is incised); painted Red Ware items, red slip, brown color geometric (No. 3 shallow bowl).

Fig. 24: Workshop 29: passageway and pottery fragments.

(Fig. 23: 1) shows the relationship between this layer and the later phases of Period IV (Biscione 1990: fig. 4). This bowl was found on the surface of Space 22 alongside other pottery specimens considered to be typical of standard pottery forms in Period IV. Hence, it can be suggested that the upper layers of Workshop 26 were contemporaneous with the Central Residential Area in Period IV and probably part of its construction.

Workshop 29 (Passageway)

Layer 1

Workshop 29 is located 50 m north of Workshop 28. Based on aerial photography, it seems to be part of a long passageway. This passageway contained a mixture of materials including pottery fragments from various periods, particularly Period IV, especially shallow bowls with leaf motifs, characteristic of Phases 0 and 1 of Period IV (Fig. 24).

3. Other evidence: Surface surveys and excavations in the satellite sites

Surface surveys of Shahr-i Sokhta show Period IV pottery in most of the Residential Area. Previous archaeological surveys in the Sistan plain have also shown many satellite sites contemporaneous with Shahr-i Sokhta Period IV (Mosavi Haji - Mehrafarin 2008). To these findings may be added the data obtained from the excavations of Tepe Taleb Khan 1 and 2, some 12 Km south of Shahr-i Sokhta, and Tepe Graziani (Kavosh *et.al* 2019). Excavations in Tepe Rud Biaban 30 Km southeast of Shahr-i Sokhta also yielded finds that are consistent with Period IV (Mariani 1993-94).

4. Conclusion

Evidence of Shahr-i Sokhta Period IV has been found in the excavated layers of workshops throughout the Residential Area of the site. Interpretation of this distribution in a broader perspective would undoubtedly clarify many issues and help formulate theories concerning this ambiguous period. Architectural evidence and relics from Period IV have been found in phase F of *Building 1*

and Workshop 19; the first and second layers of *Building 20*; the upper layers of Workshop 5 in the *Craftsmen's Area*; the upper layers of Workshop 26; the first layer of Workshop 28; and inside the passageway in Workshop 29. This distribution covers almost all of the *Central Residential Area*, *Building 1* in the north and the *Craftsmen's Area* in the west of the site. To these sections may be added the *Burnt Building* in the southeast of the site (Fig. 25).

The ceramics related to Period IV are mostly shallow bowls with a carinated body and everted rims which can be seen on the surface or within the context in all the above-mentioned areas. Deformed or underfired fragments were found inside some of the trash pits. The presence of these materials both on the surface and in the excavated layers attests to the extensiveness of the Period IV settlement of Shahr-i Sokhta. It seems that during Period IV, when it was previously thought that the city was on the verge of extinction, new structures were built over architectural remains from the preceding Period III.

However, it should also be noted that the architectural structures associated with this period were in the uppermost level of the site, which is more exposed to natural erosion and more severely affected by the process of destruction and disappearance of the structures of this period.

The excavations of recent years in the residential areas of the site have shown that unlike what was previously thought, in this period the city expanded greatly and the area under construction was extended to cover a large part of the site. By taking account of the excavations of *Building 1* and the northern and central residential sections, it is possible to have a broader perspective on daily life in Shahr-i Sokhta and its persistence in the last quarter of the 3rd and early 2nd millennia BC. It is possible that in the last quarter of the 3rd millennium BC, due to construction density, new areas were occupied and the city expanded horizontally. This process led the *Central Quarters* to reach its greatest extent and density during Period IV.

In the last quarter of the 3rd millennium BC, construction reached parts of the site that had not been used that much before, while the Central Quarters,

topographically lower than *Building 1* and the *Eastern Residential Area*, were frequented more intensively. Another point is that before these excavations it was assumed that evidence from Period IV could be found only in the *Burnt Building* area and that the city reached its peak in the 3rd millennium BC and perished soon afterwards. Today this assumption needs to be revised in response to the new excavations in the *Central Quarters*, which found occupational evidence of Period IV, especially the later phases. Other evidence from the northern parts of the site, such as *Buildings 1 and 20*, should also be considered.

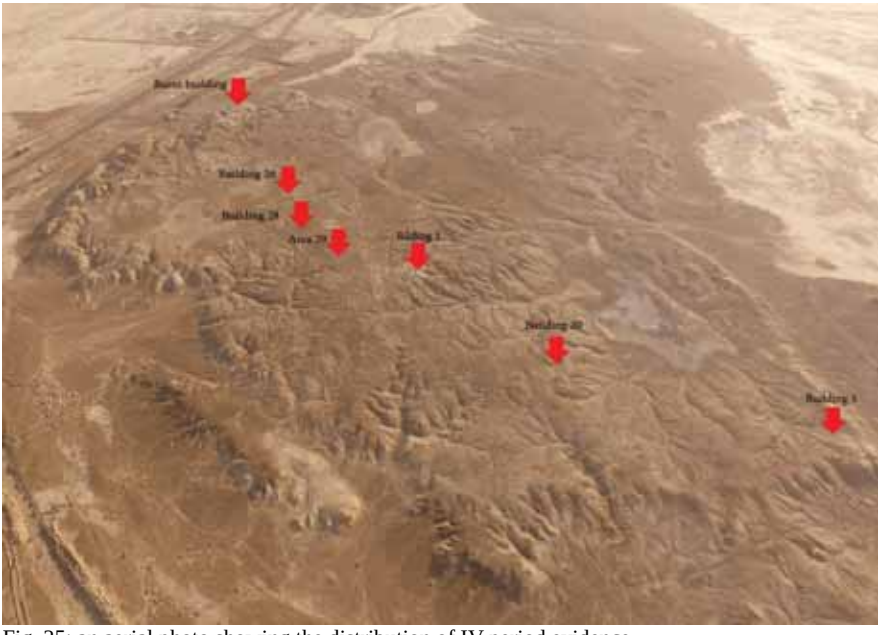

Fig. 25: an aerial photo showing the distribution of IV period evidence.

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Part II
Archaeological Researches

Harmonies and Similarities Between Sistan and Turkmenistan during the 3rd Millennium BC.

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During the third millennium BC, Sistan and Southern Turkmenistan had extensive cultural and commercial exchanges. Geographically, these territories are located on the southeastern and northeastern edges of the Iranian Plateau respectively and are considered part of Middle Asia.

Investigations have led to the recognition of the development of urbanism and to the identification of the socio-economic characteristics of large territories in Iran and the Indo-Iranian border regions from the 4th to the 2nd millennia BC. These territories were located between two other great civilizations: Mesopotamia and the Indus valley, together forming a vast area bounded by the Aral Sea in the north and the Makran Sea in the south. The southernmost part of Middle Asia, off the coast of the Makran Sea, is now under water but was probably a suitable place for human communities during the Palaeolithic Era. Lithic Industries, related to the Middle Palaeolithic period, have been identified there and in the southern parts of the Lesbela region on the border between Baluchistan and Sindh, as well as at the southeastern tip of the Baluchistan Highlands; some of them have been attributed to the Pleistocene Era (Sajjadi 2009-2010).

The issue of commercial and cultural relations between Shahr-i Sokhta and distant areas is long and complex. There are many indications that this ancient city was linked not only to Mesopotamia and Ilam, but also to the southern, eastern and northern parts of the Iranian Plateau. In this period, there were extensive relations between Shahr-i Sokhta and the settlements of Southern Turkmenistan, such as Altyn Tepe and Namazga, as well as Mundigak in Afghanistan. During Period II, the emergence of full-time artisans is well documented. The discovery of a large amount of materials such as opal, lapis lazuli and turquoise, along with the relevant tools, is evidence of an active market for these products in the city (Tosi 1974). Alabaster mines have been detected in the Sistan Plain (Tucci 1977), but other semiprecious stones, such as lapis lazuli and opal, were certainly imported. More than 90% of the lapis lazuli and opal found in Shahr-i Sokhta is waste material, indicating the preliminary preparation of small lightweight blocks of semi-precious stones. In fact, the discovery of piles of scrap, chips and semi-finished lapis lazuli, turquoise, onyx and other semiprecious stones in Shahr-i Sokhta and Tepe Hissar, along with diverse tools such as blades and saws, indicates that the site was a centre for the processing of these materials.

In the vast geographical area of Middle Asia, in addition to the Hirmand River Delta, there are at least five other main cultural regions (Fig. 1):

Southern Area No. 1: The main site in this region is Bampur. After the short investigations of Sir Aurel Stein (1937), Beatrice de Cardi began the first new activities in 1965 by excavating two small test trenches in Bampur (de Cardi 1970). Other important archaeological activities in Iranian Baluchistan include the archaeological surveys in Ladiz (Hume 1976), Khas (Maruchek 1975), Sedich (Vita-Finzi - Copeland 1980) and Damen (Tosi 1970), as well as more recent surveys on the Bampur plain (Moradi *et al.* 2014). (Fig. 2).

Eastern Region No. 2: Mundigak is the largest archaeological site in central Afghanistan, located in the vicinity of Kandahar (Casal 1961). It is considered the main site of Region No. 2. The seven identified periods in Mundigak indicate 3,000 years of occupation from the beginning of the 4th millennium to the 2nd millennium BC. During this relatively long period, Mundigak developed from

Fig.1: six Cultural Regions of Middle Asia: 1. The southern region with Bampur as the center; 2. The eastern region with Mundigak as the center; 3. The southeastern region with Mehrgarreh as the center; 4. The southern hillsides of the Alborz Mountains with Tepe Hissar as the center; 5. The northern region, Turkmenistan, with Altyn Tepe and Namazga as the main sites; 6. Sistan is not numbered.

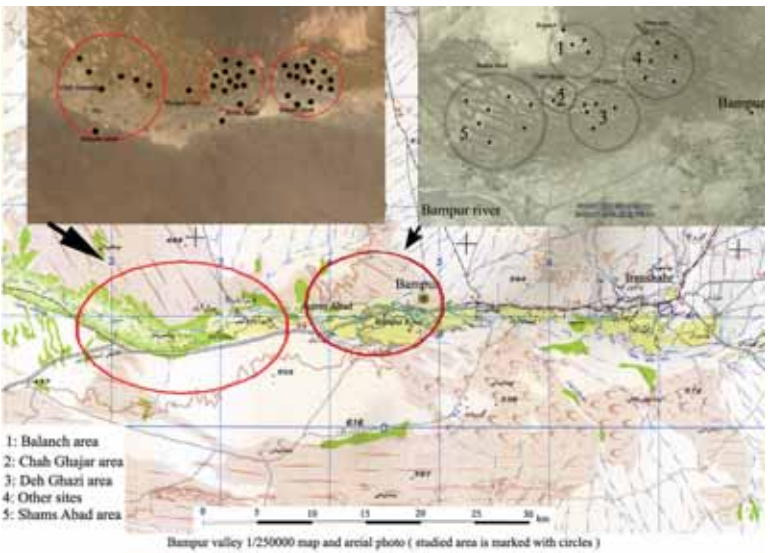

Fig. 2: Bampur valley.

a small village in Periods I-III into a large city in Periods IV-V and was then abandoned during the Iron Age. The layers of all phases are found on Hill A, but residential houses and public structures were also established around the main site (Fig. 3).

Southeastern Region No. 3, with Mehrgarreh as the main site. This prehistoric site is located in the Quetta valley in Pakistani Baluchistan. Mehrgarreh was occupied from the Neolithic to the end of the Bronze Age. Here, starting with the earliest layers of pre-pottery, the evolution of an economy based on agriculture can be seen. In these layers, whose architectural remains are limited to square houses built with mud bricks, there are traces of wild animals together with a small amount of bones of semi-domesticated goats. Other traces of this period are seen in the graves of the early 7th millennium BC (Jarrige - Lechavallier 1979).

Area No. 4: the hillsides of the Alborz Mountains with Tepe Hissar as the centre. The two main cultural regions (which can be divided into smaller sections) are located in the northeastern and eastern regions of Iran. They host the remains of the most ancient urban civilizations in eastern Iran in sites of 10 to 12 hectares with populations of 2,000 to 3,000, a number that fluctuated over the years. In the semiarid oasis of Damqan the only notable site is Tepe Hissar, which at the end of the 4th millennium BC was about 12 hectares, while in the hot plains of

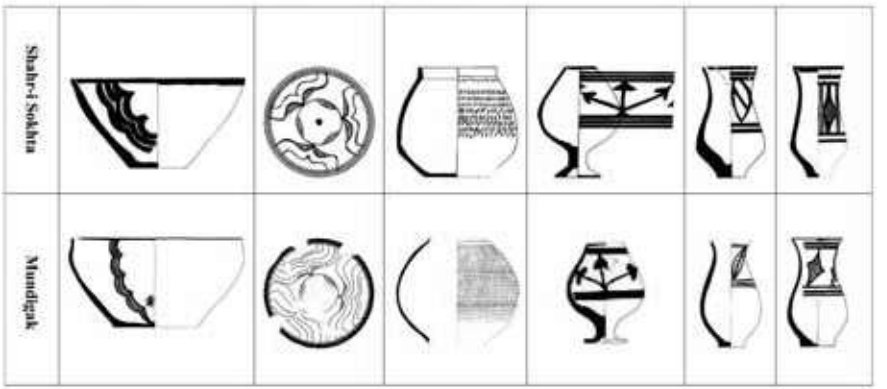

Fig. 3: painted pottery from Shahr-i Sokhta and Mundigak.

Gorgan near the southern shores of the Caspian Sea, Turang Tepe was the main settlement.

Area No. 5 is in Southern Turkmenistan, with Altyn Tepe as the main site.

The earliest layers of this site date back to the Early Copper Age, and are of the Namazga I type, characterized by Painted Monochrome Ware with large triangular patterns. The Middle Copper Age is characterized by the Yalangach-type pottery found at Anau, a type of Painted Ware with parallel lines below the neck of the vessels, along with anthropomorphic figurines and wall paintings. The Late Copper Age is distinguished by Geoksyur Painted and Polychrome Ware. From this period, a defensive mud brick wall, several rectangular towers, and a significant number of sitting female figurines with large oval eyes have been found.

Sistan Area: The remains of Shahr-i Sokhta have shown that the city was the most important settlement in the area and it was the region's main centre of social, political, economic, and cultural activity during the 3rd millennium BC. The presence of salt layers has helped to preserve the archaeological remains and the organic materials. Among these materials there were the remains of ropes, baskets and rugs, wooden objects, paints, textiles and hair, along with pottery and stone and metal artefacts. These remains are all indicative of the fact that this site was a focal point for the preparation and distribution of raw materials and objects made for domestic use and export. These were made from imported materials such as lapis lazuli and turquoise, as well as from locally mined commodities such as copper, diorite and marble.

From about 3550 to 2300 BC[1], for more than one thousand years, Shahr-i Sokhta functioned as the capital of a vast region stretching from Kandahar to the coast of the Makran Sea. It established relations with other sites and ancient cities of the 3rd millennium BC to the east, west, north and south, and was the capital and the center of the cultural area of Hirmand. Shahr-i Sokhta was not

1. This date is based on the new chronology of Shahr-i Sokhta (see Ascalone - Moradi - Sajjadi - Vecchio in press)..

just an isolated city: it had cultural and commercial connections with settlements in nearby regions and it established relations with far-away lands. The Hirmand River Culture expanded its sphere of influence in the Protohistorical period, but is too limited to be called a Trans Regional power. It had relations with the cultures of Middle Asia such as Harappa in the east, Elam, Mesopotamia and the western Iranian Plateau.

Relations between Shahr-i Sokhta and southern Turkmenistan can be seen in various ways, especially the production of beads, anthropomorphic and zoomorphic figurines, metal artefacts and particularly pottery vessels from both regions. Quetta Ware is one of the most prominent signs of the relations between Shahr-i Sokhta and areas Nos. 3 and 5, i.e. Pakistani Baluchistan and southern Turkmenistan.

This type of pottery appears in the domains of the Hirmand and Arghandab rivers, as well as in the layers of Mundigak III, Shahr-i Sokhta I and Namazga III in Southern Turkmenistan, dated to about 3500-3000 BC. This pottery is the logical continuation of Namazga I-II pottery during the Middle and Early Enolithic. The first sample of Quetta Ware in Mundigak III is Buff pottery with triangle motifs that are joined to each other to form bow-tie motifs. The presence of Quetta Ware in the lower layers of Shahr-i Sokhta is the reflection of the earliest phases of this pottery, but the later influences of Southern Turkmenistan cannot be ignored. (Fig.4)

In Mundigak and the Quetta plain this kind of pottery was wheel-made, but it was handmade in Shahr-i Sokhta I, as in Geoksyur. This kind of pottery was first identified by Professor Pigott in the Quetta Valley in Pakistan, and Masson subsequently found Namazga III Buff Ware similar to it. Later, its presence at Shahr-i Sokhta confirmed Masson's theory regarding the origin of this pottery. Quetta Ware expanded to the Delta of the Hirmand River, along the Arghandab River in Mundigak III and Southern Turkmenistan (Namazga III, about 3500-3000 BC).

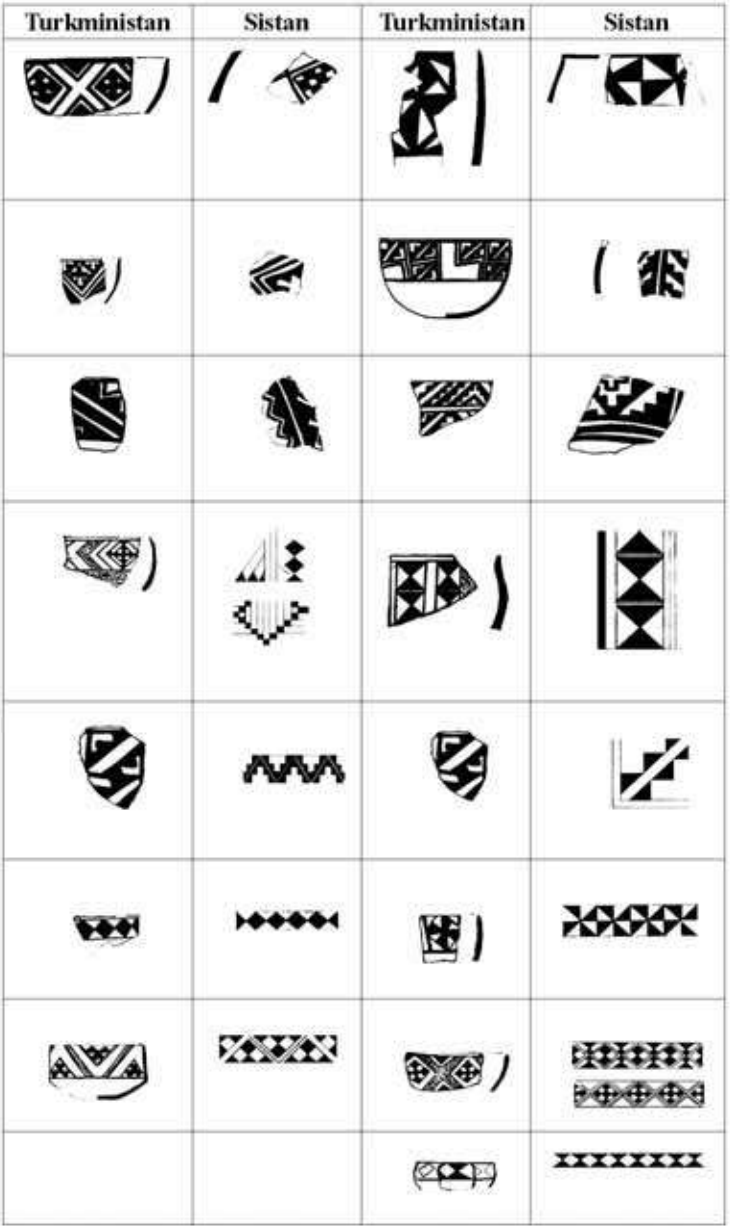

Fig. 4: comparison of painted pottery motives from Shahr-i Sokhta and Turkmenistan (Sarianidi 1983).

The similarities of the pottery motifs seen in Southern Turkmenistan sites along the Copet Dagh (such as the Murghab and Tejen Deltas) and the Sistan plain are not limited to geometric designs, but also include zoomorphic motifs, although to a lesser extent (Fig. 5).

The similarities between the cultural materials of the deltas of Hamun, Tejen and Murghab are not limited to pottery: figurines, metal objects, seals , beads, burial practices and so on are also considered points of contact. The chronological distribution of alabaster artefacts in Shahr-i Sokhta shows a significant percentage have been found in the graves of Periods I and II. This probably indicates that the production of such objects was particularly intense during these periods. Period III accounts for just 12% of the alabaster artefacts, with more than 90% of the graves having only one alabaster object and only 10% of graves having two, three or four items. The statistics for alabaster objects found in Shahr-i Sokhta show that during the first half of the 3rd millennium BC this site was one of the main sources of this material on the Eastern Iranian Plateau. Shahr-i Sokhta's alabaster items were distributed not only in the markets of neighboring areas, but were also exported to distant regions such as Susa, Mesopotamia and the Southern coasts of the Persian Gulf. Aside from Susa and Mesopotamia, such objects have been found in Central Asia in Ulugh Tepe, Altyn Tepe, Geoksyur, Mundigak, Southern Bactria, Quetta and the Makran Sea. According to the available data, the distribution of alabaster objects was equally distributed in the graves of male and female individuals. More than 75% of the alabaster vessels were found in the graves of Periods I and II, which means that production of such vessels peaked during the first half of the 3rd millennium BC. The production of conical bowls stopped during Period III and was replaced by cylindrical mortars (Figs. 6-8).

Among the objects found at Shahr-i Sokhta, figurines have a special place. The figurines of Shahr-i Sokhta are made of unfired clay, terracotta, stone, metal, and wood. Clay figurines could be made quickly by hand. Clay pieces smaller than the size of a fist were quickly shaped with one hand and parts of the human body or animal were shaped by the other hand. Usually figurines were not decorated, although some decorated ones have also been found. The figurines

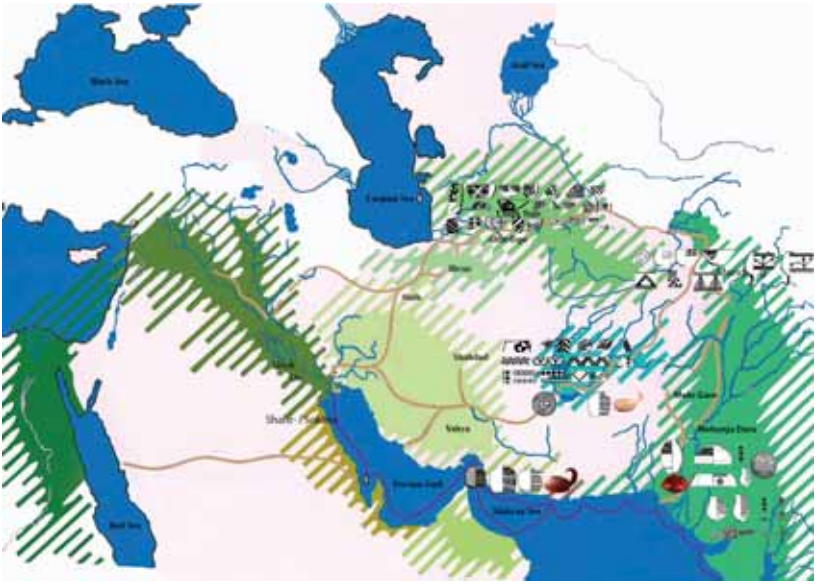

Fig. 5: pottery shape and motives from six areas of Middle Asia.

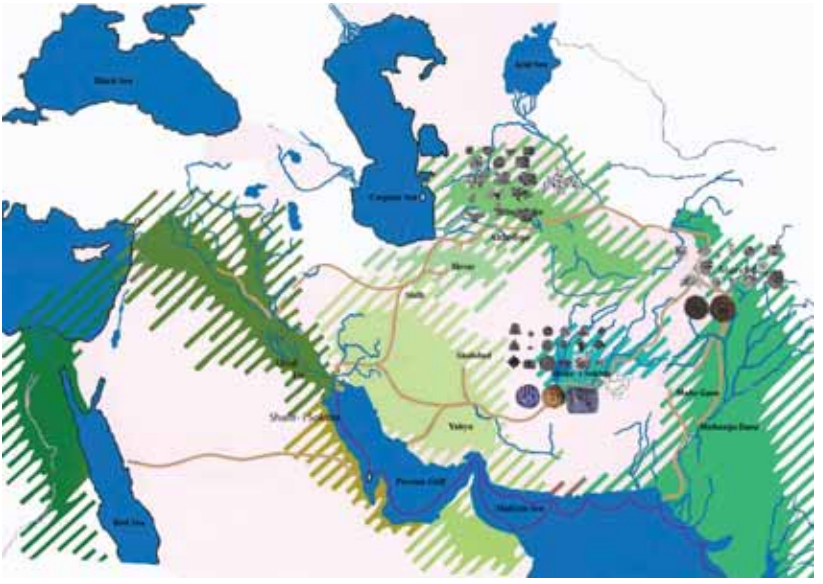

Fig. 6: seals from six areas of Middle Asia.

Fig. 7: alabaster items; 1-8. Shahr-i Sokhta; 9-16. Altyn depe.

were decorated using wooden or bone tools, and in some exceptional cases, clay spangles or bands were attached. Among the animals, humpback cattle, pigs and dogs are easily identifiable, as well as hyenas, leopards, rams, camels, and birds.

Anthropomorphic figurines are composed of male and female groups. Female figurines are found in two different positions: sitting with their legs stretched out and standing.

Male figurines are mostly in a standing position. Their hanging or open arms and their highlighted muscles are interesting. According to anthropological studies, the male individuals of Shahr-i Sokhta are classified as tall humans, but the figurines also present them as relatively muscular and strong.

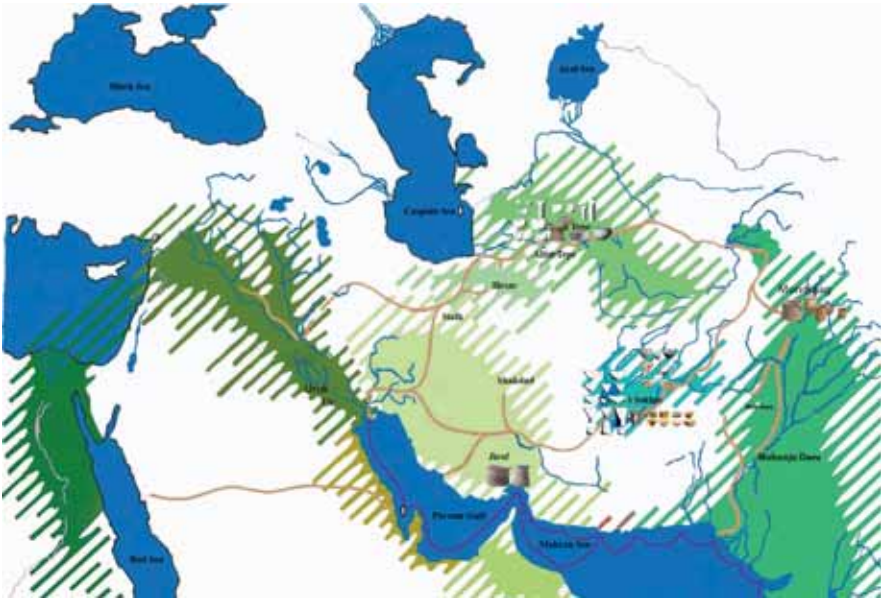

Fig. 8: alabaster items from six areas of Middle Asia.

A significant number of administrative objects have been found at Shahr-i Sokhta, including seals and seal impressions, jar stoppers, clay counting balls and triangular and round computing discs. The presence of ropes indicates their use for sealing stores or storage containers. Seal impressions on smaller vessels with very small volumes are also found in the form of round clay disks. Seal motifs are often geometric and have circular, rectangular, or square shapes, but there are also plant, animal and bird motifs (Figs. 9-10).

The similarities between Shahr-i Sokhta and the neighboring territories, especially Areas 2 and 5, are not limited to the remains of materials, but also include grave goods and tools, reflecting the social status of individuals. Various kinds of food and gifts, such as bracelets, necklaces, anklets and so on, were deposited in the graves. Structurally, aside from the simple pit graves that are common throughout the ancient world, there are similarities concerning several other grave shapes between Shahr-i Sokhta and other areas in Middle Asia. The most notable are catacombs, which are common throughout Central Asia, and were used in Shahr-i Sokhta for family burials of tribal leaders. This type of grave

Fig. 9: anthropomorphic figurines from Shahr-i Sokhta and Central Asia.

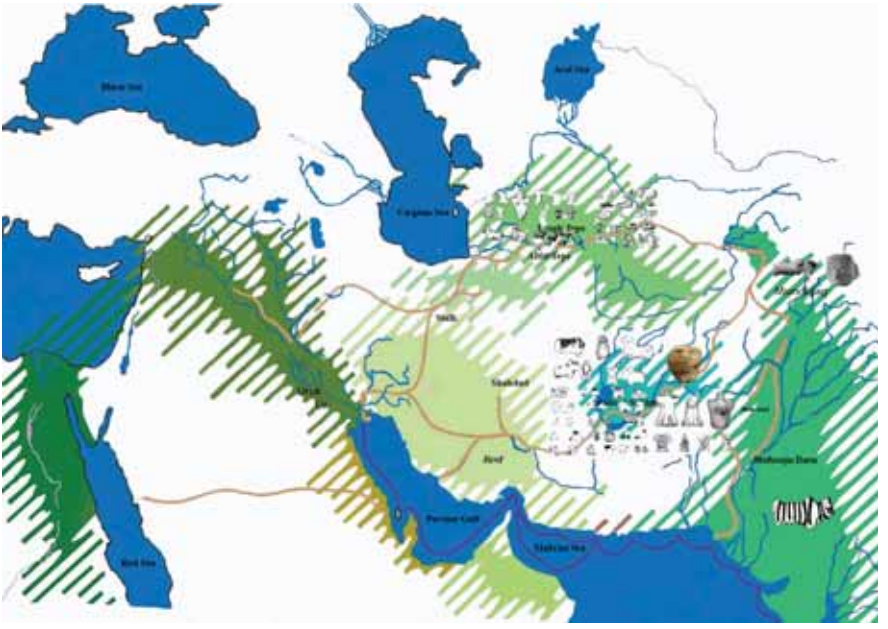

Fig. 10: clay figurines from six areas of Middle Asia.

was used in Middle Asia from the late 3rd millennium BC onwards.

Other types of shared graves were collective, circular and probably roofed. The most prominent example in Shahr-i Sokhta is Grave 1003, with 12 human skulls placed beside the grave wall and one complete skeleton of a 45-year-old man in the centre, along with a complete skeleton of a dog and the skulls of two other dogs, (Piperno - Salvatori 2007). It is one of the oldest graves in the site that shows the immigration of people from Southern Turkmenistan to Shahr-i Sokhta. It seems that this tomb was repeatedly opened to put other corpses in it (Fig. 11).

As mentioned before, relations between Sistan and Southern Turkmenistan were not limited to cultural materials or the exchange of objects and products, but there are also signs of shared intellectual and religious beliefs. One of these examples is the presence of game boards in both societies, the presence of such entertainment revealing a kind of wellbeing and comfort. One example is a wooden board with dice and gaming pieces found in Grave 731 of Shahr-i Sokhta (Fig. 12).

Another example, similar to Shahr-i Sokhta's game board was found among the recycled objects of Jiroft, in the form of a board made of chlorite but without the related pieces. An object similar to these game boards, made of bones and ivory, was found in the cemetery of Gonour Tepe (Fig. 13).

Such games and other types of entertainment have traditionally been prevalent in the ancient world. Besides the examples mentioned, game boards and relative gaming pieces and dice have been found in Mehgarreh, Enkomi in Cyprus (1580 BC), Harappa and Mohenjodaro. A wooden "chess" box and pieces belonging to the Egyptian architect Kha and his wife, dated to the 18th Egyptian Dynasty (15th and 16th centuries BC), was found in Deyr al Madineh, and game boxes were found in Ak Hur.

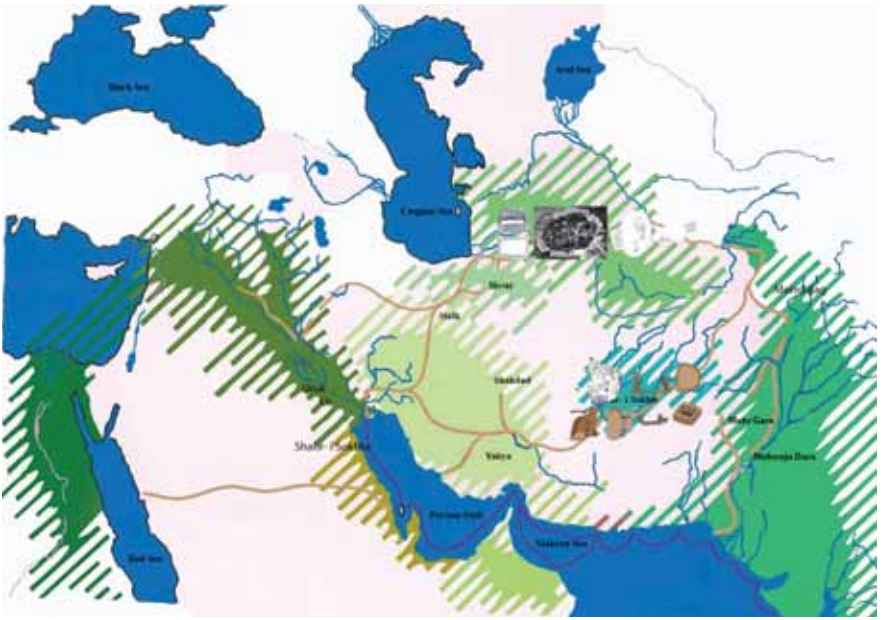

Fig. 11: grave structuers from Shahr-i Sokhta and Central Asia.

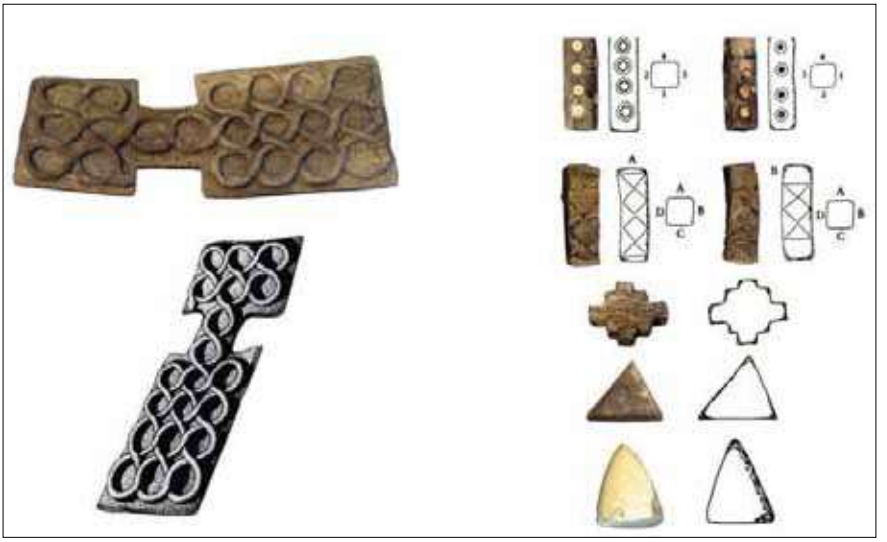

Fig. 12: wooden game board from Shahr-i Sokhta.

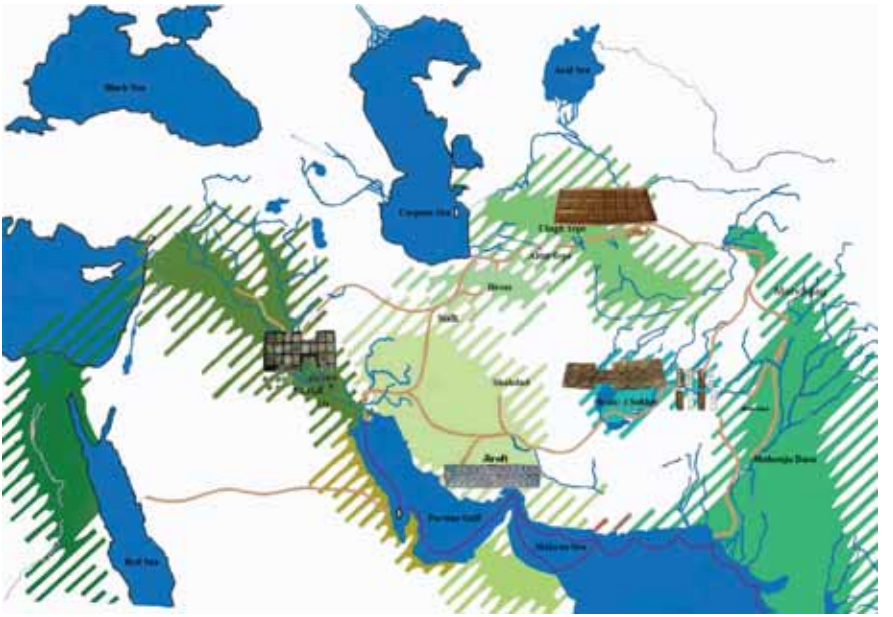

Fig. 13: game boards from Middle East.

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The Research of the *Consiglio Nazionale delle Ricerche* (National Research Council) in Eastern Iran: Shahr-i Sokhta and Sistan in late 3rd – early 2nd Millennia and the Diffusion of the Greater Khorasan Civilization (Bactria-Margiana Archaeological Complex)

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To the memory of Sandro Salvatori,
Researcher, Colleague, Friend

The archaeological research of *Consiglio Nazionale delle Ricerche*, CNR (National Research Council) in Iran began in 1976 with a survey in the Urmia plain aimed at the study of the Urartian expansion into Iran, carried out by of the *Istituto di Studi Egeo-Anatolici*. The survey came to an end with the Islamic Revolution of 1979. The institute, that after 2000 changed its name into *Istituto di Studi sulle Civiltà dell'Egeo e del Vicino Oriente*, ICEVO (Institute of Studies on the Civilizations of Aegean and Near East), continued its studies and connections with Iranian scholars, and after 1998 it was possible to resume fieldwork in north-western Iran. After 2006 a series of bureaucratic reasons made it impossible to

continue activities in that part of the country, so the research shifted to Eastern Iran, which was also an old interest of the institute. Specifically, CNR was interested in two problems: the crisis of urbanization and the abandonment of the settlements in Eastern Iran of late 3rd-early 2nd millennia BC and the possibly contemporary expansion in Eastern Iran and in the neighbouring areas of the Bactria-Margiana Archaeological Complex (BMAC), which the authors prefer to call Greater Khorasan Civilization (GKC) for the reasons explained below.

These interests materialized with an excavation at Shahr-i Sokhta in years 2007 and 2014 described below; with the excavation since 2011 at Tepe Chalow (county of Jajarm, Northern Khorasan, Figs. 1-2) of a GKC necropolis (Sołtysiak *et al*. 2016; Vahdati *et al*. 2019; Vahdati *et al*. 1399; Vahdati - Biscione in press; Vahdati *et al*. in print) and with inspections to published and unpublished sites of Eastern Iran reportedly with GKC pottery (Biscione - Vahdati 2012; Biscione - Vahdati 2021; in press). In the meantime ICEVO and other institutes in 2013 merged into the new *Istituto di Studi sul Mediterraneo Antico*, ISMA (Institute of Studies on Ancient Mediterranean) and in 2016 the archaeological fieldwork in Eastern Iran passed to the *Istituto per le Tecnologie Applicate ai Beni Culturali*, ITABC (Institute for the Technologies Applied to the Cultural Heritage), that added to the research mentioned above two laser-scanner and photogrammetric surveys, in Fars at Firuzabad (Fig. 2) and in Sistan at Kuh-e Khwajeh (Fig. 13). Since 2017 ISMA continued its archaeological research in Iran with an excavation at the site of Qaleh Naneh, in Kurdistan, near the border with Iraq. Finally in 2019 ISMA, ITABC and other institutes merged into a new one, the *Istituto di Scienze per il Patrimonio Culturale*, ISPC (Institute of Sciences for the Cultural Heritage) and now all the archaeological activities of CNR in Iran, are carried out in the same institute.

The well-known crisis of urbanization of Eastern Iran began in late 3rd - early 2nd millennia, in different moments in different areas, and after 1800-1700 BC extended almost all over the region, as shown, for instance, by the abandonment of Tepe Hissar and Shahdad, by the end of the Indus civilization and by the crisis of GKC. The case of Shahr-i Sokhta will be discussed below. After 1800-1700 a

Fig. 1: Eastern Iran and neighbouring areas, with the main geographical features mentioned in this article.

dark period extend over much of Eastern Iran, where in most areas settlements are unknown until late 2nd - early 1st millennium.

It must be remarked that the flourishing period of GKC and its great expansion into Eastern Iran (Biscione - Vahdati 2021: 543) happened in 24th-19th centuries BC i.e. at the same time of the crisis of Tepe Hissar and possibly of the crisis and of the end of the Hirmand Civilization (see below). After 1800/1700 anyhow the crisis hit also GKC (Luneau 2021), although it marked more a change than a collapse.[1] After 1500/1400 BC in the whole 'Core Area' of GKC (i.e. the regions

1. It should be remarked that the GKC pottery found in Eastern Iran belongs only to the flourishing period of this civilization, and apparently no pottery of the later period was found..

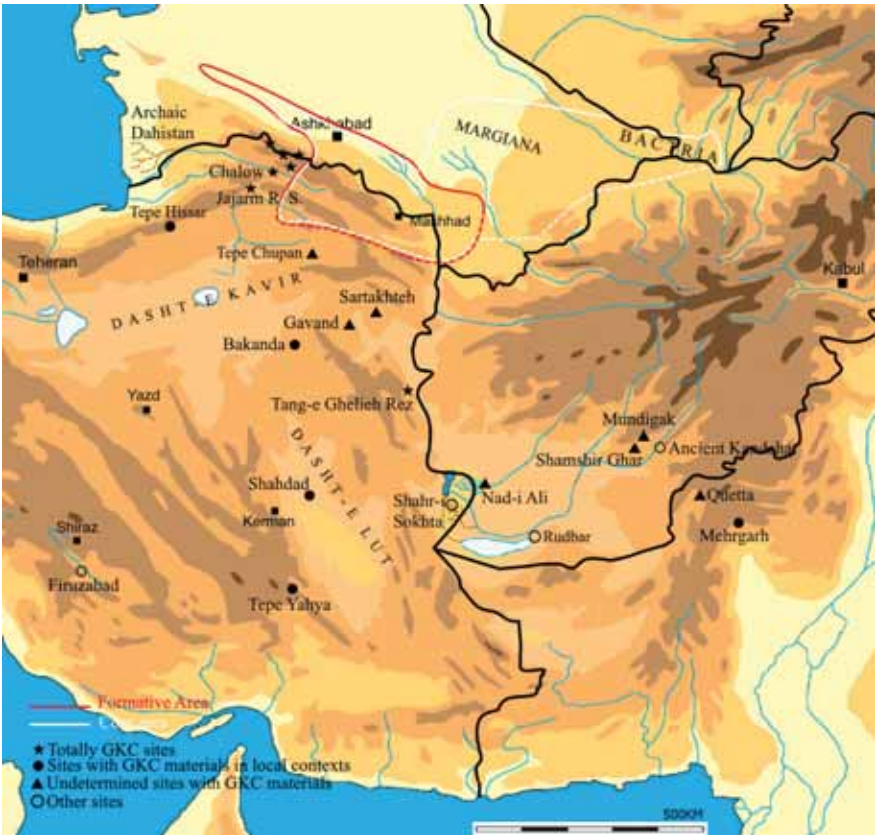

Fig. 2: archaeological sites and areas of Eastern Iran and neighbouring regions mentioned in this article.

where it was preceded by Namazga Culture or not previously settled, see below) it was replaced by the Yaz I culture (e.g. Lhuillier 2013; Vahdati 2018), that continued with periods II and III into the Achaemenid period. This anyhow did not happen in the so-called 'Expansion Area' of GKC (the regions where GKC expanded into areas formerly occupied by other cultures/civilisations, see below), where after 1800/1700 BC no settlement is known.

The other exceptions to this generalized abandonment are the Gorgan plain and the ancient delta of the Atrek River (Figs. 1-2). In this last area the presence of the Archaic Dahistan Culture of the Iron Age, 13th- 6th/5th centuries BC, is well-known (e.g. Lecomte 2006: 461-462; 2009: 69-72), and so are its connection

with the Grey Ware Culture, suggesting an unbroken cultural continuity. The evidence suggests that the Archaic Dahistan culture occupied the whole of the area of distribution of the earlier Grey Ware culture, including the Kal-e Shur basin where Grey Ware was replaced by GKC and eventually by Yaz I culture (Biscione - Vahdati 2012: 358, 359 fig. 5), the Gorgan plain and the oasis of Tepe Hissar, as witnessed by the excavations of 1995 by E. Yaghmai (Roustaei 2010: 615-617).

The reasons of the crisis are still unknown and many hypotheses have been put forward, e.g. the over-exploitation of the environments due to overpopulation, the shifting of trade routes, an ecological crisis, a drought period (e.g. Biscione 1977: 115; Dales 1977a; Dixit *et al.* 2014; Fouache *et al.* 2015: 27; Luneau 2016: 171-172, 173-175; 2019)[2] but we are far from a consensus.

Let us examine what happened at Shahr-i Sokhta. There, according to the traditional views, after the great expansion of phases 5-4 (late Period II - early III) with a surface of about 100 ha, we witness a shrinking of the inhabited part of the settlement, that in period IV (phases 1-0) seems to have covered a surface of 5-10 ha, both at the *Burnt Building* (560 sq. m) and on other parts of the site (Tosi 1976: 141, pl. I; 148, fig. 4; 152, fig. 8; Salvatori - Tosi 2005: 289 fig. 12). In this volume anyhow H. Moradi evidences the presence of Period IV in the central and in the northern parts of the city, thus with a surface larger than previously assumed. It is necessary now to measure the surface of the new found parts of the city settled in Period IV and to determine whether the pottery assemblage of the new-found areas is exactly like the one of the *Burnt Building*[3] or somehow different, implying a slightly different date or a different function.

Whatever the surface of Period IV, there are evidences of a significant change in the final part of Period III, i.e Phase 2, that from many points of view marks a passage from the full Period III, Phases 4-3 (Salvatori - Vidale 1997: 63-67, figs.

2. For a general presentation of the Holocene climatical variations in Central Asia see Fouache *et al*. 2021.
3. The pottery of Period IV was never properly published, the only extensive publication being Biscione 1979, which was not aimed at a comprehensive and total typology. Anyhow the pottery of Period IV was very standardized and shows a very limited range of variations, therefore the typology presented in the article can be considered fully reliable. This was also confirmed by an unpublished dissertation (Giacummo 1987).

192-208; Salvatori - Tosi 2005: 287-289, fig. 12) to the Period IV of the *Burnt Building*. Phase 2 was originally identified at Shahr-i Sokhta in the necropolis, squares BQ and BV of the topographical grid of the Italian excavation, with two thin and poorly preserved mud brick platforms that were washed away by a sudden rain (Biscione *et al*. 1974: 29; Biscione 1990: 391, 408 fig. 18). The data have never been fully published. Then Phase 2 was also discovered at the sites of Tepe Rud-i Biyaban 2 and 3 (Biscione 1990: 394; Salvatori - Tosi 2005: 288) The presence of Phase 2 was always empirically determined according to the presence of pottery that did not find comparisons in other phases of the Shahr-i Sokhta sequence. Recently Phase 2 was discovered also at Tepe Graziani (Kavosh *et al*. 2019: 129, 135).

The CNR excavations of 2007 were aimed at Period IV (on the surface of the chosen area was found a good amount of pottery typical of this period) but instead they revealed a good sequence of phase 2, useful to study the process that led to Period IV.

The excavation was a northwards extension of Trench 5, dug in 2002 by Dr. Zurab Makharadze (not published), so it was considered part of the same trench. It was located on a small hill at the NW corner of Shahr-i Sokhta (Fig. 3) at the junction of the 50 × 50 m squares G'FL, G'FM and G'FR determined in 2005 by the Iranian Archaeological Mission. Locating on the Google Earth satellite imagery the co-ordinates of the NE corner of the new excavation (30°36'08.75"N 61°19'29.5"E) it was possible to ascertain that the place lies in square G'CO of the Italian Archaeological Mission.

The excavation began on 26th November 2007, opening a testing pit determined by the lie of the ground, oriented east-west and measuring 5.5 × 8.0 m. On the highest point of the excavation was visible a fragment of a much eroded wall (Wall 1, Figs. 4, 8) preserved to a height of just a few centimetres, oriented east-west. It was associated with the remains of a heavily eroded clay floor which survived only in the immediate vicinity of the wall (Fig. 4), with abundant evidence and remains of straw, seeds and other paleobotanical remains. Wall and floor were defined Layer 0.

Under the floor was found a dark, loose soil, rich in ashes, with abundant traces of organic matters, evidence that the area was used as a garbage dump. The remains of the Layer 0 floor sealed the upper part of the deposit that, as shown by the uniform strata of ashes and other matters (Fig. 5), accumulated in a very regular way. The garbage dump, that covered a significant part of the testing pit, had a precise stratigraphic and chronological meaning and was called Layer 1. Immediately west of Wall 1 and under it the garbage dump was just a few centimetres thick, while east of it, beyond an earlier wall (Wall 2, Fig. 5) it was more than a metre deep. It filled an empty space without any structure and rested on a soil formed by decayed mud-bricks, that was reached in the last days of excavation. It was an open space that southwards continued into a similar open area excavated in 2002.

In the north-western part of the testing pit the soil was instead hard and whitish: it was formed by mud-brick fragments and decayed mud-bricks.

Wall 2 (Fig. 5), which was a few centimetres under the floor of layer 0 and was covered by the loose soil of the garbage dump, was part of Layer 2, that was identified by a series of structures and spaces: Room 1, Space 2 and Space 3. The walls of Room 1, that in part were earlier and re-utilized, were covered by black plaster; a door, later filled in, connected Room 1 and Space 3. The soil of Room 1 and Space 2, as already said, was compact, whitish and formed by decayed mudbricks. In Space 3, instead, there was one of the typical Shahr-i Sokhta fillings (Fig. 6), rich in pottery and in any kind of finds. Most of the walls of Space 3 were earlier and re-utilized.

Layer 2 was abandoned before the garbage dump, and not for a very short period, as shown by the filling of decayed bricks. Before the area was used as a garbage dump the tops of the walls were cut.

Under the foundations of the walls of Layer 2 the soil changed and became one of the typical Shahr-i Sokhta fillings, rich in any kind of materials. This change evidenced Layer 3, formed by walls under Room 1 and Spaces 2-3. These walls apparently formed two poorly identifiable spaces, which because of this were not numbered and defined. Some of the walls of Layer 3, as already said,

Fig. 3: Shahr-i Sokhta 2007. Trench 5, the excavation area before the activities seen from south-west. In the lower left corner can be seen part of the excavation by Dr. Makharadze carried out in 2002.

Fig. 4: Shahr-i Sokhta 2007, Trench 5. A fragment of the burnt floor and Wall 1, both layer 0 of the 2007 excavation, level 2 of the sequence of Trench 5, seen from north. The floor had a great amount of straw and seeds and was taken away for paleobotanical studies.

Fig. 5: Shahr-i Sokhta 2007, Trench 5, Space 1. The regular strata of the accumulation of the garbage dump (layer 1 of the 2007 excavation, level 3 of the sequence of Trench 5) as seen on the southern section of Space 1. On the right can be seen the eastern (outer) face of Wall 2, the eastern wall of Room 1.

Fig. 6: Shahr-i Sokhta 2007, Trench 5. The filling of Space 3. Mudbrick fragments, potsherds and stone objects can be seen.

were re-utilized for room 1, Layer 2. Under Space 2, Layer 3 was identified a floor on which rested a square fireplace (Fig. 7).

The lowest layer, Layer 4, is identified by one wall on the southern edge of the excavation, which was re-used also in the upper layers 3 and 2, and by a floor in space 2, that covered a buried jar whose mouth emerged from the floor (Fig. 7). It was not possible to go deeper because of lack of time.

Thanks to the garbage dump of Layer 1 it was possible to connect the 2007 sequence to the one of the excavation of 2002, which reached exactly this layer. Above it two structural phases were found, identified by brick platforms, so it was possible to reconstruct the sequence of the north-eastern corner of Shahr-i Sokhta. It is formed by the following levels:

Level 1. Upper brick platform of the Iranian excavation of year 2002.

Fig. 7: Shahr-i Sokhta 2007, Trench 5, Space 3. The square fireplace of layer 3 (level 5 of the sequence of Trench 5), that rested on a floor taken away during the excavation, and the earlier floor of layer 4, with the mouth of a buried jar.

Level 2. Lower brick platform of the Iranian excavation – layer 0 of 2007 excavation.
Level 3. Garbage dump (lowest point reached by the Iranian excavation – Layer 1 of the 2007 excavation).
Level 4. Layer 2 of the 2007 excavation.
Level 5. Layer 3 of the 2007 excavation
Level 6. Layer 4 of the 2007 excavation.

Soil samples were systematically gathered to study microfauna and botanical remains. The good preservation of the remains allows a sound study of the environment of Shahr-i Sokhta in late Period III that will shed light on the theory of the dry period beginning in mid-3rd millennium, proposed as one of the causes of the urbanization crisis (Gupta *et al*. 2006: 1086-1087; Dixit *et al.* 2014; Fouache *et al.* 2015: 27). These samples are being studied, like the others of those years of excavation, by Dr. L. Costantini and his team.

A preliminary examination of the pottery of the garbage dump revealed a remarkable amount of ceramics later than Phase 3 and earlier than Period IV, thus identifying at last Phase 2. In order to gather a larger sample of this pottery it was decided to continue in the following season the excavation of the garbage dump, but for a series of bureaucratic reasons this was possible only in 2014. The aims of the 2014 season, which began on 9th December, included also reaching the natural soil in the westernmost – and deepest – part of the excavation of 2007.

There was opened a small testing pit, 2 × 1 m, presuming that the natural soil was close and because earlier walls did not leave much space. The pit went down to a depth of 1,80 m in archaeological levels of Period III, until on 14th December it was decided to end the work because of lack of time, of cramped working space that did not allow to identify structures and because of the fear that nearby walls could collapse into the pit. Therefore the natural soil was not reached.

The exploration of the garbage dump was continued opening a 4 × 4 m square immediately south of the area excavated in 2007 (Fig. 8).

The soil of the new square was dark, loose and rich in ashes, with abundant traces of organic matters, just like the one of the 2007 excavation. The only

exception was the north-western corner, very close to Wall 1 of the 2007 excavation, where the loose soil was covered by a layer of hard clay, probably originating from the decay of the wall.

Under the garbage dump was found a small structure of Level 4, formed by a wall oriented east-west and then north-south, making a right angle, and by another wall oriented north-south, leaning on it and continuing southwards (Fig. 8). The garbage dump rested on a compact clayey soil, which was not excavated because, as already said, the aim was gathering more evidence of Phase 2. In the north-eastern corner of the excavation there was a pit also filled by the garbage dump (Fig. 8), that there reached its deepest point.

A first examination of the pottery found in the garbage dump gave results that allow also to establish a chronology of the sequence. Here a preliminary presentation will be made. The first evident thing is the fact that pear-shaped beakers are practically absent and bowls are the dominant shape. Two groups of pottery have been identified. One of them shows good connections with the buff ware of Phase 3: it is characterized by small undecorated bowls, with fine paste

Fig. 8: Shahr-i Sokhta 2014, Trench 5. The area excavated in 2014 at the end of the season. Wall 1 (level 2) of the 2007 excavation can be seen at the highest point of the baulk, the level 4 structure is located south of it and to the east is visible the pit filled by the garbage dump (level 3). Some of the level 4 structures excavated in 2007 can be seen beyond the baulk.

of a light buff colour, shading off to whitish or greenish, and engobe of the same colour, with rounded lower part of the body and slightly extroverted rim (Fig. 10: a-d) similar to the ones of Phase 3, types B 10-13 (Salvatori - Vidale 1997: 65-66). They seem to be the prelude to the small bowls of period IV (Biscione 1979: fig. 10; 1990: 392, 396 fig. 3, particularly I-L). These small bowls are very common, so much that they can be considered typical also of Phase 2. Buff bowls with a S-shaped profile (Fig. 9: e), typical of Phase 3 (Salvatori - Vidale 1997: 65, 153; figs. 206-207), were also found, but they are not as common as the small bowls.

Other elements typical of Phase 3, as known at Shahr-i Sokhta, Tepe Rud-i Biyaban 2 and 3 and at Tepe Graziani (Mariani 1993-94; Salvatori - Vidale 1997: 65-66; Kavosh *et al*. 2019: 106-135) are rare (Fig. 9: a-c) or absent. A few intrusive sherds from deeper layers were also found (e.g. Fig. 9: d, f).

The other group is formed by shapes already attributed to Phase 2, and now identified more precisely. For instance the buff cylindrical-conical bowls (Fig. 10: e) are similar to the ones from Tepe Rud-i Biyaban 3 (Fig. 10: l) attributed to phase 2 (Biscione 1990: 392, 395; fig. 2C; 403; figs. 9-10), and the buff, undecorated ledged-rim jars[4] (Fig. 10: i, j; k from Tepe Rud-i Biyaban 2), already evidenced as typical of Phase 2 (Biscione 1990: 392, 393 fig. 1 A-B, 395; fig. 2 A, 405; fig. 13). Also typical is a buff conical-rounded bowl with horizontal rim (Fig. 10: f), similar but not identical to the ones of period IV (Biscione 1979: pl. XI fig. 9; Giacummo 1987: fragment 20172). Other typical shapes are light buff basins with almost horizontal rim (Fig. 10: g-i), with painted decoration or undecorated, with a diameter ranging from 18 to 31 cm. A similar but not identical shape was previously already identified at Shahr-i Sokhta and Mundigak III (Casal 1961 II: fig. 94, n. 429; Biscione 1990: 391-392, 399, 400; fig. 6, 401; fig. 7-8). Identical shapes were instead found in the excavation carried out by the Zabol University at Tepe Graziani, Building cycle 3,1 (Kavosh *et al*. 2019: 128 fig. 118 nos.3-4). Other pottery shapes connecting Tepe Graziani with Phase 2 can be seen again in

4. One similar fragment was found in Period IV (Giacummo 1987: fragment 22385). Most probably it is not a shape typical of Period IV but an intrusive fragment that rose from deeper layers.

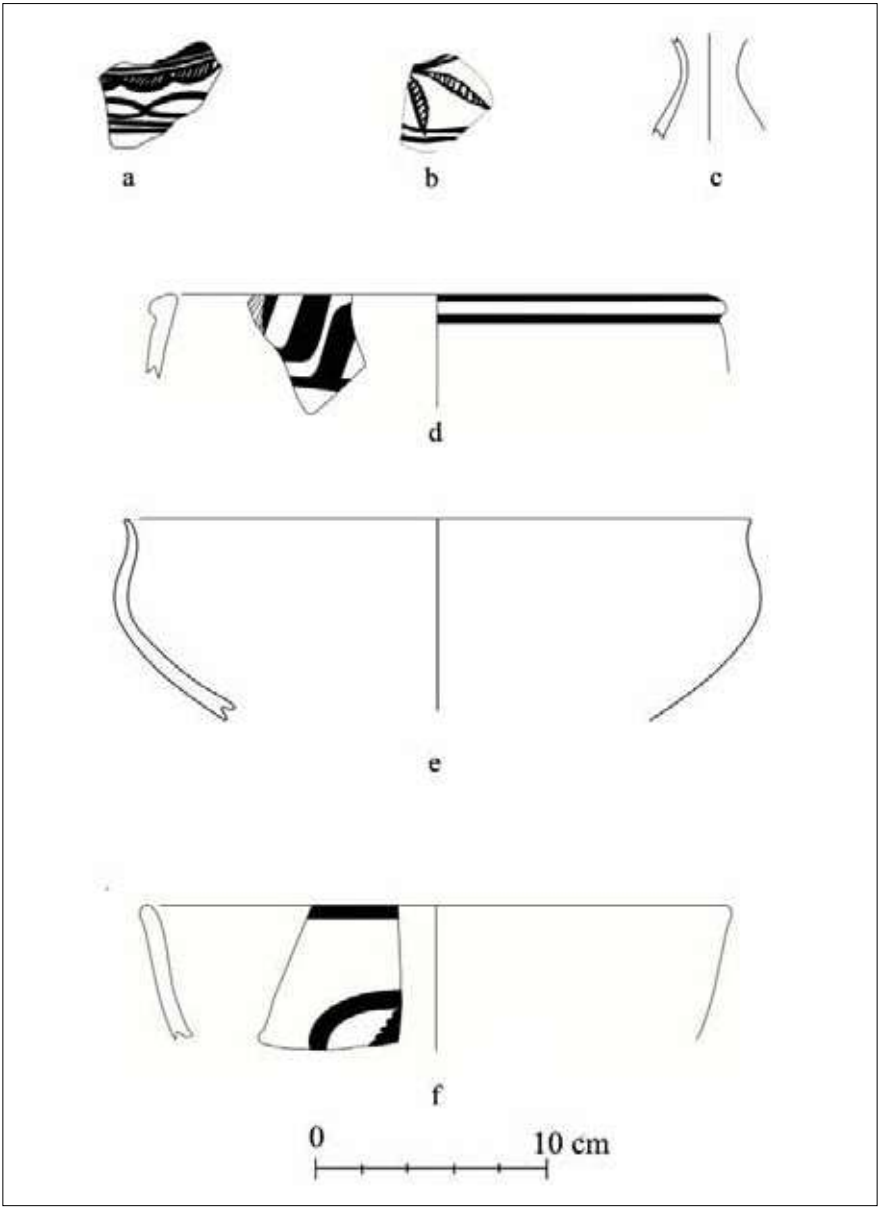

Fig. 9: Shahr-i Sokhta. Buff pottery from level 3 of trench 5, continuing the tradition of phase 3 (a, b, e) and intrusive fragments from deeper strata (c, d, f).

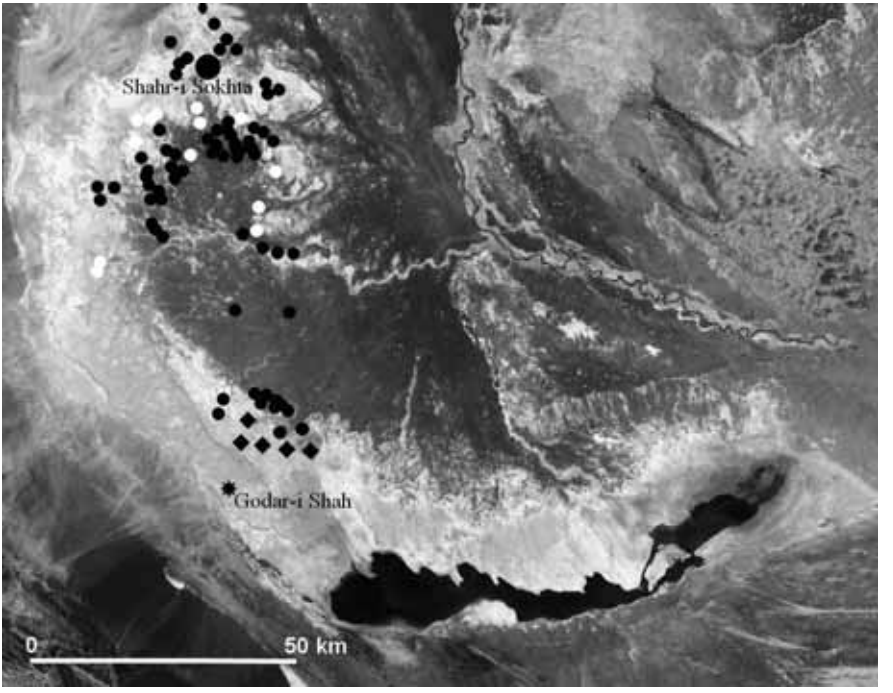

Fig. 10: Sistan. Buff pottery of Phase 2, typical shapes. Vases a-j from Shahr-i Sokhta, Trench 5, level 3; vases k-l respectively from Tepe Rud-i Biyaban 2 and 3 (k-l from Biscione 1990: 393 fig. 1, 395 fig. 2).

Building cycle 3, 1 (Kavosh *et al*. 2019: 128 fig. 118, nos. 10-11) and in Trench III (Kavosh *et al*. 2019:134; fig. 122, no. 20). The similarities with phase 2 were already evidenced by the authors (Kavosh *et al*. 2019: 129, 135).

It must be remarked that in the layers of Phase 2 only buff ware was found. There was no trace of Grey or Red Ware. Painted decoration is very rare.

Other finds from Trench 5 include well-known clay human and animal figurines, beads, lithic industry and a wooden stick die (Fig. 11). On three faces numbers are indicated respectively by one, two and three circles with a dot in the middle, and on the fourth face there are couples of vertically opposite triangles. The motifs are filled with an encrustation of a very light brown, almost whitish colour. Those dies are well-known at Shahr-i Sokhta (Cortesi *et al.* 2008: 24-27).

South of the square excavated in 2014, on the surface, in an area with abundant fragments of the small bowls described above, was found a square lapis lazuli stamp seal with an incised composition of straight lines forming square angles, without lug or suspension holes (Fig. 12).

As already said at Shahr-i Sokhta Phase 2 was almost absent, but now it is known in the Trench 5, here presented, and in other parts of the city (Moradi this volume; Sajjadi this volume). The sequence is not particularly short, as shown by the two platforms of the 2002 excavation and by the garbage dump presented above. One of the main tasks facing us are checking the connections between the sequence of Trench 5, the other areas found at Shahr-i Sokhta and the evidence gathered at Tepe Graziani and at Tepe Rud-i Biyaban 2 and 3. It should be remarked, for instance, that while at these last two sites the cylindro-conical bowls and ledged-rim jars (Fig. 10: k-l) have almost always a painted decoration (Biscione 1990: 392, 395 fig. 2C; 403, figs 9-10; 404, figs. 11-12), the ones found at Shahr-i Sokhta are undecorated and larger. This could be a random variation due to the small number of finds or it could suggest that the two sequences do not fully overlap.

Another task facing us in the next future is the determination of the settled area of Shahr-i Sokhta in Phase 2. A cursory check of the surface of the north-western part of the city revealed indeed a significant presence of this kind of pottery, and also the other evidences found in the recent excavations should be taken into account. This and the new data on the presence of Period IV (Moradi this volume) urge us to check and verify our ideas about the sudden collapse of the settled area of Shahr-i Sokhta at the end of Period III (e.g. Tosi 1976: 138; Biscione 1990: 402; Salvatori - Tosi 2005: 289, fig. 12). It is indeed likely that the surface of the city shrank, but how much and when is still to be determined. The reduction of surface of the city could be mirrored by a smaller number of settlements of Period IV in the ancient Rud-i Biyaban delta.[5]

5. Professors S. R. Musavi Haji and R. Mehrafārin, directors of the systematic archaeological survey of Iranian Sistan carried out in 2007-2008 by the University of Zahedan, kindly gave us a copy of the unpublished survey reports. To them go our warmest thanks. A cursory examination of the reports revealed 54 sites that can be surely dated to Period IV, a number much smaller than the one of Periods II and III. Anyhow we should take into account the fact that whatever the date of Shahr-i Sokhta sequence (see the following paragraph) the time-span covered by Period IV was shorter than the one of Periods II-III.

Fig. 11: Shahr-i Sokhta 2007. The wooden stick die from Trench 5, space 1, cut 18 (level 3), Shahr-i Sokhta. On this face the number is indicated by two incised circles with a dot in the middle, filled with an encrustation of a very light brown, almost whitish colour.

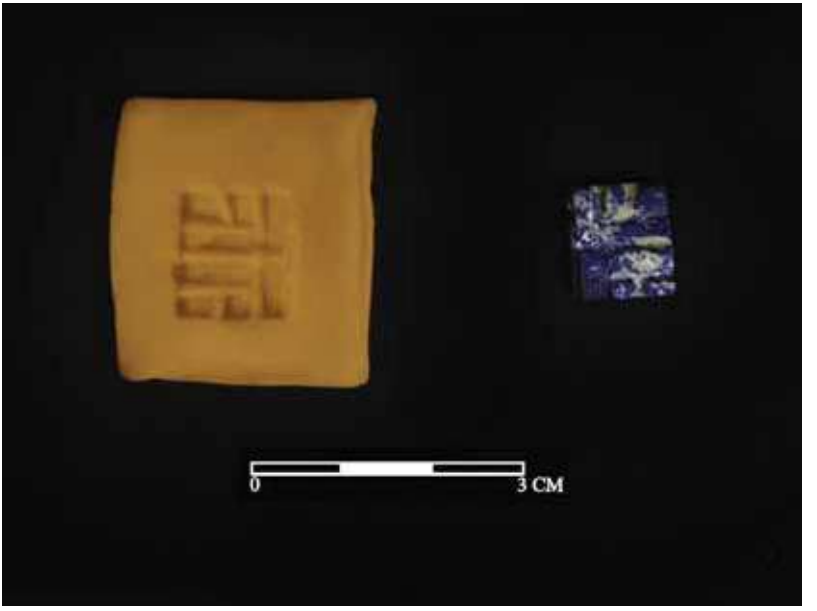

Fig. 12: Shahr-i Sokhta 2014. Square stamp seal with incised composition of straight lines forming square angles, without lug or suspension holes. Surface, immediately east of Trench 5.

Phase 2 is traditionally dated 2300-2200 BC (Biscione 1990: 399; Salvatori - Tosi 2005: 288, 289 fig. 12; 290 fig. 13; Cortesi *et al*. 2008: 9, 28-30), based on a consistent series of C14 determinations and comparisons with other areas, although a date earlier than the Indus civilization was proposed for the whole Shahr-i Sokhta sequence, therefore including the later part of Period III (Jarrige *et al*. 2011). A new set of C14 dates from Tepe Graziani indicate approximately 2850-2620 for Period II, 2600-2470 for Period III, Phases 4-3 and 2450-2350 for Period IV (Helwing *et al*. 2019: 153-155). At the moment, waiting for new C14 determination from the recent excavations at Shahr-i Sokhta, the authors prefer conservatively to follow the traditional dating, with the variation for the end of period IV exposed below.

The other focus of interest of CNR is the presence of BMAC/GKC in Eastern Iran, that is implemented with excavations at Tepe Chalow and inspections to published and unpublished sites in Eastern Iran where GKC materials were reported. This study includes Sistan too. The work is carried out by A.A. Vahdati, the co-director of the excavation at Chalow and of the operations for the research of GKC sites, and by R. Biscione.[6] The research is going on year by year, following the constant flow of new information. The last inspection was carried out in March 2019 and the results are already interesting (Biscione - Vahdati 2021; in press).

Based on the previously published works and on the new data gathered on the field it was possible to ascertain that the Namazga I-IV culture was present in a large region of Eastern Iran, inside a line running from Darreh Gaz to Shirvan, and to Torbat-e Jam, including the upper Atrek Valley and the areas of Mashhad, Nishapur and Sabzevar and possibly the regions of Neqab and Davarzan (Fig. 1).

6. The authors of the research thank all the colleagues who kindly gave information and showed them sites and materials, many of them unpublished, all over Khorasan. In particular we wish to thank Mr. M. Abdullahzadeh, director of the branch of Davarzan of the Khorasan Razavi Cultural Heritage Office (CHO); Mr. Maymari, of the Neqab branch; Mr. Rajabi, of the Bardaskan branch of the Khorasan Razavi; Mr. M. Farjami,and Mr. S. Yusefi, archaeologists of the Southern Khorasan Province. The authors of the research are particularly grateful to professors O. Gārāzhian and H. Bāsafā from Nishapur University for their kindness and their explanations, and to professors S. R. Musavi Haji and R. Mehrafārin of the Zahedan University, who kindly gave a copy of the unpublished reports of their survey in Sistan, as explained in footnote 4. Above all the authors of the present article are very grateful to Dr. A.A. Vahdati, without whom this part of the research could not have been possible.

In this large zone, which covers a surface greater than the area of Namazga culture I-IV in Turkmenia,[7] no other cultures are known. It was defined 'Formative Area' (Biscione - Vahdati 2021: 527-28) because GKC has definitely its roots in the Namazga culture (Fig. 2).

GKC, as it is well known, occupied also the Murghab delta, ancient Margiana, and the Middle Oxus valley, ancient Bactria, where no previous cultures or civilizations are known. The Formative Area, Margiana and Bactria, i.e. the regions where GKC was preceded only by Namazga culture and the previously unsettled regions where it expanded (Fig. 2), are defined 'Core Area' (Biscione - Vahdati 2021: 528). It covers the majority of Greater Khorasan of Sasanid and Early Islamic period (Rante 2015: 9-17), a region with a strong individuality that continued in Iron Age with the presence of Yaz Culture, in Achaemenid period (Cattenat - Gardin 1977: 230-235, figs. 2-4) and in some way was still present in the Early Islamic period (Rante 2015: 21-22). For this reason the authors prefer to use the name 'Greater Khorasan Civilization', GKC, instead of Bactria-Margiana Archaeological Complex or Oxus Civilization, two formulas that impose strong geographical limits to a larger phenomenon.

GKC expanded further in areas originally settled by other cultures/civilizations (Fig. 2), namely in Northern Khorasan in the middle Atrek valley in the area of Bojnord, in the Kal-e Shur valley (in the regions of present-day Jajarm and Esfarayen), in Khorasan Razavi, in Southern Khorasan, in Sistan (for Sistan see also fig. 14), in the Quetta and Mehrgarh areas in Pakistan (Santoni 1984; 1988; Jarrige 1988; 1989; Jarrige - Hassan 1989) and at Mundigak (Balali 2010). In Khorasan, south of the formative area, five sites with GKC pottery have been found (Biscione - Vahdati 2021: 531-36), namely Tepe Chupan, Sartakhteh, Gavand, Bakanda, Tang-e Ghelieh Rez. Later on GKC pottery (and possibly also NMZ IV) was found at sites near Neqab and Davarzan, in Northern Khorasan (Figs. 1-2).

7. The presence of Period Namazga IV in the ancient Murghab delta is poorly documented, and the question is still under discussion, therefore it was preferred not to include this region in the diffusion area of Namazga I-IV.

Tepe Chupan, not excavated, is a site with a still not well-defined Chalcolithic local culture and clusters of GKC pottery that possibly result from the erosion of graves. It is not possible to ascertain whether GKC and local pottery coexisted or the GKC arrival was later than the settlement. The same applies to Sartakhteh.

At the site of Gavand a GKC grave was illegally excavated. Scientific excavations by the Southern Khorasan Cultural Heritage Office (Farjami 2015; 2016: 474-475, 478 fig. 4) revealed that the site was destroyed by agricultural activities, and in the mixed layers has been found pottery going back to GKC, historical and Islamic period. Possibly the GKC pottery indicates the presence of a necropolis. At Bakanda an unpublished necropolis was excavated, whose graves showed an association of local and GKC pottery. At Tang-e Ghelieh Rez a GKC necropolis was excavated and preliminarily published (Sorush - Yusefi 2014).

Further presences of GKC prestige objects and pottery in local context are well-known in Eastern Iran, suffice it to mention among the other sites Tepe Hissar (e.g. hoards 1 and 2, Schmidt 1937: 171-174 figs. 96-98, 175 fig. 99), Shahdad (Lamberg-Karlovsky - Hiebert 1992; Salvatori - Tosi 1997: 128-131; Mutin - Lamberg-Karlovsky 2019: 554-558) and Tepe Yahya (Lamberg-Karlovsky - Hiebert 1992: 6, pl 2 a-b; Lamberg-Karlovsky - Potts 2001: 63 fig. 2.5, 146 fig. 5.3, 201-203, 205-206; Mutin - Lamberg-Karlovsky 2019: 558-550).

It is now possible to divide the wide region into which GKC expanded outside the core area into two different zones (Biscione - Vahdati 2021: 529-530): the expansion area, where GKC replaced the local cultures/civilizations and is represented by settlements and graveyards without any local element, and the influence area, where GKC pottery is associated to local one, like for instance at Tepe Yahya, or GKC prestige objects are found in local contexts, e.g. at Hissar or at Shahdad (Fig. 2). Unfortunately, it is not always possible to be sure if some of the unexcavated sites should be placed in the expansion or in the influence areas.

The different distribution of GKC luxury objects and pottery also evidences different types of connections with the core area of the GKC (Biscione - Vahdati 2021: 542). In the expansion area the total presence of GKC and the lack of any other cultural tradition indicate the presence of a large number of people coming

from the core area. In the influence area isolated burials with GKC pottery show the presence of individuals coming from the core or expansion areas who moved for various reasons (trade, specialized knowledge and abilities needed abroad etc.), as already suggested by other authors (e.g. Lamberg-Karlovsky - Hiebert 1992: 3, 6; Salvatori 1995: 50; Thornton 2013: 195; Salvatori 2016: 454; Mutin - Lamberg-Karlovsky 2021: 574, 578-79); groups of GKC luxury objects and GKC pottery highlight strong connections with the core area and finally the presence of isolated GKC luxury objects indicates most probably commercial ties with the core area[8].

The expansion seems to have happened in regions that at the moment were unpopulated, as shown by the lack of earlier settlements in the Jajarm Railway Station area (Fig. 2) near the Kal-e Shur river, by the gaps in the sequences of Chalow (Vahdati *et al*. 2019: 182-184) and by the end of the Hirmand civilization in Sistan (see below).

Southern Sistan, both Iranian and Afghan, constitutes one of the most significant territories with important GKC presence. The surveys carried out in Afghan Sistan in 1969-1971 by Prof. G. Dales, then of the University of Pennsylvania Museum of Archaeology and Anthropology, revealed a set of GKC luxury objects (Dales 1972: 31-35, figs 16-19; Dales 1977b), defined in the publication 'Hissar IIIC' because at the time there were no other possible comparisons. Only later the full meaning of these finds and their implications would have been clear to archaeologists. The objects, most probably coming from graves, were brought as offerings to the burial of a local holy man in the shrine of Godar-i Shah, located on the course of the Shela Rud, which is the natural spillway of the Hamun Lake into the Gowd-e Zirreh (Figs. 13-14).

The results of the survey were published only in a preliminary way (Flam 1969; Dales 1972; 1977b; 1993). Prof. Dales was preparing the final publication of the report and in 1984 or 1985 showed us in Rome slides of the finds of his survey,

8. The area of Mehrgarh, here registered as belonging to the influence area, is peculiar because GKC pottery coexists with the local one, but its presence is so strong to suggest the contemporary presence of local and GKC traditions, equally significant, that co-existed peacefully.

among which we could identify fragments of pottery then called 'Namazga VI' and now better defined GKC.

Prof. Dales never published the report also because of his untimely demise, but in 2008 R. Biscione could study the documents kept in the archives of the Pennsylvania Museum of Archaeology and Anthropology.[9] Many of the surface potsherds gathered in the Gardan Reg and Shela Rud area (Fig. 13) are typical of the Hirmand Civilization, periods Shahr-i Sokhta II-III-IV, but a number of them are clearly GKC (Fig. 15). These sherds were found in at least six sites out of at least nine,[10] and in three of them they were associated with pottery of periods Shahr-i Sokhta II-IV, while the other three gave only GKC pottery.

The report of the survey in Afghan Sistan carried out in 1949-1951 by prof. W.A. Fairservis (Fairservis 1961) was checked, but it was not possible to determine with certainty the presence of GKC materials. The datable elements of the protohistoric sites found by Fairservis (who actually defined them 'prehistoric') have very good parallels with Periods II and mainly III of Shahr-i Sokhta. Some finds anyhow might suggest connections with GKC, like the two pottery trumpet-shaped hollow feet from site 110 (Fairservis 1961: 75 fig. 36 p-q) and the two fragments of copper-bronze round mirrors with triangular-section rim from site 109 (Fairservis 1961: 72 fig. 36 b-c), not known at Shahr-i Sokhta and ubiquitous in GKC (e.g. Kaniuth 2006: 65-73; Vahdati *et al*. 1399: 56 fig. 8 n. 6; Vahdati *et al*. in press). The potsherds kept in the storerooms of the Peabody Museum of Archaeology and Ethnology at Harvard University were checked by Raffaele Biscione in 2008,[11] and no evidence of GKC ceramics was found.

9. The pottery gathered during the survey was brought to the Kabul Archaeological Museum, and the graphic and photographic documentation of the survey is kept in the archives of the University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia. The study was possible thanks to the kindness of Dr. Richard Hodges, then Director of the Museum, and to the invaluable help of Prof. Holly Pittman, to whom go our warmest thanks. The results of the study will be soon published.

10. Unfortunately in the archives no map was found with the localization of the sites, and their description is not always clear about their number. For instance the definition 'kiln sites' found in the archives does not specify how many they were and the same happens for 'Shela Rud terraces'.

11. This was possible thanks to the kindness of Professor C.C. Lamberg-Karlovsky and of Dr. Richard Meadow, to whom go our warmest thanks.

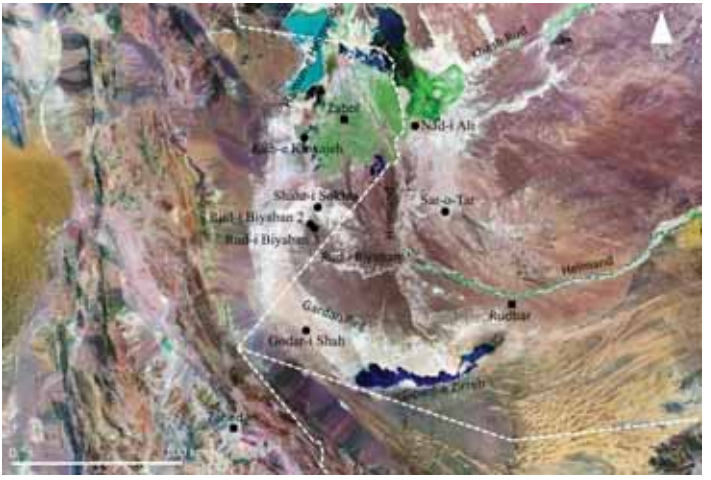

Fig. 13: Sistan. The main geographical features and the archaeological sites mentioned in this article (Elaboration from false colour satellite imagery).

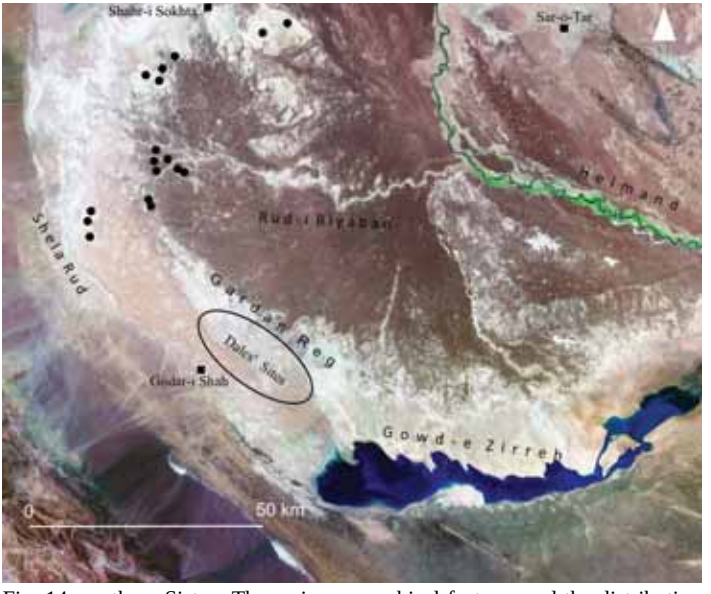

Fig. 14: southern Sistan. The main geographical features and the distribution of the GKC sites. Dots indicate the GKC sites and squares mark sites of other periods. It is not possible to determine exact position and number of the sites found by the Dales' survey, so their approximate position is indicated by the black ellipse (Elaboration from false colour satellite imagery).

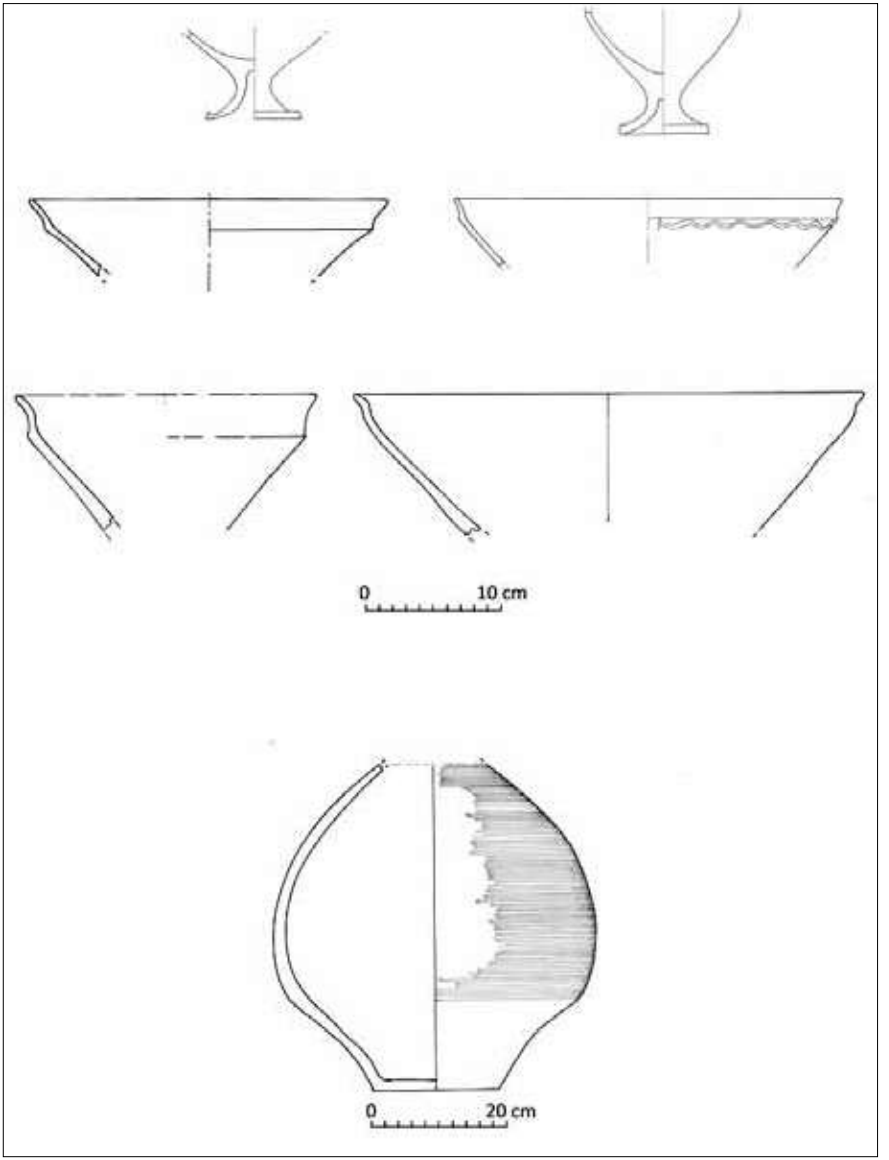

Fig. 15: samples of GKC pottery from various sites of the Dales' survey in the Gardan Reg area.

It must be remarked that the protohistoric sites of the Fairservis survey are located in the Gardan Reg area, i.e in the same region studied by Dales. Unfortunately the incompleteness of the cartography and of the records does not allow us to understand if the territories surveyed by Fairservis and by Dales overlap or not and, if not, how far are the two areas.

In 20th century not one GKC fragment was ever found in Iranian Sistan, neither in the excavations, nor on the surface of the excavated sites including Shahr-i Sokhta, nor in surveys, but in the recent years things changed. A cursory check of the reports of the Sistan survey of 2007 – 2008 directed by professors S. R. Musavi Haji and R. Mehrafārin (see footnotes 4 and 5) revealed sure presence of GKC pottery in 17 sites, 11 of them in the south-western part of the ancient delta of the Rud-i Biyaban and the others in the northern part (Fig. 14). Possible GKC pottery was found on 29 more sites.

Among the 17 sites with sure GKC pottery 11 were settled also in period Shahr-i Sokhta III, on 2 were found period IV and GKC potsherds, one had pottery of periods III, IV and GKC and 3 were new foundations. It is clear that GKC pottery was scarcely associated with the one of period Shahr-i Sokhta IV.

It should be remarked that in the Spring of 2021 professor R. Shirazi of the Zahedan University carried on a survey aimed at identifying on the field sites with GKC pottery, preliminary to the excavation of one of these sites. The aim of the research, that doubtless will give rich results, is exactly the study of the GKC presence in Iranian Sistan.

The data from Sistan corroborate the evidence of a BMAC/GKC presence (Fig. 2) at Nad-i Ali (Besenval - Francfort 1994: 5) Shamshir Ghar (Francfort - Tremblay 2010: 107-108) and Mundigak (Balali 2010). They also shed a new light on the significant GKC presence in the Quetta and Mehrgarh areas, which were not isolated outposts in far-away areas. The important influx in Sistan is not surprising if we think that at Shahr-i Sokhta Period I and at Mundigak Period III was found Namazga III pottery, dated end of 4th millennium – beginning of the 3rd (e.g. Biscione 1973) and the Quetta valley too was reached by the same Namazga III pottery (Fairservis 1956: figs. 414-415). Mergarh, Nowsharo and Sibri are not

far from the Quetta valley, on a natural highway connecting it, and ultimately Afghanistan, with the Indus Valley. Clearly the expansion of GKC followed at least some of the routes already used one thousand years before by the Namazga III expansion out of the formative area.

It is to be remarked that all the GKC potsherds found in Sistan, just like the ones found in other parts of Iran and in the Mehrgarh area, are associated with the flourishing period of the GKC, dated 24th - 19th centuries BC (Lyonnet - Dubova 2021: 32) and not with the later, final period dated 1800/1700 – 1500/1400 BC (Luneau 2021: 497).

These facts suggest that in Sistan, unlike the Mehrgarh area where GKC and local pottery were found together in the excavations (Santoni 1988: 138; Jarrige 1996: 871), the two cultural traditions were not contemporary. Indeed if GKC and Hirmand Civilization co-existed and some of the small sites hosted both cultural traditions most probably some GKC sherds would have been found also in the excavations, and as already said this never happened.[12] We must therefore accept that in Sistan GKC and Hirmand Civilization were not contemporary and that GKC pottery arrived *after* the abandonment of Shahr-i Sokhta and of the other sites in the Rud-i Biyaban, i.e. after the end of the Hirmand Civilization.

This is a further evidence that forces us to re-consider the date of the latest part of the sequence of Shahr-i Sokhta, namely the end of Period III (Phase 2, dated 2300-2200, see above) and to the whole of Period IV, Phases 1-0. Phase 1, that constitutes the most important part of Period IV with the occupation of the whole *Burnt Building*, shows strong connections with Bampur V-VI, generally dated 2200-2000 BC, and the C14 determinations (Salvatori - Tosi 2005: 288, 290)

12. In the oasis of Nishapur there is clear evidence that, at least in the Chalcolithic period, Namazga culture and a local culture not yet well-identified coexisted. The eastern part of the oasis was territory of the local culture (Garajian 2012: 59-62), the western one of the Namazga Culture (Hiebert - Dyson 2002; Bāsafā - Rezāi 2016) and apparently the cultural border was very strong and impassable, as no potsherds of one cultural tradition was found in the sites of the other. This peculiar fact could be connected with the presence, immediately west of the Nishapur oasis, of an easy road leading to the upper Atrek valley, that as already said was territory of the Namazga culture. In Sistan there is no clear border between the Hirmand Civilization and GKC, so the model of the Nishapur oasis cannot be applied.

"…point to a maximum probability range between 2200 and 2000 BC, well in accordance with a palaeo-magnetic determination from the same archaeological context (2050-1950 BC)". Then after the fire the *Burnt Building* was abandoned and followed a gap dated 2000-1850 BC; finally in Phase 0 one of the rooms of the *Burnt Building* was re-settled and this occupation, based on one C14 and one U238 calibrated determinations indicating a time-span 1950-1650 BC, was dated on the chronological tables 1850-1700 BC (Salvatori - Tosi 2005: 289 fig. 12, 290 fig. 13). It is evident that the date of Phase 0, extending Period IV into 2nd millennium BC and giving it a total length of 450 years, is based only on these two determinations.

It must also be remarked that the pottery of Phases 1 and 0 is identical (Biscione 1979: 293; Tosi 1983: 92), and therefore they are a single cultural horizon. It is difficult to suppose that the ceramic of Period IV continued without any change for almost half a millennium, including a gap of 150 years. Comparing the 500 years before Period IV we see that the sequence of Shahr-i Sokhta in the same time-span includes the whole of Periods II and III (Phases 7-2), and that the pottery changed in a significant way. It is therefore unlikely that the pottery of Period IV went on for such a long period without any change.

Based on these facts and on the presence itself of GKC, whose flourishing phase and expansion into Eastern Iran and Pakistan ended by 1800/1700 BC, and preferring a conservative date until new elements elucidate the question of the absolute chronology of periods Shahr-i Sokhta III and IV, it is reasonable to think that the gap between Phase 1 and 0 was very short and that Phase 0 too was short. We presume that the whole Period IV, phases 1-0, can be dated approximately 2200-2000 BC, matching the date of Bampur V-VI proposed by Salvatori and Tosi, 2200-2000 BC (Salvatori - Tosi 2005: 290). This means that GKC reached Sistan immediately after the end of the Hirmand Civilization around 2000 BC, at the same time of the expansion into Mehrgarh area (Jarrige 1995: 42, 44, 47; Jarrige 1996: 871). This date allowed GKC about 200 years to reach its maximum expansion in Sistan and in Mehrgarh region, and after that about 200-300 years to develop in Sistan a complex of at least 23 sites and graves (graveyards?) with the luxury objects found at Dam in secondary deposition (see above).

Of course, higher dates for Periods III and IV, proposed by Jarrige *et al*. (2011) and by Helwing *et al*. (2019), would solve the problem and even imply a gap between the end of Period IV and the arrival of GKC pottery in Sistan. Anyhow, as already said above, the authors of this article prefer to wait for additional evidence before pushing back a few centuries the dates of Shahr-i Sokhta, Bampur and of other sites of south-eastern Iran. The 17 GKC sites of Iranian Sistan and their localization in well-defined areas, compared to the 55 sites surely datable to Period IV (unpublished data from the surveys by Dales and the University of Zahedan) distributed all over the ancient delta, suggest that possibly the shifting of the Hirmand, that led to the drying up of the Rud-i Biyaban, began in Period IV, and that GKC arrived in Sistan when it was already drier than in the heydays of the Hirmand Civilization.[13] Possibly the shifting was complete by 1800/1700 BC, as indicated by the total absence in Iranian Sistan of sites between the end of flourishing GKC and the Achaemenid period. It is not probable that the mighty Hirmand River dried up totally between 1800-1700 and 550 BC, nor it is possible to think that if there was water the area would not have been settled. It is therefore likely that between 1800/1700 BC and the Achaemenid period the Hirmand delta shifted to another area of Sistan. The *Istituto di Scienze per il Patrimonio Culturale*, ISPC, is studying this problem on satellite imagery.

Settlements are indeed present in Afghan Sistan. Until very recently the only known site was Nad-i Ali, whose sequence, after the probable GKC period (see above), includes also Iron Age, presumably dated 8th–6th centuries BC (Dales 1977c: 101-104, 111; Allen, Trousdale 2019: 62), Achaemenid and Parthian-Sasanian periods (Dales 1977c: 101-104). Satellite imagery shows that the area around Nad-i Ali is presently watered by a branch of the Hirmand delta and by the Khash Rud river. This last river has a mean yearly discharge corresponding to 7% of the one of the whole Hirmand (van Beek - Meijer 2006: 12), a discharge that was definitely enough for the life of the site. So the possibility that in late

13. The expansion of GKC in Eastern Iran took place in many areas presently drier than the neighbouring ones that, whatever the climatic conditions of late 3rd millennium, presumably were drier also 4,000 years ago. This could mean, for instance, that water management techniques of GKC were more efficient than the previous ones, or that GKC techniques of food productions needed less water (Biscione - Vahdati 2021: 543).

3rd – early 2nd millennium BC Nad-i Ali did not depend on the Hirmand but on the Khash Rud should be taken into consideration.

Recently some early sites, identified by the survey of the Hirmand Valley carried out by the Smithsonian Institution in the Seventies and directed by W.B. Trousdale, were published, revealing a new Iron Age culture hitherto unknown, dated approximately 1200-900 BC (Allen - Trousdale 2019: 30, 56-58, 63) and therefore preceding Nad-i Ali.[14] These sites (Allen - Trousdale 2019: 36, 42-47), known only in Afghan Sistan in the Sar-o Tar basin, in the Rudbar area on the Hirmand and possibly near Nad-i Ali (Figs. 13-14), suggest that in the late 2nd millennium BC the Hirmand delta could have been located in the Sar-o-Tar region. This is confirmed by geological evidence of a 2nd millennium delta exactly in that area (Whitney 2006: 3 fig. 2, 29 fig. 18, 30). The delta anyhow seems to be largely artificial, with excavation of canals beginning in Iron Age and continuing for 2500 years with increasing length and complexity (Allen - Trousdale 2019: 35).

Many tasks face us in the future for a better understanding of the proto-history of Sistan, and studying the mid-late 2nd millennium delta is one of the most important. When it will be surely found, we will have the key for the understanding of the ‘dark period’ and for a full comprehension of the history of Sistan, one of the key areas for the ethnogenesis of ancient Iran and for the formation of the Iranian culture, religion and traditions.

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Potter's Marks in Shahr-i Sokhta: Their Functions and Meanings

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1. Introduction

Shahr-i Sokhta is a familiar name in Iranian Archaeological history. Recent archaeological excavations at Shahr-i Sokhta have yielded valuable information about this part of the south-eastern Iranian Plateau, drawing the attention of archaeologists. The large population of the site, along with its satellite settlements, required the production of large numbers of pottery vessels. The presence of millions of pottery sherds as well as hundreds of kilns attests to the thriving pottery industry in this area. The presence of such a huge quantity of pottery on the main mound as well as the surrounding hills confirms this viewpoint.

Archaeological surveys in this site and the surrounding area, especially the eastern lowlands, show that it is dotted with kilns and pottery workshops, which is evidence that the majority of the pottery used in this area was produced in and around villages such as Tepe Dash or the hills of Rud-e Biyaban. On the surface of the city and its northwest area, i.e. the Monumental Area, there are the remains of pottery kilns that seem to belong to the site's later periods of occupation.

The site's large area, population and more than one thousand years of occupation are all evidence that the city was a major regional trading centre, maintaining

relations not just with the surrounding settlements but also far-off civilizations, which also explains the presence of such a large quantity of ceramics.

The pottery of the site has been the object of several studies, but we still do not have enough information regarding the pottery of the city and its production. Shahr-i Sokhta's pottery belongs to two main categories, Buff and Grey Ware. Red Ware is occasionally seen among the collected cultural material; however, Buff Ware is seen in all periods of occupation. Pots, jars, bowls and beakers are the main forms of Buff Ware. Beakers, especially pear-shaped ones, are present in all periods.

Large numbers of Period II beakers have potter's marks on the bottom. They take various forms, but the majority of them are either straight or slanted lines. Buff Ware bowls were among the common shapes, most of them unpainted and roughly hemispherical in shape. However, a good number of them are painted with geometric designs (Figs. 1-2), undergoing various changes from Periods I to IV.

The majority of geometric motifs on the Buff Ware bowls of Shahr-i Sokhta consisted of simple or composite lines, triangles, chains of triangles, hanging triangles, zigzags and festoons. Zoomorphic motifs were not as common as geometric ones, and were limited to animals such as goats, birds, stags/deer and fish. The most common zoomorphic motifs were goats and stags/deer, seen on beakers, but during Period III fish motifs appear on the inner surface of bowls and plates. Some of these decorative motifs on Buff Ware could be related to features of the region's natural environment, such as rivers, lakes and fields. Mostly seen on shallow bowls or dishes, these motifs usually range from light brown to dark brown and almost black (Figs. 3-4).

Shahr-i Sokhta's Grey Ware is a special type. This category mostly consists of bowls and/or small dishes/plates, and in a few instances trumpet-shaped vessels. The Grey Ware of Shahr-i Sokhta is usually burnt or blackened. Almost all the deep Grey Ware bowls from this site are painted, although there are also unpainted ones. In the case of deep bowls, motifs decorate both the inside and

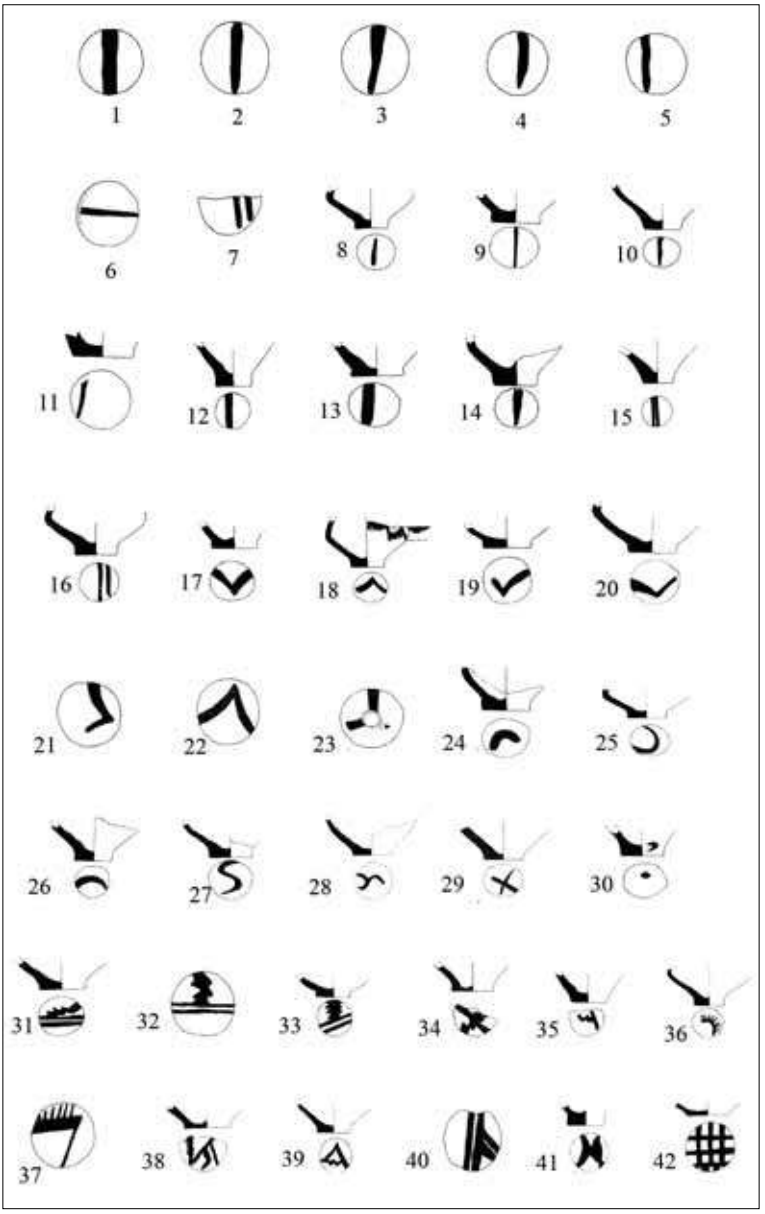

Fig. 1: Shahr-i Sokhta. Painted signs on the bottoms of vessels.

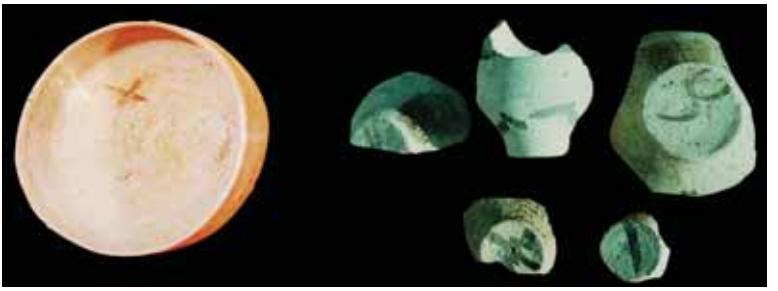

Fig. 2: painted signs.

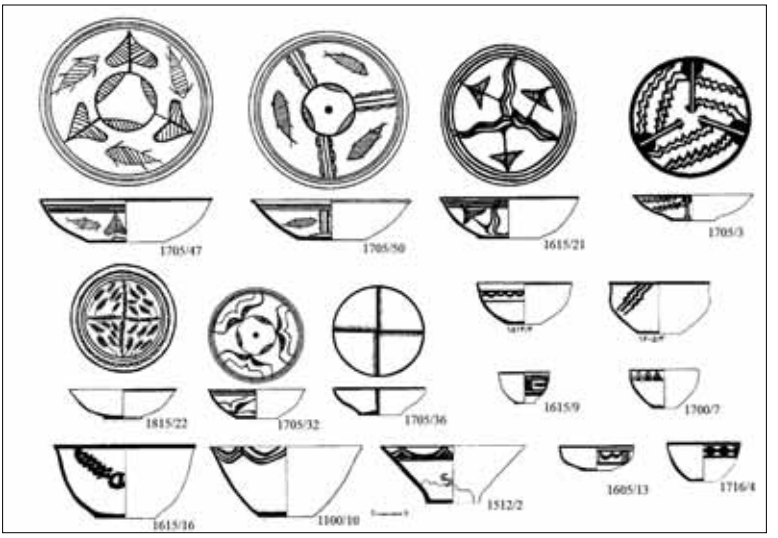

Fig. 3: Shahr-i Sokhta. Reflection of nature scene and geometric designs.

Fig. 4: Shahr-i Sokhta. Painted pear shape beakers with potter marks.

outside. The external motifs are mostly below the rim on the upper part of the vessel, consisting of geometric lines and crossed triangles, while the internal motifs cover the entire surface. The internal decoration consists of natural motifs. In the centre of plates or bowls there are two crossed S-shapes and sometimes two crossed arrowheads. These motifs are replicated on both sides, inside and out. The motifs on the outside of smaller bowls also consist of various lines and delicate crossed triangles on the rim, sometimes repeated inside the vessel.

Polychrome (yellow, red, orange, black) and bichrome ceramics, dated to the years from 3000 to 2300 BC, were also produced; samples are found in graves and residential areas. Bichrome beakers had flat bottoms and were decorated with orange, black and brown geometric patterns. Polychrome vessels included wide pots, in some instances cylindrical, and beakers with flat bottoms. The pigments were made with ferrous minerals, malachite, lapis-lazuli and coal among other components.

The pottery of Shahr-i Sokhta can be divided into several groups, of which the most important are:

1. Common vessels used in daily life such as beakers, plates, bowls, jars, pots and so on, consisting of both painted and unpainted types. Pear Shaped Beakers (PSBs) are the most common form in this group. They must have played an important role in burial rituals, and there are hardly any graves that do not contain at least one of these beakers.

2. The second group of pottery is new and unused vessels. It seems these vessels were made to be used primarily for inhumation purposes. These vessels include wide-mouthed pots, cylindrical jars and unpainted Buff Ware bowls. They were not only used in burial ceremonies, but also in daily life. A considerable number of vessels of this type were recovered from the catacombs, and they often carry potter's marks, either engraved or painted (Fig. 5a-b).

3. The third group of vessels consists of pottery specially made for burials. This type is less common in residential areas than graves. Almost all of them are deep Grey Ware bowls decorated inside and outside. Unlike most pottery from Shahr-i Sokhta, the decorations on these bowls in some way reflect life, or

Fig. 5a-b: Shahr-i Sokhta. New and unused bowls: a. Catacomb No. 1705; b. Catacomb No. 1400.

are borrowed from nature. Almost all of the bowls are marked with a crossed S-shape, similar to a swastika, that can be interpreted as a carousel or the carousel of life, along with fields, domesticated animals, lakes, fish, leaves and rivers. Considering the beliefs of Shahr-i Sokhta's inhabitants regarding life after death, one can deduce that these designs are interpretations of the role of the wheel or cycle of life (Figs. 6a-b, 7).

2. Potter's marks in Eastern Iranian Sites

The presence of potter's marks on the surface of pottery vessels has given rise to various hypotheses. It seems that the signs and patterns have meanings and interpretations, but they have not been deciphered. However, their presence on the pottery fragments, and in some instances on other items such as anthropomorphic and zoomorphic figurines, has attracted the curiosity of scholars. These signs are conventionally called potter's marks. A number of signs were discovered by the Italian archaeological Mission during the first stage of archaeological excavations at Shahr-i Sokhta (Tosi 1983). Some years later, during the second phase of investigations at Shahr-i Sokhta, more samples were found by the Iranian team, first during the excavations of the necropolis and residential areas and later during the archaeological surface surveys (Sajjadi 2003).

The presence of these signs is not limited to Shahr-i Sokhta, but is seen throughout the archaeological sites of the Eastern Iranian Plateau. A considerable number of signs have been found in Shahdad (Hakemi 1997; Kaboli 1990), Tepe Yahya (Lamberg-Karlovsky 1970; Beale 1986; Potts 1981) and to a lesser extent Bampur (de Cardi 1970). They have also been seen further east, in sites such as Dumb Sadat (Fairservis 1958), Amri (Casal 1964), Balakot (Fig. 8; Dales 1979), Quetta (Quivron 1980), Mundigak in Afghanistan (Casal 1961) and some Chalcolithic sites in India (Lal 1962). Potter's marks have also been reported in northern parts of the Iranian Plateau and sites in Central Asia (Masson - Sarianidi 1972) and Bactria (Sarianidi 1977), as well as Margiana, Tuqloq Depe, Gunor Depe and Dashli (Fig. 9) in Northern Afghanistan (Hiebert 1994), where they are found on or underneath small bowls and dishes. In Altyn Depe in Central Asia

Fig. 6 a-b: Shahr-i Sokhta. Gray Ware bowls with swastika and crossed S/'cycle of life'.

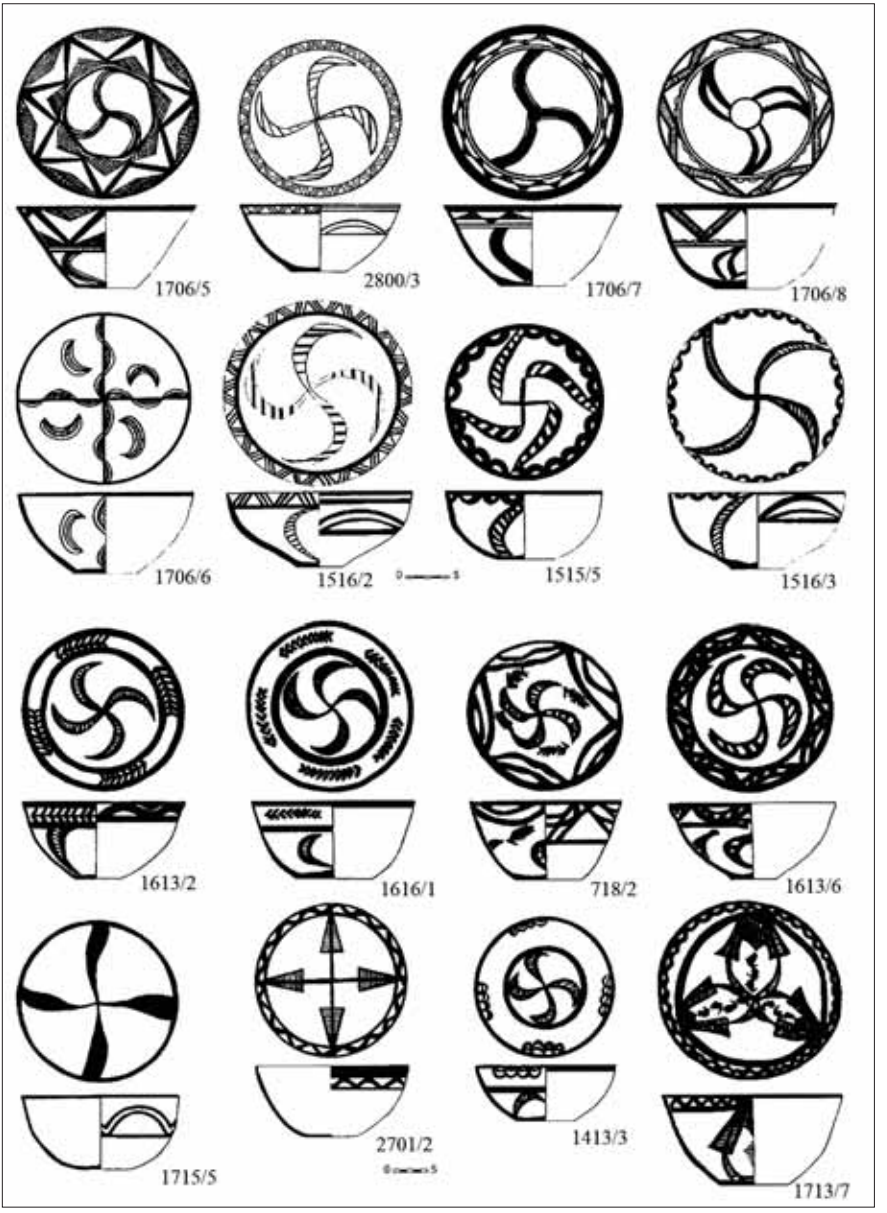

Fig. 7: Shahr-i Sokhta. Gray Ware bowls with swastika and crossed S/'cycle of life'.

there were signs on clay figurines. Masson compares them with Proto-Elamite, Sumerian and Harappan signs (Masson 1988; Fig. 10). Outside the Indo-Iranian Borderlands, the signs are reported less frequently. Those of Arslan Tepe in Malatya on the Anatolian Plateau could be mentioned (Frangipane 1996) (Fig. 11). In Iran, Shahdad, Yahya and Shahr-i Sokhta have yielded the most signs.

2.1. Shahdad

Shahdad is a large Bronze Age site located in the Kerman region. The site has yielded hundreds of burials with thousands of magnificent artefacts from the 3rd millennium BC (Hakemi 1997). During the recent excavations of the necropolis, a considerable number of architectural features from the 3rd millennium BC were unearthed (Kaboli 1989). Together with some other data, the site's wealth of cultural materials and its geographical location once prompted some scholars to identify Shahdad as the city of Aratta mentioned in a Sumerian text (Madjidzadeh 1976: 105-113; Kaboli 1986), although following the recent discovery of the Halil basin civilization, this has been rejected (Madjidzadeh, 'Aratta or Marhashi', in press.). A collection of 606 potter's marks were found on the ceramics, which is the largest corpus of potter's marks in Eastern Iran (Fig. 12). They are both engraved and stamped on Red Ware vessels from Necropolis A.

Signs are often found on the lower part of jars or on their base, their number varying from 1 to 6 (Hakemi 1997: 64). Some of the signs recorded in Shahdad recall Sumerian signs and Proto-Elamite tablets. It should be pointed out that since Shahdad Red Ware belongs to the second half of the 3rd millennium BC, the signs may be earlier than the Harappan inscriptions. The pottery collection of Shahdad includes a jar with 6 engraved signs (Fig. 13). These were studied by Hintz and are dated to the Old Elamite period. This "inscription" translates as: "60 Ka of fresh rain water". Together with the inscribed and non-inscribed tablets in Tepe Yahya as well as Shahr-i Sokhta, the discovery of this inscription is evidence of the strong presence and importance of Elamite culture in eastern Iran.

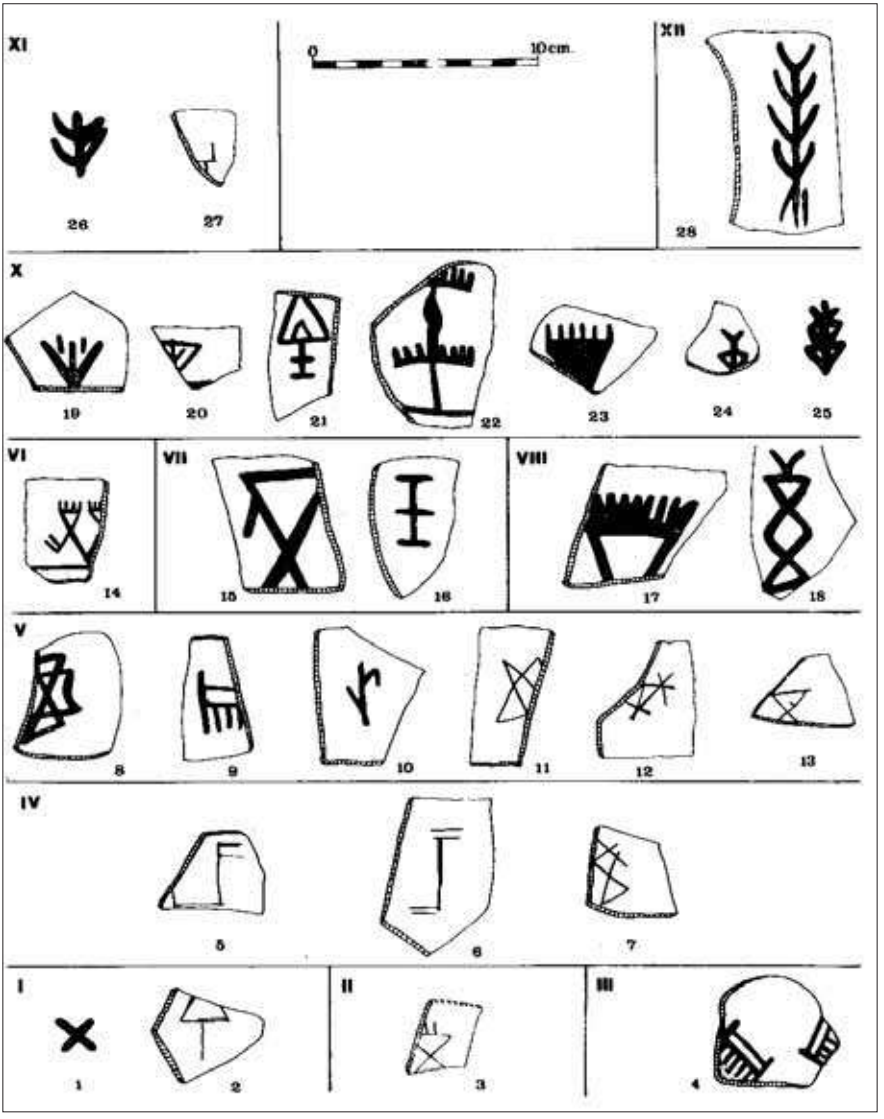

Fig. 8: Balakot. Potter's signs (Dales 1979).

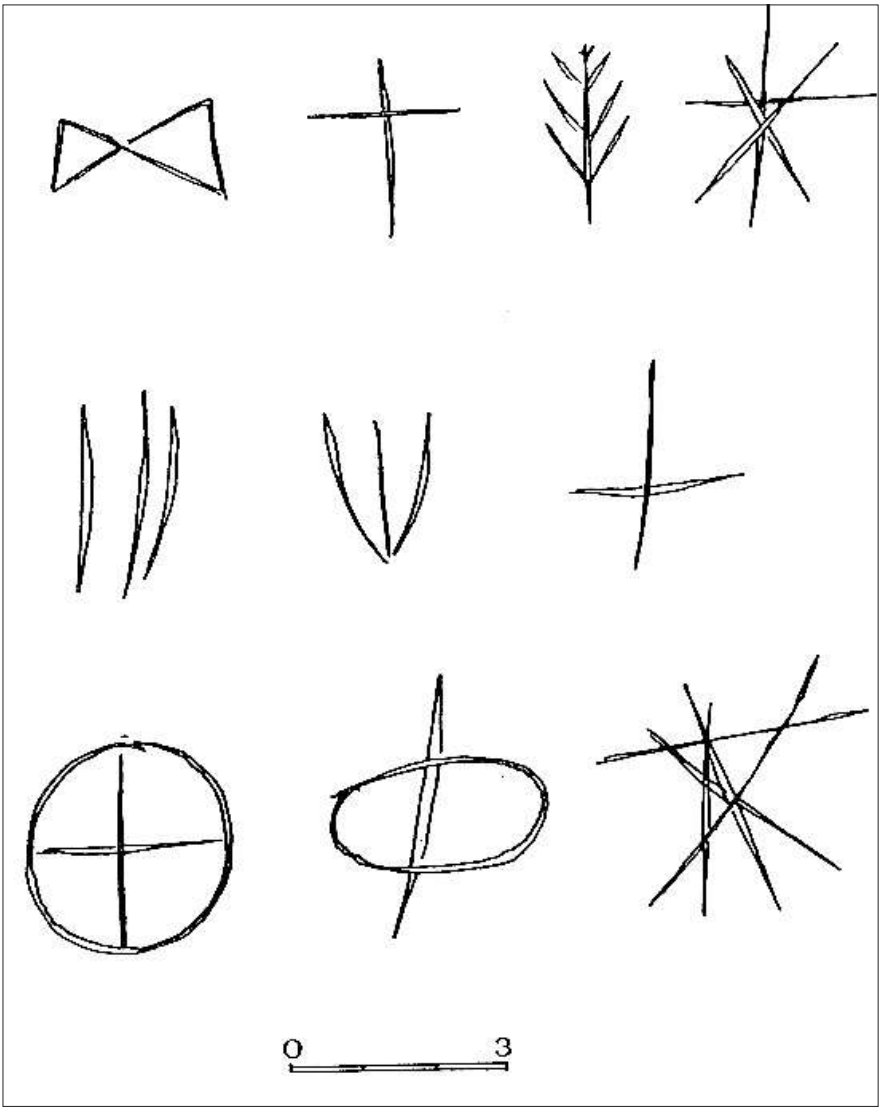

Fig. 9: Central Asia. Potter's signs (Masson 1988).

Site	Group					
	I	II	III	IV	V	VI
South of Turkmenia						
Proto Elamita " Texts"						
Sumerian "Texts"						
Harapa "Texts"						

Fig. 10: comparison table of signs (Sarianidi 1992).

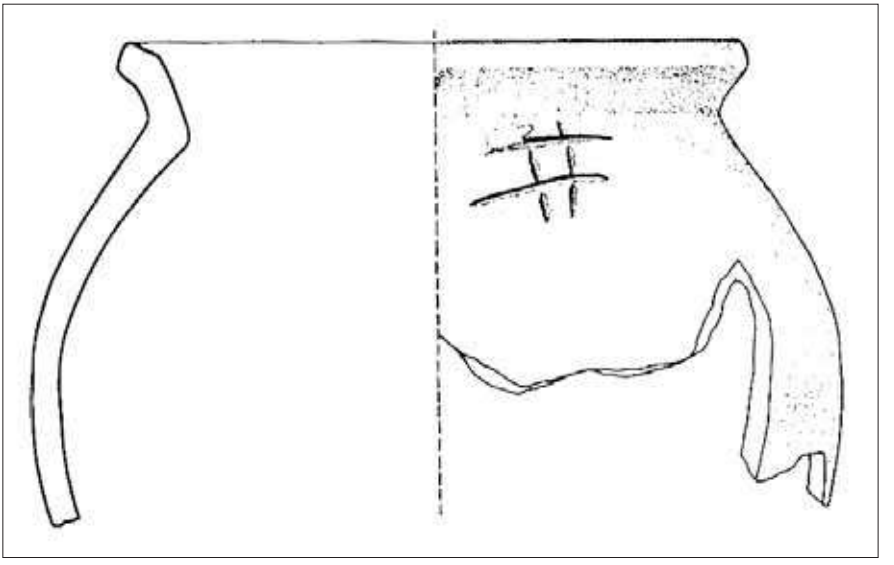

Fig. 11: Arslantepe. Potter's signs (Frangipane 1996).

The two main groups of potter's marks in Shahdad, stamped and engraved signs, number 275 and 331 respectively. The star is among the most widely used signs in both types. According to Hakemi, in Sumerian pictograms and Elamite tablets the star is the sign of the Gods, and is usually found before or next to other signs. According to Hakemi, due to the large number of signs and the presence of more than one sign on some of the vessels, they should not be seen as potter's marks, but rather as being comparable to the pictograms discovered in Tepe Sialk and Tepe Yahya. In Shahdad, the signs are mostly geometrical, but insects, reptiles, birds and creatures resembling rams, leopards and wild boar are also common. One of the most interesting signs is human body parts (Fig. 14).

In any event, the signs discovered in Shahdad are characterised by great variety. The site has continued to yield scores of signs that shed further light on their meaning. As we will see in the following pages, some of the signs found at Tepe Yahya (Potts 1981: fig. 5: 1a, 3) and Shahr-i Sokhta (Tosi 1983: 144) had numerical values from one to three. One of the signs found at Shahdad , which has also been seen in other sites, is in fact one of the most common in other locations such as Zab, Margiana, Mundigak, Bactria, Balakot and sites in the Quetta valley. Furthermore it is also seen in Proto-Elamite and Harappan sites. At Shahdad, this sign (Tab. 5: 32) was found under unique circumstances, which enabled Kaboli to propose a new interpretation of it. Kaboli reported that a group of signs were depicted on four bowls fitted inside each other. Engraved on the smallest was the sign 'I', on the second 'II', on the third 'III' and on the last and largest, ⋈ (Kaboli 1989: 74). Measurement of the vessels and their capacity showed that the bowl with the sign 'II' had twice the capacity and the bowl with 'III' had three times the capacity of the one with 'I', while the bowl with ⋈ 4 times the capacity of the one with 'I' and twice the capacity of the one with 'II'. The researchers thus concluded that these signs had to do with numerical values and were used for measurements and had nothing to do with potter's marks.

2.2. Tepe Yahya

Tepe Yahya is a site in Southern Kerman excavated by Harvard University over

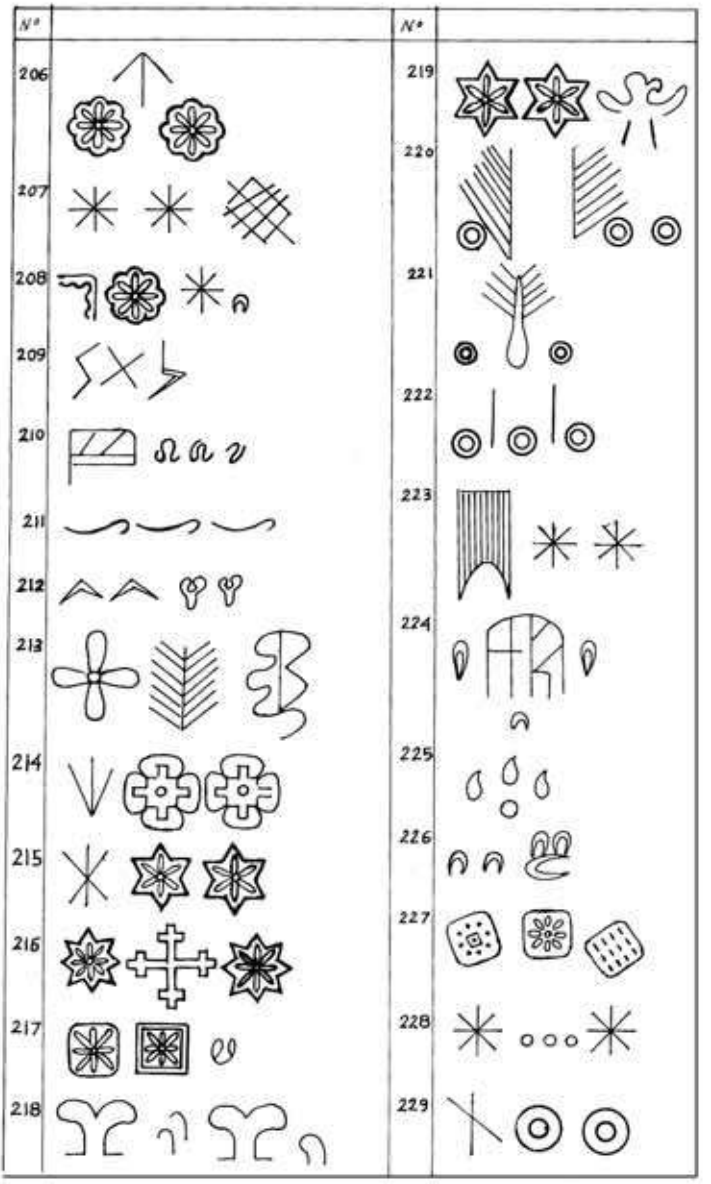

Fig. 12: Shahdad. Potter's signs (Hakemi 1997).

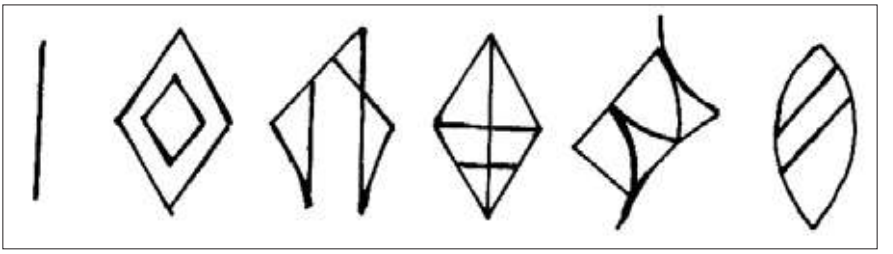

Fig. 13: Shahdad. Linear Elamite inscription (Hakemi 1997).

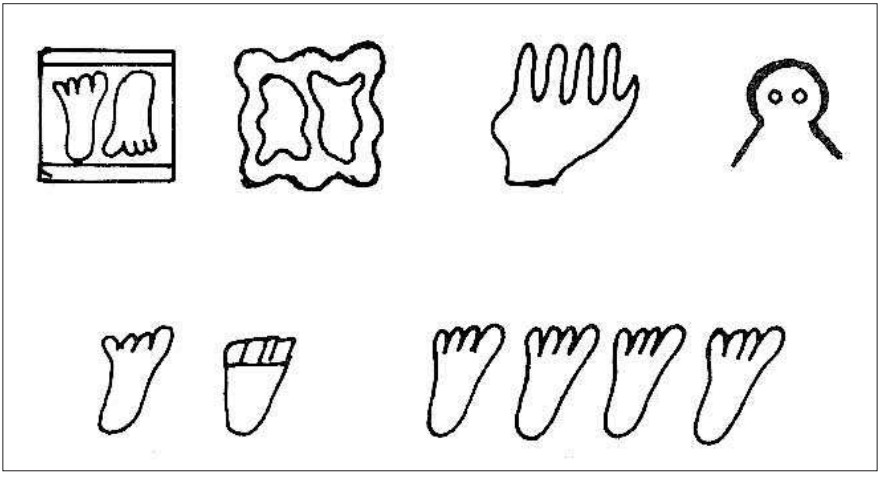

Fig. 14: Shahdad. Signs relating to human body (Hakemi 1997).

8 campaigns (Lamberg-Karlovsky 1970; 1986). The site was occupied from the fifth millennium BC until the Parthian period, with a few gaps (Beale 1986: 11). Overall, 353 signs are reported for Tepe Yahya (Potts 1981: 107). As with other sites, these statistics may not be accurate, but they do shed light on the signs from this ancient site. Unlike the signs discovered in Shahdad and Shahr-i Sokhta, which were on complete and intact vessels, the signs of Tepe Yahya were found on pottery fragments. The potter's marks of Tepe Yahya consist of 20 main groups and a number of sub-groups (Figs. 15-16). Like other signs, these were engraved on the surface of the vessels before firing.

The potter's marks of Yahya are mostly seen on handmade and Coarse Ware fragments, which is what prompted Potts to study them. The vessels are mainly cups, dishes and jars (Potts 1981: 109-111). Most of the signs are from Period IVA, although signs from IVC, IVB and Periods I-III have also been seen. According to Potts, although most of the signs belong to Period IVA, we should not overlook those of the preceding and subsequent periods, which constitute evidence of the pre-existence and continuation of this tradition in the area. Most of the signs in Yahya are engraved on the outer walls of vessels very near to the base, but signs on the bases themselves are less common (Potts 1981: 108). This contrasts with the vessels from Shahr-i Sokhta, where, for example with the pear-shaped beakers, most of the signs are either on the body surface or under the bases.

2.3. Shahr-i Sokhta

It was pointed out earlier that considerable numbers of potter's marks were observed on vessels from the necropolis of Shahr-i Sokhta, but it is noteworthy that the very same signs were also seen on pottery fragments from the Residential Area. The signs consist of three forms: scratched (Fig. 17), engraved (Fig. 18) and painted (Fig. 19).

The scratched and engraved signs were executed while the pottery was still wet and unfired with the help of sharp tools, probably made of bone. In this case, the vessels were mostly unpainted bowls, pots, jars and beakers. Painted signs were applied with the same methods used to paint decorative designs on the body of vessels. Painted signs are mostly seen on painted ware, especially on the bases of painted pear-shaped beakers (Fig. 20), but they are far less numerous than scratched and engraved vessels. (Figs. 21-22).

The difference between the scratched and engraved signs, which has not been reported in other sites, is that the former consist of thin, shallow lines, while those classified as engraved are deeper and wider. Further research on the two types has shown that scratched signs were executed with rudimentary tools such as bone awls, whereas for the engraved signs the tip of the tool must have been wider.

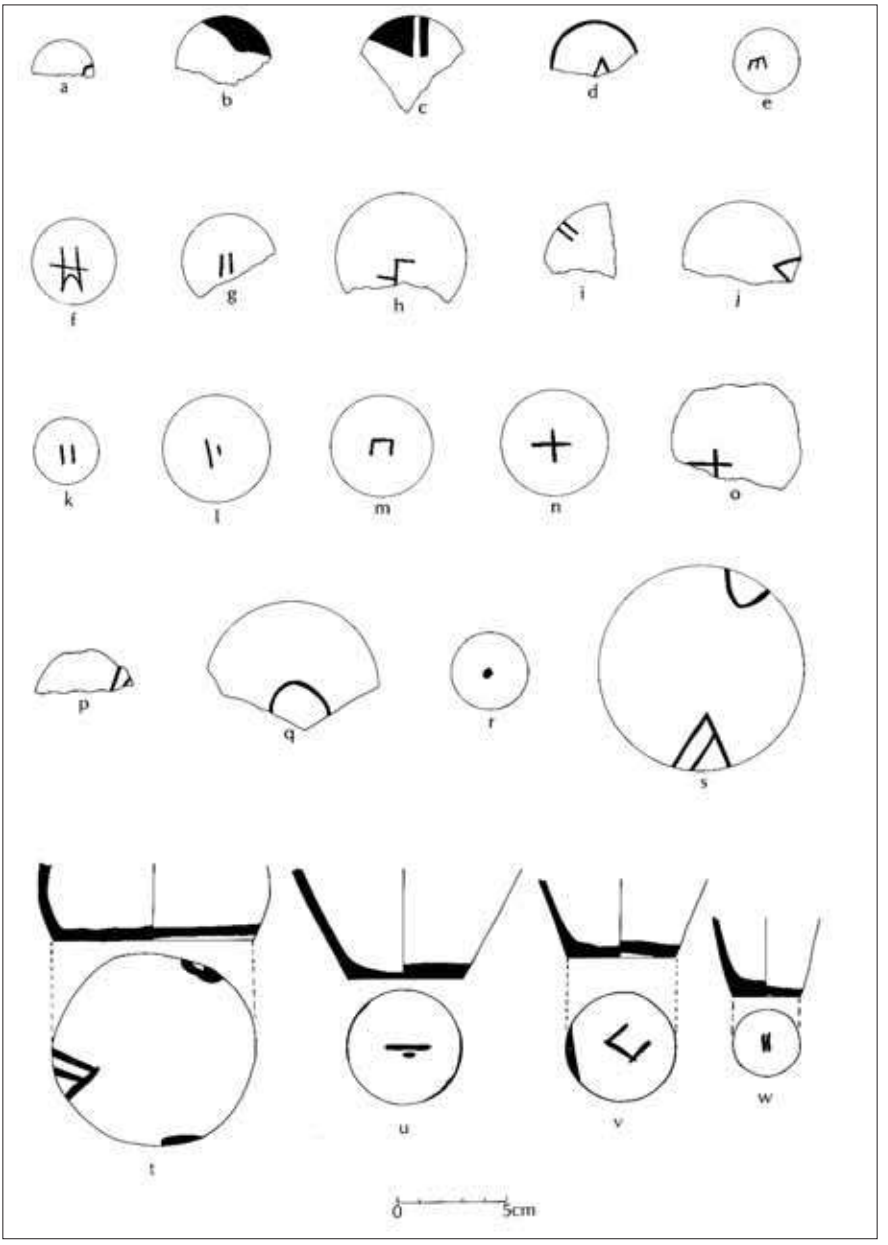

Fig. 15: Tepe Yahya. Potter's signs (Potts 1981).

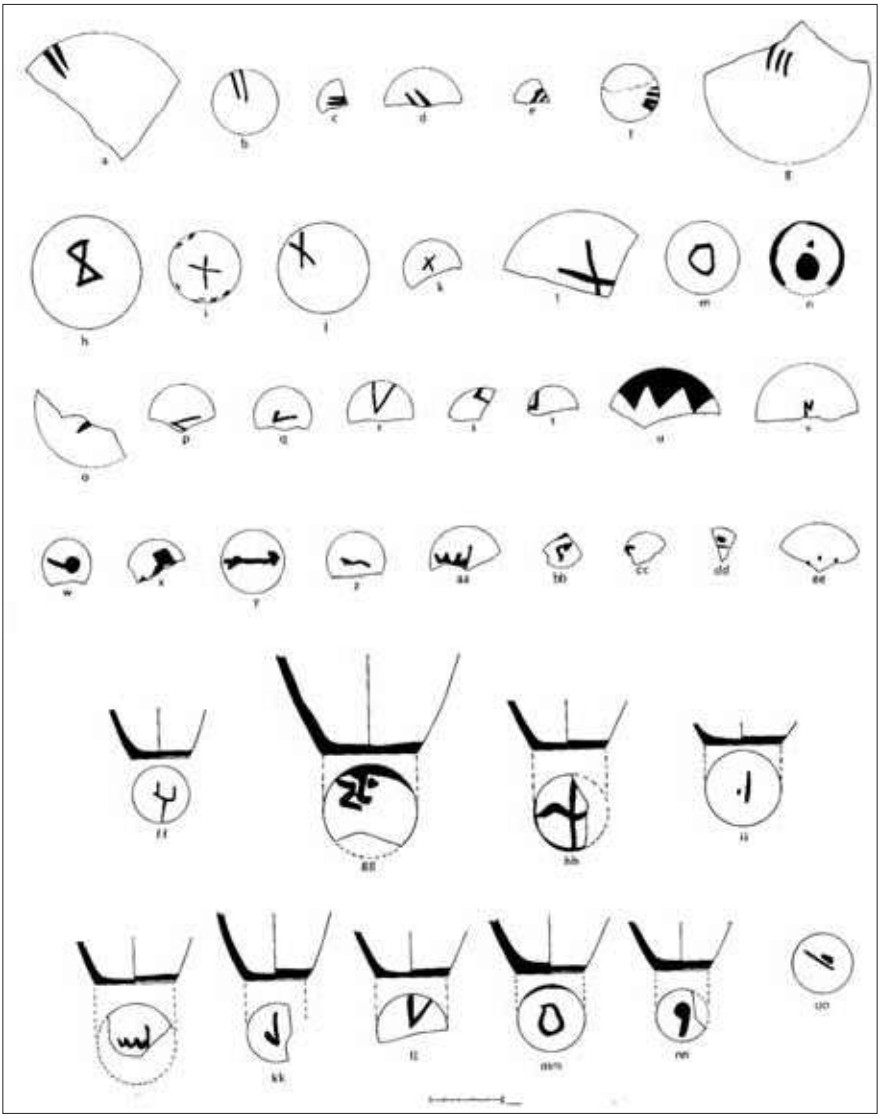

Fig. 16: Tepe Yahya. Potter's signs (Potts 1981).

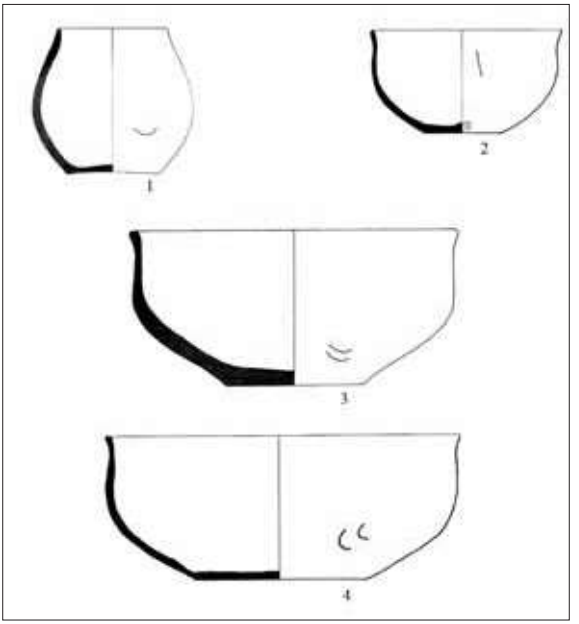

Fig. 17: Shahr-i Sokhta. Scratched..signs.

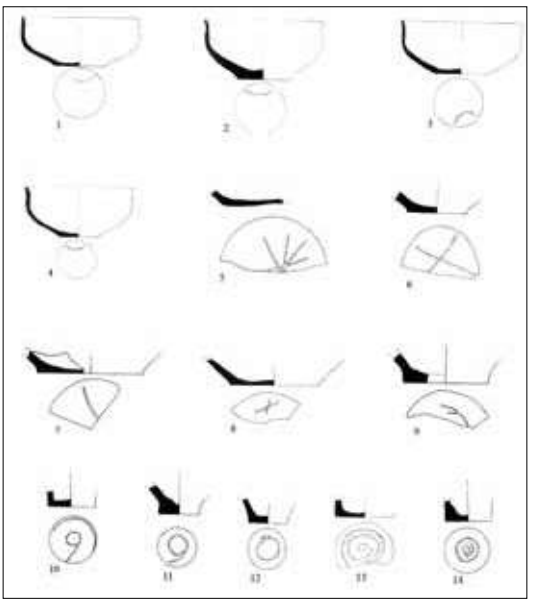

Fig. 18: Shahr-i Sokhta. Engraved signs.

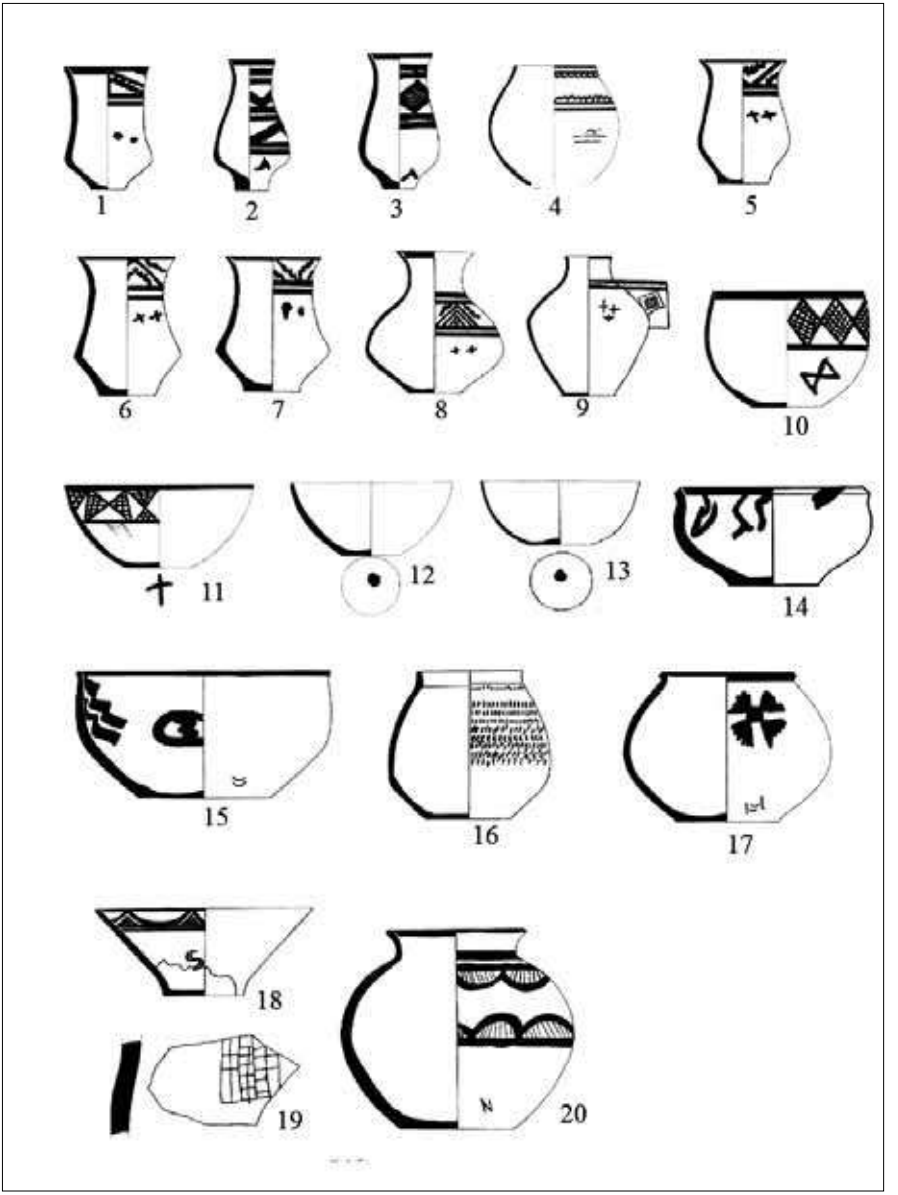

Fig. 19: Shahr-i Sokhta. Painted signs.

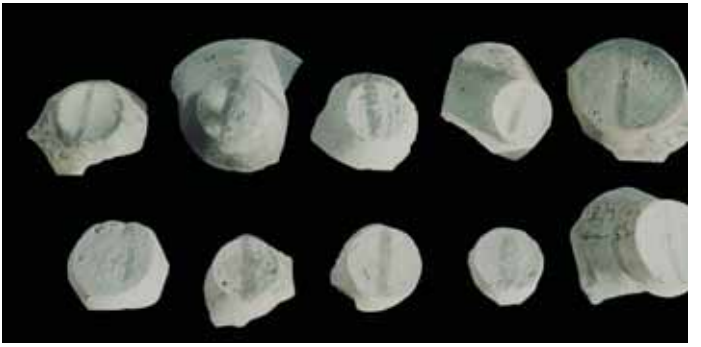

Fig. 20: Shahr-i Sokhta. Painted signs on the base of pear-shaped beakers.

Fig. 21: Shahr-i Sokhta. Engraved signs on cylindrical shape Buff Ware bowl.

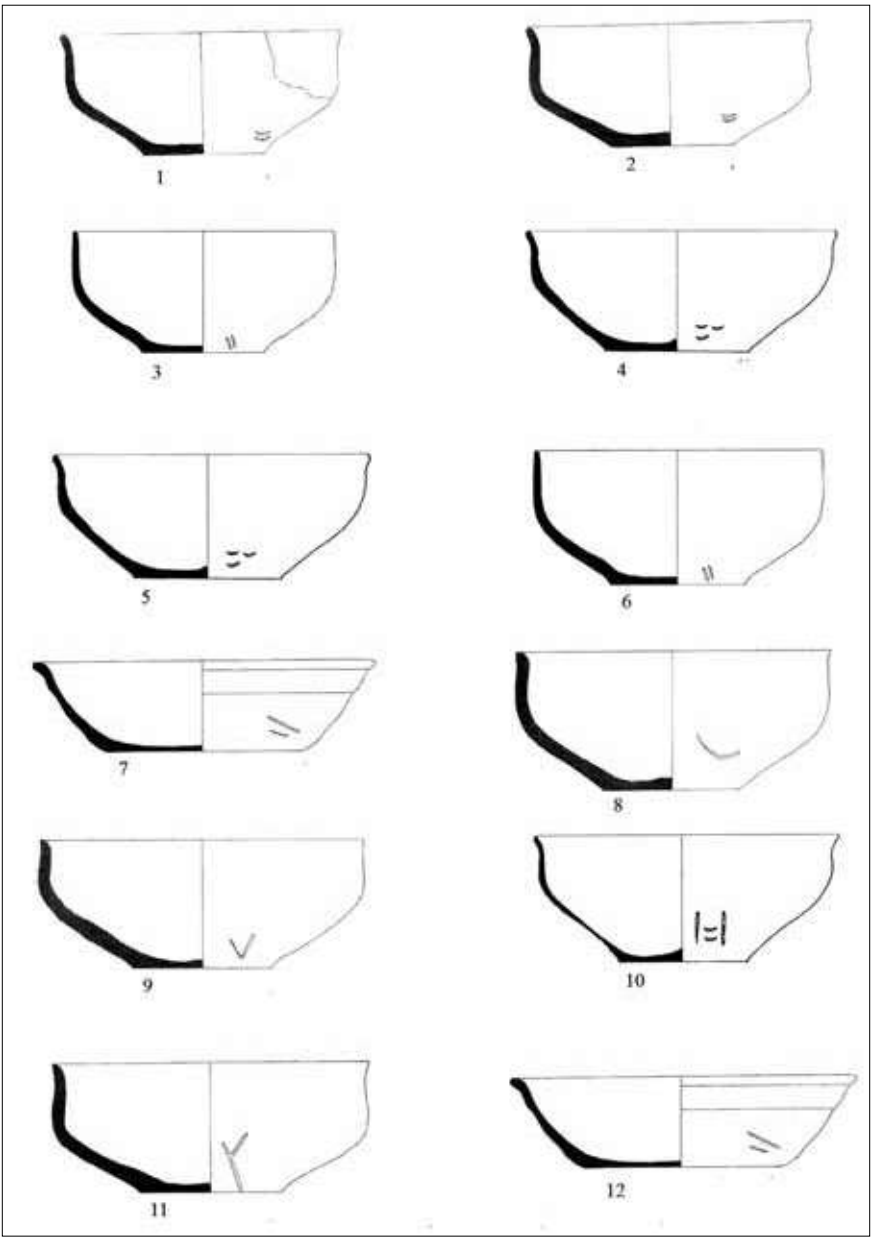

Fig. 22: Shahr-i Sokhta. Scratched signs on the bowl.

Potter's marks are seen all over the vessels. However, with bowls, the majority are near the bases, and with cylindrical jars, they are positioned in the middle or upper part of the vessel. Regarding painted vessels, for example pear-shaped beakers, the majority of the signs are on the bases, but the same signs are seen on the body of beakers and bowls and in some instances inside them. Some 444 potter's marks have been found on Shahr-i Sokhta ceramics[1] and they are divided into 3 main categories and 56 groups as follows:

Scratched. 111 marks in 14 groups

Engraved. 110 marks in 20 groups

Painted. 123 marks in 22 groups

A: Scratched: 111 marks in 14 groups (Fig. 23).

Group 1: simple straight vertical and near-vertical lines (Fig. 23: 1), straight left-leaning vertical lines (Fig. 23: 2), straight right-leaning vertical lines (Fig. 23: 3).

Group 2: parallel lines: vertical, left-leaning (Fig. 23: 4), vertical, right-leaning (Fig. 23: 5), horizontal (Fig. 23: 6), vertical (Fig. 23: 7).

Group 3: multiple parallel, vertical slanted lines (Fig. 23: 8), right-leaning (Fig. 23: 9).

Group 4: arched vertical and horizontal lines: two arched horizontal (Fig. 23: 10), one arched and one straight horizontal (Fig. 23: 11), two parallel arched horizontal (Fig. 23: 12), two parallel arched vertical (Fig. 23: 13), three horizontal parallel (Fig. 23: 14), multiple arched parallel (Fig. 23: 15).

Group 5: multiple small horizontal arched lines (Fig. 23: 16).

Group 6: compound angled lines: two lines forming an 'L' (Fig. 23: 17), two lines forming an inverted 'T' (Fig. 23: 18), and 3 lines forming a 'Π' (Fig. 23: 19).

Group 7: lines forming an 'S': horizontal (Fig. 23: 20), vertical (Fig. 23: 21).

Group 8: combination of an arched line with an attached straight slanted line (Fig. 23: 22).

1. From 1997 to 2002.

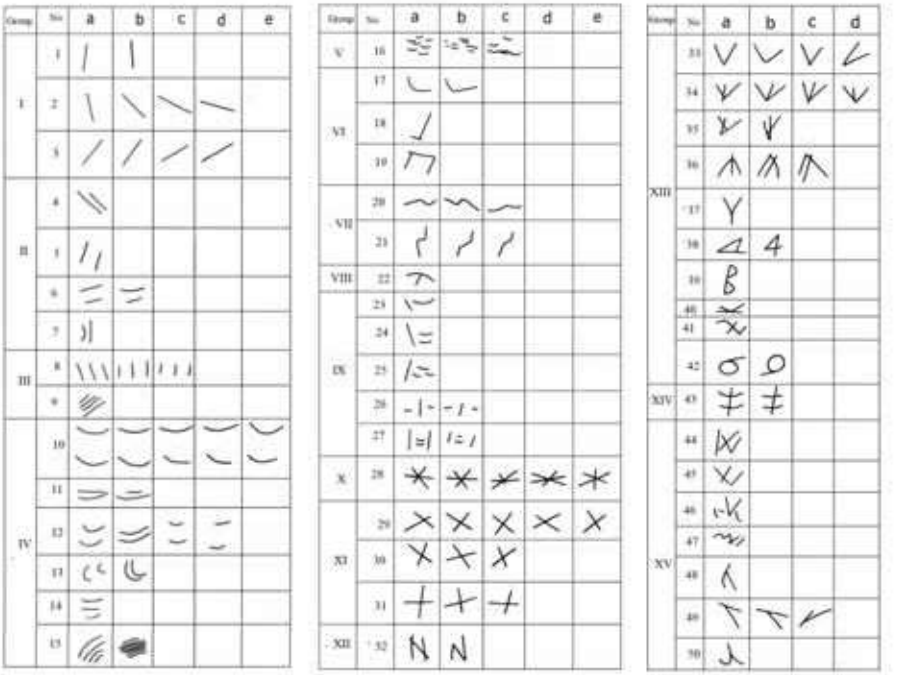

Fig. 23: Shahr-i Sokhta. Scratched signs.

Group 9: combinations of straight and arched lines: one arched on the right and one straight vertical slanted on the left (Fig. 23: 23), two arched on the right and one straight vertical slanted on the left (Fig. 23: 24), three arched on the right, and one straight vertical slanted on the left (Fig. 23: 25), one straight vertical in the middle with one arched on either side (Fig. 23: 26), two arched in the middle with one straight vertical on either side (Fig. 23: 27).

Group 10: asterisks (Fig. 23: 28).

Group 11: X crosses (Fig. 23: 29-30), + crosses (Fig. 23: 31).

Group 12: Latin letters: 'N' (Fig. 23: 32), 'V' (Fig. 23: 33), 'W' (Fig. 23: 34), (Fig. 23: 35), 'M' (Fig. 23: 36), 'Y' (Fig. 23: 37), '4' (Fig. 23: 38), 'B' (Fig. 23: 39), Horizontal 'K' (Fig. 23: 40), slanted 'Z' (Fig. 23: 41), 'J' (Fig. 23: 42).

Group 13: one vertical line crossed by two parallel lines. (Fig. 23: 43).

Group 14: other combinations (Fig. 23: 44-50)

B: Engraved: 110 marks in 20 groups (Fig. 24-26).

Group 1: straight lines, vertical (Fig. 26: 1-2), slanted lines (Fig. 26: 3-5, 7-8), horizontal (Fig. 26: 6).

Group 2: sinuous curved lines (Fig. 26: 9).

Group 3: horizontal and vertical curved lines, e.g. one vertical curved line (Fig. 26: 13).

Group 4: two parallel vertical lines (Fig. 26: 15).

Group 5: multiple festoons: three parallel vertical festoons (Fig. 26: 16), two horizontal festoons (Fig. 26: 17), three horizontal festoons (Fig. 26: 18), four horizontal parallel festoons (Fig. 26: 19), two horizontal festoons and two parallel vertical festoons (Fig. 26: 20).

Group 6: wavy lines (Fig. 26: 21-24).

Group 7: combinations of vertical and horizontal lines: crossed (Fig. 26: 25), T-shaped (similar to cuneiform characters) (Fig. 26: 26).

Group 8: combinations of angled lines: as if forming a bottom right corner (Fig. 26: 27), as if forming a bottom left corner (Fig. 26: 28).

Group 9: forks: facing up (Fig. 26: 30), facing down (Fig. 26: 34-35), facing right (Fig. 26: 35), facing left (Fig. 26: 32, 38), curved (Fig. 26: 36-37)

Group 10: Latin letters and numerals: “V” (Fig. 26: 39), “M” (Fig. 26: 40), “W” (Fig. 26: 40), “9” (Fig. 26: 42).

Group 11: half circles (Fig. 24: 43), with extension (Fig. 26: 44).

Group 12: ‘X’ sign (Fig. 26: 45-48).

Group 13: ‘+’ sign (Fig. 26: 49).

Group 14: asterisks (Fig. 26: 50).

Group 15: ‘combs’: with two teeth (Fig. 26: 52), three teeth (Fig. 26: 51), four teeth (Fig. 26: 53).

Group 16: triangles (Fig. 26: 54-55).

Group 17: combinations of vertical, slanted and curved lines: one vertical and two curved horizontal above (Fig. 26: 56), one vertical and two parallel horizontal on the side (Fig. 26: 57), two vertical with two horizontal between them (Fig. 26:

58), two vertical with three horizontal between them (Fig. 26: 59), two vertical with four horizontal between them (Fig. 26: 60).
Group 18: Arrows: One head (Fig. 26: 61), two heads (Fig. 26: 62).
Group 19: Nested circles and spirals (Fig. 26: 63).
Group 20: other combinations, (Fig. 26: 64-71).

C: Painted: 123 marks in 22 groups (Figs. 27-29).
Group 1: simple bands, slanted vertical (Fig. 29: 1), horizontal (Fig. 29: 2-4).
Group 2: two parallel vertical bands (Fig. 29: 5).
Group 3: two parallel horizontal bands (Fig. 29: 6).
Group 4: two parallel horizontal curved bands (Fig. 29: 7).
Group 5: '+' signs: one (Fig. 29: 8), two (Fig. 32: 9), three (Fig. 29: 10).
Group 6: 'X' signs (Fig. 29: 11).

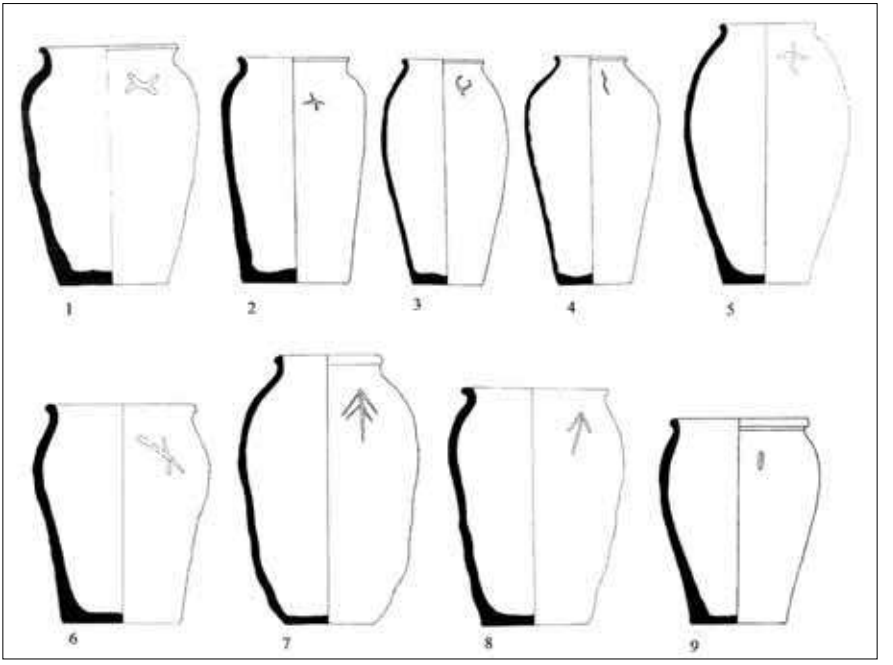

Fig. 24: Shahr-i Sokhta. Engraved signs on cylindrical shape Buff Ware bowl.

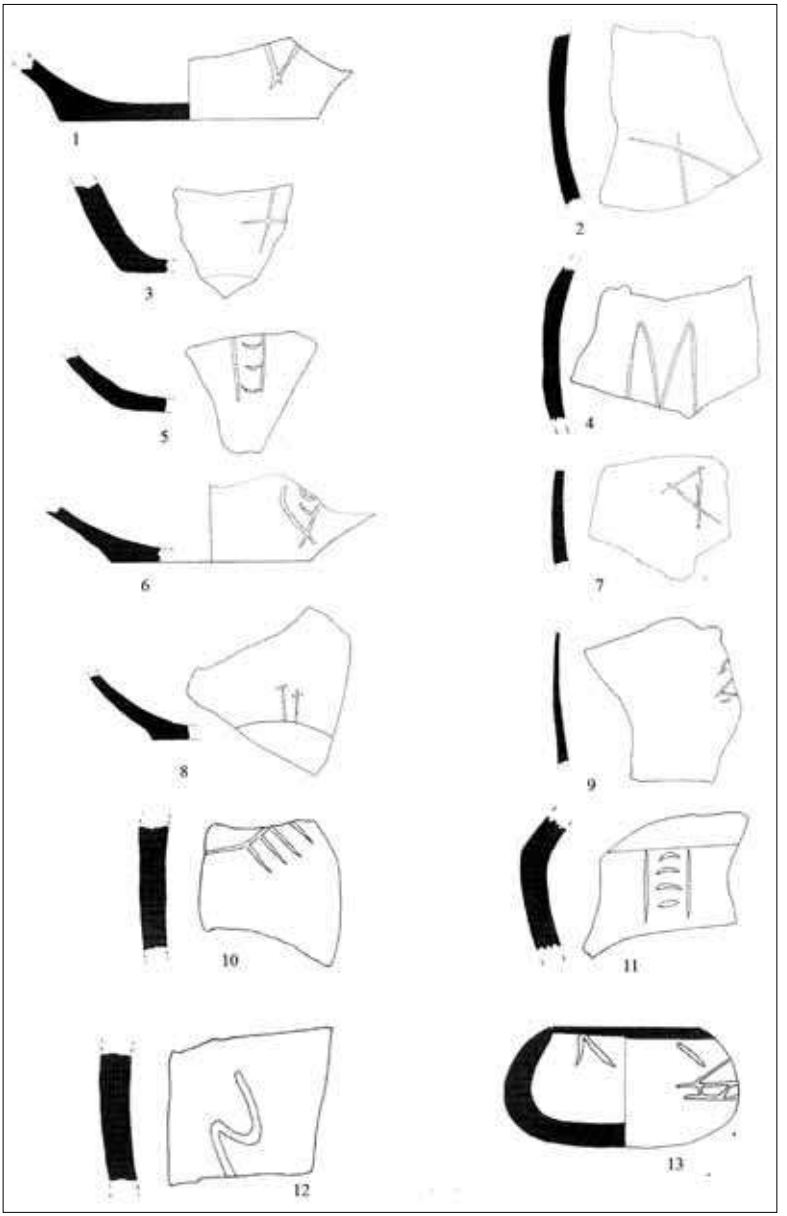

Fig. 25: Shahr-i Sokhta. Engraved signs.

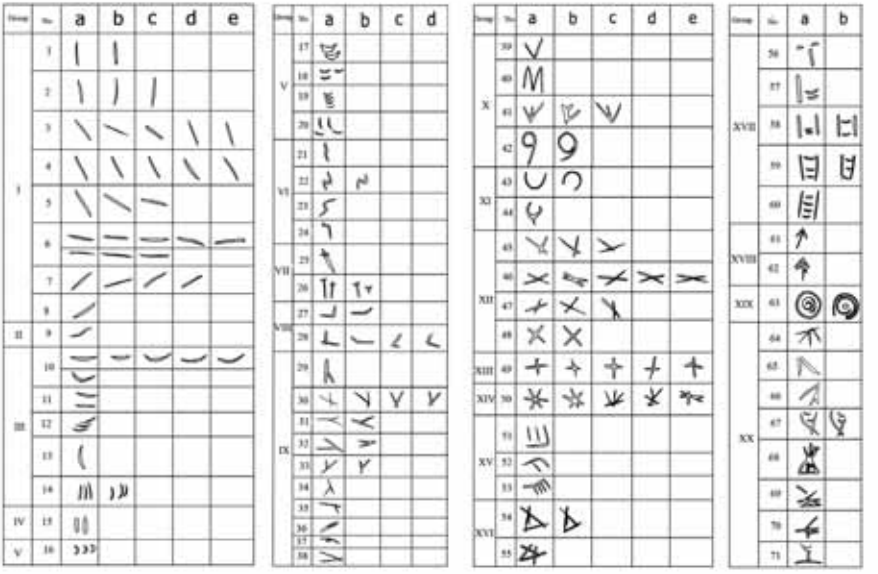

Fig. 26: Shahr-i Sokhta. Engraved signs.

Group 7: paint spots: one spot (Fig. 29: 12), two spots (Fig. 29: 13), three spots (Fig. 29: 14).

Group 8: chevrons (Fig. 29: 15-16).

Group 9: double chevrons (Fig. 29: 17-18).

Group 10: Latin letters: 'M' (Fig. 29: 19), 'S' (Fig. 29: 21).

Group 11: less-than sign (Fig. 29: 22).

Group 12: 'M' rotated 90° clockwise (Fig. 29: 23).

Group 13: half circles and curved lines: curved (Fig. 29: 24), half circle (Fig. 29: 25).

Group 14: parallel horizontal half-moons (Fig. 29: 26).

Group 15: dentate bands (Fig. 29: 27).

Group 16: combinations of serrated and simple bands: one simple horizontal band and one dentate vertical band (Fig. 29: 28-29), two simple horizontal bands and one dentate vertical band (Fig. 29: 30-31), one simple vertical band and one dentate horizontal band (Fig. 29: 32-33), two simple horizontal bands with one dentate horizontal band (Fig. 29: 34-35), two horizontal bands, one with two teeth

(Fig. 29: 36), two vertical bands, one with two teeth (Fig. 29: 37).
Group 17: combs (Fig. 29: 38-39).
Group 18: butterflies (Fig. 29: 40)
Group 19: triangles with simple and serrated bands (Fig. 29: 41-42).
Group 20: intersecting triangles (Fig. 29: 43).
Group 21: grid (Fig. 29: 44).
Group 22: other combinations (Fig. 29: 45-51).

The majority of the marked vessels from Shahr-i Sokhta were found in the catacombs. Most of them were new and unused, providing further evidence of the specialized organization of burial ceremonies, since on one hand these signs were drawn or engraved on the surface of vessels of uniform shape such as bowls, beakers and jars, and on the other hand almost all the vessels were new and not used at all, indicating that they were ordered, produced and used for special burial ceremonies.

During the excavations by the Italian mission in Shahr-i Sokhta, along with the above-mentioned signs, two other composite signs were found; one, a combination of different signs on the surface of a Buff Ware jar found in Rud-e Biyaban and the other on the shoulder of a clay bull figurine (Fig. 30).

It seems that the 'text' on the body of the jar is complete. It is important to point out that jars of this type in Sistan and Turkmenistan were found near the pottery kilns. The 'text' is composed of 6 marks consisting of pictograms and linear signs. Recognizable signs on this jar include a Maltese cross and a sign showing the shape of a jar, which has also been seen on the tablets of Susa C and Sialk IV, which are about 500 years older than the samples from Shahr-i Sokhta (Tosi 1983) (Fig. 31).

On the inner part of the rim of a small cream-coloured bowl from Grave 2400 of Period II were seven distinct signs painted in brown (Fig. 32) that resemble no other known signs from Shahr-i Sokhta (Sajjadi 2003; Fig. 31: e, 12). On another group of vessels from Grave 1700, a number of different signs were found, but on each vessel there were two similar signs (Fig. 32: b). A group of similar signs

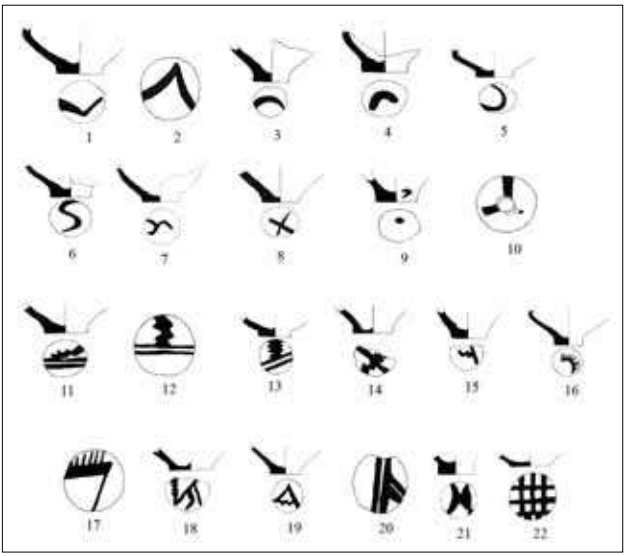

Fig. 27: Shahr-i Sokhta. Painted signs on the base of bowls and beakers.

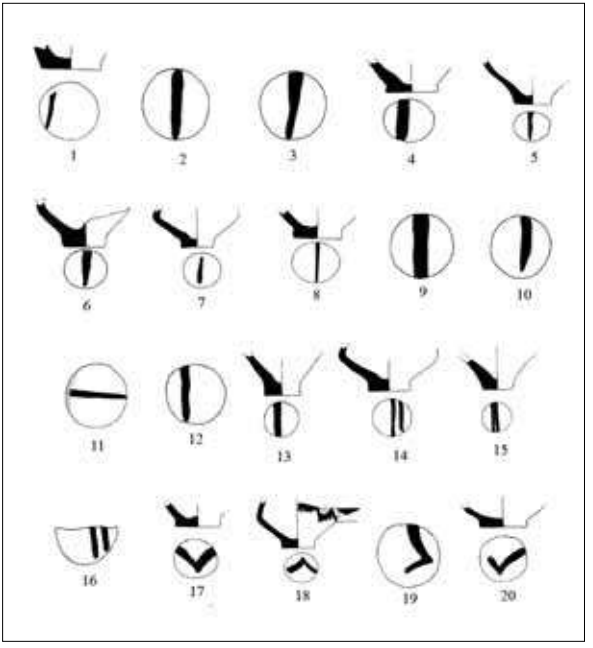

Fig. 28: Shahr-i Sokhta. Painted signs on the base of beakers.

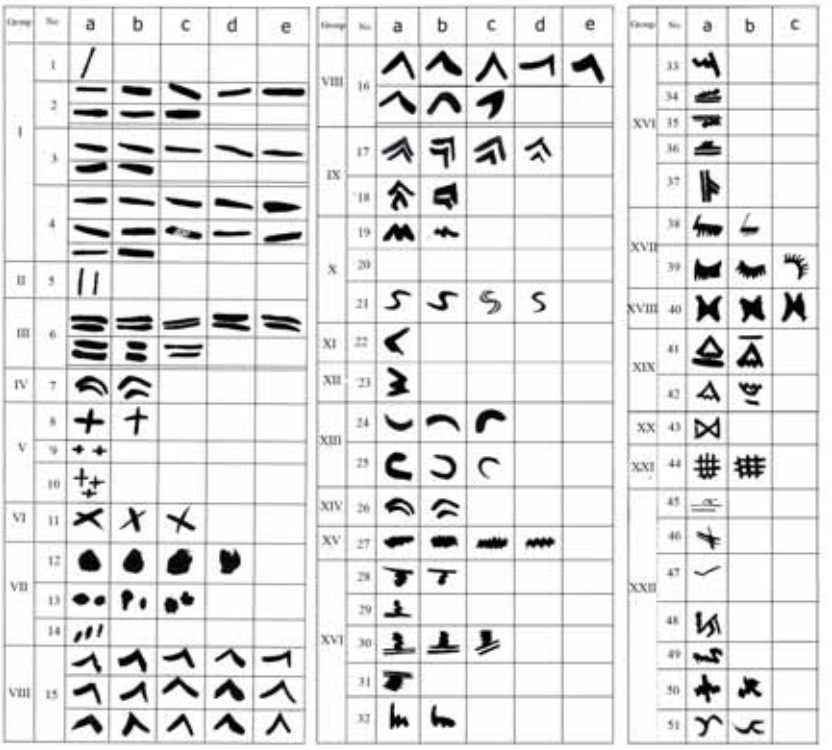

Fig. 29: Shahr-i Sokhta. Painted signs.

Fig. 30: Shahr-i Sokhta. Potter's sign on the shoulder of clay bull figurine (Tosi 1983).

were depicted on the shoulder of a buff-coloured Wet Ware jar from Grave 1705. Engraved under the rim and neck of this vessel were 16 stars that may represent 16 units (Fig. 19: 16) (Sajjadi 2003; fig. 14: 1705, 52). A similar vessel was seen in Mundigak IV3 (Casal 1961: fig. 98: 465).

Chronologically, as we get farther from Period II, during Period III and approaching Period IV, the signs become more linear and their resemblance to pictograms fades. The three types of sign, scratched, engraved and painted, share common elements, which is proof of the use of the same signs regardless of method.

Shared features are most common between scratched and engraved signs. At least 25 signs may be said to resemble each other. The most important common elements are shown in Table 1.

Of the 444 signs found at Shahr-i Sokhta, 32 closely resemble signs from either Shahdad or Tepe Yahya or both (Beale 1986: fig. 34.6, 34.7; Lamberg-Karlovsky 1970: fig. 18; Potts 1981: figs. 1-3, 5; Hakemi 1997: 665-688). Eleven signs are reported in all three sites, 9 signs are common to Shahdad and Shahr-i Sokhta and 12 signs are common to Shahr-i Sokhta and Tepe Yahya. The signs common to all three sites are (Table 2, Nos 5, 8), (Table 3, Nos 10, 11, 12, 13), (Table 4, Nos 18, 21), and (Table 5, Nos 26, 27, 32). Sign , in addition to Shahr-i Sokhta, Yahya and Shahdad, has been reported at least in 9 other eastern Iranian sites, as well as Mundigak IV3 (Casal 1961: fig. 87, no. 372; 105, no. 516), Quetta (Fairservis 1958), Zab Lorlay (Fairservis 1959; Potts 1981: 115), Bactria (Sariadini 1977: 97-110), Balakot (Dales 1979: fig. 6: 3, 7, 13) and southern India (Lal 1962).

Another sign common to Shahr-i Sokhta, Shahdad (Hakemi 1997: 665, Ma.1:59) and Tepe Yahya (Potts 1981: fig. 5:37) (Table 3, No 12), which is also seen in Zab Lorlay (Fairservis 1959), Mundigak (Casal 1961: fig. 105:520), the Quetta Valley (Fairservis 1958), Bactria (Sarianidi 1977), Site No 28 in Afghani Sistan (Fairservis 1961: fig. 19h) and southern India (Lal 1962). Also common to the three sites of Shahr-i Sokhta, Yahya (Beale 1986: fig. 4.36: n, o) and Shahdad

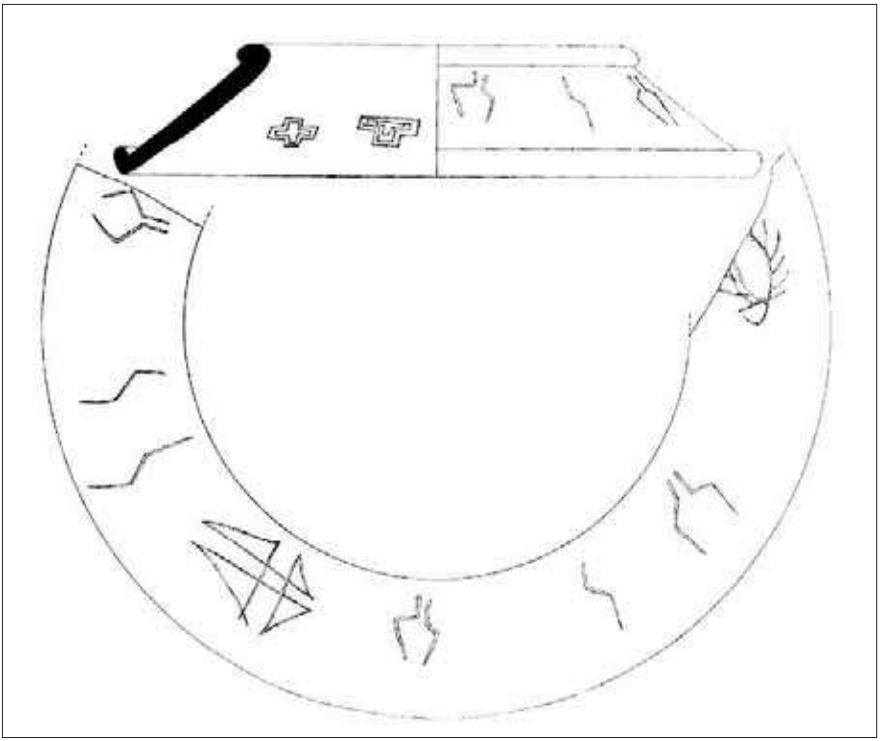

Fig. 31: Rud-i Biaban. ‘Inscribed’ jar Period III of Shahr-i Sokhta (Tosi 1983).

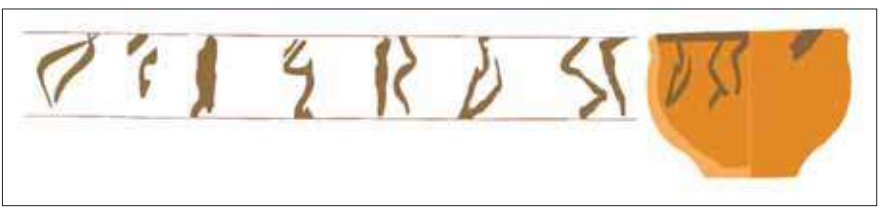

Fig. 32: Shahr-i Sokhta. ‘Inscribed’ bowl of grave 2400 Period III.

(Hakemi 1997: 665, Mc.1:31) (Table 3, No. 13).The 12 signs (Table 2, Nos. 1, 3, 4, 7; Table 3, No. 15; Table 4, Nos. 19, 20, 23, 24; Table 5, Nos. 29, 30, 31) are common to Shahr-i Sokhta and Tepe Yahya, but are not seen in Shahdad.

In this collection, only two signs closely resemble those seen in other sites: 'I' (Table 2), seen in Zab (Fairservis 1959), and (Table 4, No. 20), seen in Amri (Casal 1964), the Quetta Valley (Fairservis 1958) and Chalcolithic sites in Southern India (Lal 1962).

The 9 signs common to Shahr-i Sokhta and Shahdad but not seen in Yahya are: (Table 2, Nos. 2, 6; Table 3, Nos. 9, 14, 16; Table 4, Nos. 17, 22; Table 5, Nos. 25, 28) (Hakemi 1997: 666, Ma.1:109) is also seen in Amri (Casal 1964) and Mundigak (Casal 1961: fig. 93: 425).

One of the most striking signs is (Table 3, No. 11), which in addition to Shahr-i Sokhta, Shahdad and Yahya has been seen in Margiana (Masson 1988) and Mundigak (Casal 1961: fig. 86: 337). The sign has been interpreted as a symbol of the Gods, which we will discuss later.

A total of 12 potter's marks from Shahr-i Sokhta have parallels in Proto-Elamite and Harappan tablets and this resemblance has given rise to various hypotheses. Among them, (Table 2, Nos 3, 5), (Table 4, Nos. 20, 21) and (Table 5, No. 32), are common to all three cultures. Four are common to Proto-Elamite culture and Shahr-i Sokhta: (Table 2, No. 1: Table 3, Nos 10, 11: Table 4, No. 19). Three are common to Shahr-i Sokhta and Harappa: (Table 3, No. 13; Table 4, Nos. 23, 24) (Potts 1981: fig. 4).

2.4. The Proto-Elamite tablet of Shahr-i Sokhta

Despite the fact that Shahr-i Sokhta is the largest known city of the Proto-Historical period on the Eastern Iranian Plateau, no significant written text has yet been discovered there. The discovery of the only known Proto-Elamite tablet from Shahr-i Sokhta could be interpreted as a mere coincidence or in relation to contacts with Susa or Yahya. In fact it seems odd that during the 3rd millennium BC, which saw the rapid spread of tablets in various languages, the population of

Shahr-i Sokhta lacked a system for recording or writing. This inadequacy would have damaged the social and economic organization of the settlement and would have caused major harm and disruption to their social structures. It may therefore be assumed that this city either possessed an archive of registered documents which has not yet been found, or they used some other method unknown to us for registering and documenting their commerce and affairs.

It is true that many of the features of urban society seen in the west of Iran and Mesopotamia are not present in the eastern Iranian settlements, but it cannot be denied that in the absence of 'texts', the populations of societies such as Shahr-i Sokhta must have adopted some other system to record their commercial transactions and manage a populated and active society.

It seems that the potter's marks of Shahr-i Sokhta and other sites in Eastern Iran, such as Shahdad and Tepe Yahya, were directly connected with some of the Proto-Elamite signs. Although it is possible that some of the resemblances are coincidental, they cannot be dismissed, since they could well be due to cultural influences. Indeed, the similarities between the potter's marks from various Eastern Iranian sites and Proto-Elamite or Harappan signs are extensive.

About one hundred years ago J. De Morgan discovered two clay tablets at Susa with no resemblance to the writing systems of Mesopotamia, which came to be called Proto-Elamite. These clay tablets are of the late 4th millennium or early 3rd millennium BC, and later some of them were studied by V. Scheil (Scheil 1900; 1905; 1923; 1935).

Surveys and excavations in other Proto-Elamite sites established the use of this writing and numbering system not only in Susa and its satellite settlements, but also outside the Khuzestan plain and across a vast area.

Similar clay tablets were also found at Sialk in Kashan, Melyan in Fars (Stolper 1984), Tepe Yahya in Kerman (Lamberg-Karlovsky 1970), Godin Tepe in Kermanshah (Weiss - Young, 1975), Shahr-i Sokhta and a number of other sites dated to the 3rd millennium BC. The size of the territory under the influence of Proto-Elamite culture and the widespread use of these signs over such a huge area has prompted scholars to study the reason and explanation for the use of these

signs, in the region generally and in small sites such as Tepe Godin and Yahya in particular. Their research has sought to clarify the widespread use and influence of Proto-Elamite culture. The most widely accepted theory is that the presence of clay tablets and related artefacts outside Susa is the result of the gradual spread of culture and technological progress, as the inhabitants of other cities and villages borrowed and learnt the rudiments of 'writing' and 'recording' data, together with other advanced traditions, from Susa.

Another viewpoint is that the presence of tablets outside the Susa plain is evidence of a colonial system managed from the main settlement or capital city, which enforced its will and political views on the surrounding settlements either directly or indirectly via the activities of traders and merchants. Both theories were studied and evaluated by Young and Wise, both of whom are more inclined to accept the second viewpoint. This theory is supported by archaeological evidence showing population growth, migration and the creation of new settlements or colonies (Damerow - Englund 1989: 3-4).

This viewpoint also has its weaknesses however, based on the very same archaeological evidence. The lifespan of colonies in various places such as Godin (Weiss - Young 1975) and Tepe Yahya was short, more or less one century, which is not consistent with the idea of migration driven by population growth.

Information obtained from tablets does not help to solve this problem, since these data are either insufficient or in fact non-existent. Most of the signs and texts have yet to be clearly deciphered and understood; only a few preliminary steps have been taken, such as grouping physical characteristics and graphical designs with a view to the classification of the ideographical signs on the tablets and eventually classification of the meaning of the "words" and accounting practices (Sajjadi 2002).

It has been said that in addition to Khuzestan, Sialk, Godin and some other Proto-Elamite sites, texts were also found in Tepe Yahya IVC. This period of Yahya was rather short, about 100 years, 2850-2750 BC (Beale - Lamberg-Karlovsky 1986: 11). In any event, during this period, by means of the tablets and related technology such as seals for their products and storage, the population of Yahya

(and possibly of most of the sites on the eastern Iranian Plateau) standardized their systems of weights and measurements and became familiar with modern management methods which had probably been unknown to them before.

As mentioned earlier, this period in Tepe Yahya was short and after one century the settlement disappeared. The reasons for the abandonment of Proto-Elamite colonies on the Iranian Plateau are still a mystery. Whether the population of this culture returned to its original lands or became assimilated with the local inhabitants cannot be determined.

As pointed out above, there was a gap after the abandonment of Tepe Yahya during the Proto-Elamite period. In addition, after this short period in Tepe Yahya, there is no continuation or usage of tablets and bevelled-rim bowls (BRB) in Shahr-i Sokhta, Hesar, Tepe Maliyan, and Tepe Sialk (Sajjadi 2002: 135).

The signs on Proto-Elamite tablets mostly concern human beings, beasts, crops and numbers. Other than these signs, cylinder seal impressions have also been seen. Studying the form of the signs, texts and digits, it becomes clear that most of them are about the distribution of rations, statistics regarding workers and products. However, there are no signs relating to natural resources, mining, places, metals or stone vessels. This could indicate that Proto-Elamite society was not dealing with small-scale production; in other words, they did not engage with local and limited capitalism, but had much larger and broader intentions. On the other hand, the probable presence of slavery and payment of rations in place of wages means the absence of a free labour market.

Currently in Shahr-i Sokhta only one Proto-Elamite tablet has been found (Fig. 33). Apart from this tablet and some cylinder seals and impressions[2], none of the other discovered materials have anything to do with Proto-Elamite civilization and culture. The presence of this tablet in the oldest phase of the site could indicate that the foundation of Shahr-i Sokhta was the result of the encounter of Central Asian culture with western Proto-Elamite culture among the local inhabitants of Sistan. This event took place during the last two centuries of the 4th millennium BC, at a time when trade between Mesopotamia and the lands to the east was well under way (Amiet - Tosi 1978: 22).

2. Period I, Phase 10.

Amiet concluded that the oldest seals found in this city belong to Phases 9 and 10, in other words 3200 to 3100 BC, and are similar to Jemdet Nasr seals (Amiet 1983: 199-210). They include one seal which belongs precisely to Elam.

The tablet of Shahr-i Sokhta resembles the ones from Susa 16-13. Its shape is similar to that of traditional Proto-Elamite tablets. It has two carved signs on the right hand side and five signs consisting of 5 digits on the left side. The first sign on this tablet from the right is similar to sign n° 322h which has been found on 3 tablets from Susa (Meriggi 1971-1974). In Susa, this sign, together with digit I as a separate character, is depicted three times. From an ideographic standpoint, the sign represents a tree or a branch. The second sign has suffered major damage and is undecipherable. After these two signs, 5 more signs depict 5 digits written in the standard Susian form. In any case it is not clear whether the two first signs depict merchandise or persons or some organization and trading post or all of them. In the lower part of this tablet, like the other tablets of this period, the impression of a cylinder seal can be seen. Further examination of the tablet has shown that it was sealed before writing (Sajjadi 2002: 139).

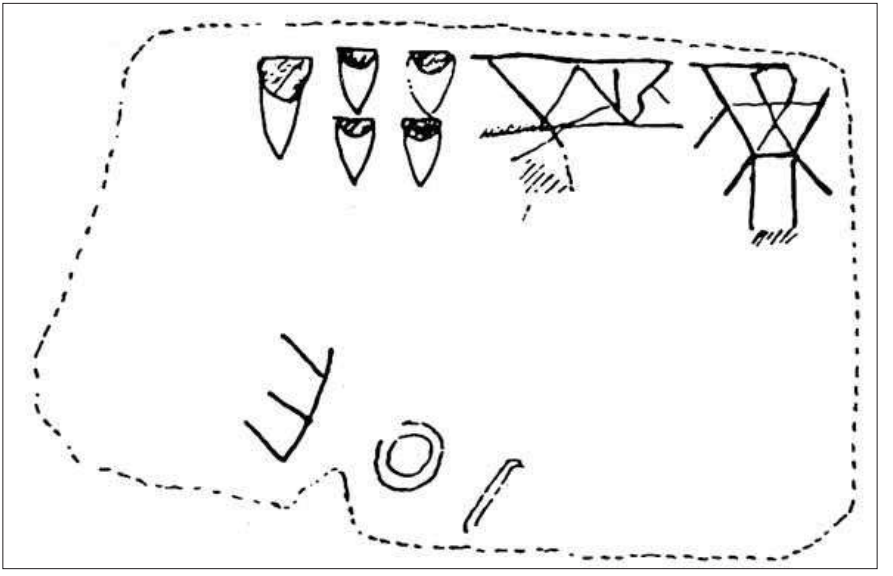

Fig. 33: Shahr-i Sokhta: Proto-Elamite tablet.

3. Conclusions

Regarding potter's marks, repeating what was said before, these signs have been seen in various sites in Eastern Iran, but despite their frequency their interpretation is rather difficult if not impossible. On the other hand, it does not seem that potter's marks were used throughout the area. For example, in Bampur only 9 signs were found (de Cardi 1970). In addition, only some of the signs from the various sites are common or resemble each other, although this is possibly due to the limited number of excavated sites, preventing further study and analysis. We might not expect close resemblances and similarities, but statistically, they are considerable, at least among the signs from Shahr-i Sokhta, Shahdad and Tepe Yahya. In any event, we cannot ignore that the signs (or at least the signs for which published descriptions are available, for example from sites such as Amri, Balakot, Mundigak, and Turkmenistan) are rather limited. On one hand, the lack of information makes comparison difficult, and on the other hand their interpretation and the determination of their practical application become more ambiguous. According to scholars, the most important functions of these signs are potter's marks, kiln marks, family symbols, conventional signs for measures and numbers, short messages, trademarks and abbreviations.

It seems that potter's marks represent the most common application of these signs, although in archaeological literature this expression is an arbitrary term. Attribution of this function may not always be valid. One of the reasons is the differences between the numbers of signs in the various sites. While in some sites such as Shahr-i Sokhta, Shahdad, and Balakot numerous signs are present, in other sites such as Bampur their number is limited, and in sites in Turkmenistan the reported numbers of signs are even lower. Though it is true that the numerous pottery fragments from Shahr-i Sokhta are indicative of large-scale pottery production, potter's marks are not present on all vessels, and if these signs were meant to be representative of the 'potter's signature', then it should have been present on all or at least a large percentage of the vessels. On the other hand the variety of vessel shapes should also be considered, since in all sites, signs are present on certain groups of vessels. For example in Shahr-i Sokhta, these signs

are seen only on three type of vessel: beakers, bowls and jars. These are almost all Buff Ware vessels, their presence on Grey and Red Ware vessels being very rare, while at the same time in Shahdad, they are present on Red Ware jars but not other types of vessels.

Worth mentioning in this regard is the presence of more than one sign on some of the specimens, since if these signs were meant to be the potters' signature, on each sample we would not expect to find more than one, whereas in some case more than 6 different signs are seen. In some cases there are combinations of engraved, scratched and stamped signs, but if the theory of the 'potter's signature' were true, there would not be more than one signature, since it is assumed that the potter would only have one. In addition, the similarities and commonalities among the reported signs from various sites should not be overlooked or treated as merely coincidental and accidental, as if a potter from Shahr-i Sokhta chose the exact same signature as a potter from Shahdad or Tepe Yahya purely by chance.

Another point is that the signs are not only seen on pottery vessels. A clear example of these signs on artefacts other than vessels is the anthropomorphic figurines discovered in Altyn Tepe, (Masson 1988: 84-85), as well as some zoomorphic figurines from Shahr-i Sokhta (Tosi 1983: fig. 48). Based on the above reasons therefore, these signs cannot be attributed to potters' signatures.

The signs on the figurines in Altyn Tepe are mostly seen on the shoulders or foreheads, and sometimes on the backs. The signs on the Altyn and Ilgingly depe figurines (Fig. 34) were classified into 6 groups by Masson, and based on his analysis there is a strong possibility that these signs were directly influenced by Western texts, especially Proto-Elamite and magical / ritual symbols which formed in Turkmenistan.

Another potential function of the signs could be as trademarks associated with certain pottery kilns. However, this theory can also be rejected on the basis of the same considerations made for the potter's signatures.

Another theory based on excavations in the necropolis was suggested by Potts (Potts 1981: note 3), although the emergence of new evidence subsequently led to it being rejected. This theory was that the signs in question were ordered by the

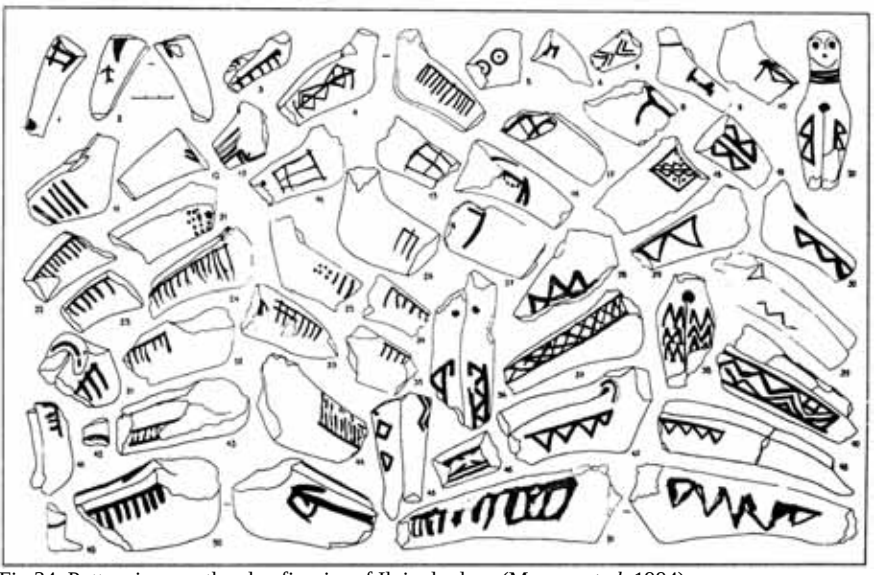

Fig.34: Potter signs on the clay figuries of Ilgingly depe (Masson *et al*. 1994).

potters' customers, in order to prevent objects from being mixed up. In this regard we need to emphasise that new and unused vessels with potter's marks were found in some of the graves of Shahr-i Sokhta III and IV, especially catacombs. All the evidence shows that these vessels were ordered for the burial ceremony by either the deceased person during their life or by their survivors, and that they were used for the storage of food and offerings placed in the graves after the person's death. The frequency of these new and unused vessels and their presence in relatively wealthy graves gave rise to the notion that the signs in question were chosen and ordered by the customers of the vessels, or even that they were symbols of the deceased person's family or tribe. However, this notion also quickly lost credence following the discovery of further evidence, since the frequency and variation of the signs on the vessels from the burials are inconsistent, and one person could not have chosen more than one sign or special identifying symbol, whether as a family symbol or an identifying sign when ordering the vessel from the potter. This hypothesis had earlier been suggested concerning the signs of Tepe Yahya, but as already mentioned, it also has its weaknesses and is not defensible either.

In a detailed and interesting argument regarding the potter's marks of Tepe Yahya, Potts mentions some of these points. It seems that at the time of publication of his article, Potts did not have sufficient data from certain sites, potentially affecting his reasoning and his conclusions. Whereas in Tepe Yahya, potter's marks are seen only on handmade vessels, in Shahr-i Sokhta and some other sites on the Eastern Iranian Plateau, signs are also seen on wheel-made pottery. Indeed, apart from some of the vessels of Shahr-i Sokhta III and IV, which were made by hand or hand-powered wheel, with rough bodies, all the signs are seen on wheel-made vessels and are therefore different from the samples of Tepe Yahya.

Potts argues that it is possible that handmade vessels were made by individual families in their own homes, but were treated and fired in public kilns. Therefore, in order to prevent the mix-up of vessels and clarify who owned what, they marked them accordingly. After a series of calculations Potts concludes that only 49 of the signs had a public and widespread function and adds that this figure could not represent all the families living in Tepe Yahya IVA, III, and II. He adds that there is no evidence with which to estimate the population of Tepe Yahya during the 3rd millennium, but if we assume that each sign belongs to a specific family, and the maximum number of signs used at the same time is 49, then we achieve a significant and logical figure. In this case we can assume that this number of families concurrently resided in the site, but this is a rather low estimate for Tepe Yahya, and the low number of signs could be a reflection of low domestic pottery production.

It is clear that Potts' reasoning is baseless, in terms of the assignment of signs to certain groups and families, the calculation of the population of Tepe Yahya and the low pottery production rate among families.

In contrast, the population of Shahr-i Sokhta during periods II and III, based on the number and concentration of residential dwellings, as well as available useful spaces, even in the most pessimistic estimates could not have been less than 7000 to 8000 and if we use this logic, assigning the signs to the families of the city, the numerical discrepancy means that we quickly run into some major difficulties. Firstly, based on this theory, in all graves containing pottery, at least

one signed vessel should be found, and secondly, all the signs in one grave should be the same or similar to each other. However, some graves yielded numerous signs that differ from one another. This is more evident in Shahdad, where there is more than one sign on each of the vessels, and each sign is different from the next.

Another theory proposed by Potts regarding the signs belonging to low-income families who were forced to produce their own handmade vessels at home is refuted by the riches of the graves from Shahr-i Sokhta and Shahdad, unless we assume that signs belonged only to a certain class of the community, such as artisans. Another reason why this cannot be true is that the signs on the vessels were varied and different from one another even in same grave. In some graves, such as No 1615, there was a variety of vessels with different signs (Sajjadi 2003: fig. 13, Grave 1615, 25; 14). Potts further suggests that it is possible that the signed vessels could be the work of non-professional potters, but even he agrees that it is not possible to confirm this idea (Potts 1981: note 3). In fact, the application and reasons behind the use of these signs would make this extremely unlikely, if not entirely impossible.

Some other scholars, without insisting on specific meanings and interpretations, consider some signs to be combs, butterflies or stylized and elaborate four-legged animals, while attributing some other signs to simple numerical values, which could be considered linear metric signs (Vats 1940: pls. XCV 401-406, XCVI-XCVII, XCVIII 581-598, 600-613).

In fact, some of the signs on ceramic vessels from Shahr-i-Sokhta are seen on small rectangular Harappan stamp seals too (Tosi 1983: 144). They could be directly compared with cultural materials from Period III of Shahr-i Sokhta, but it should be pointed out that proper interpretation of the meanings and functions remains ambiguous. In some cases, various meanings and functions were attributed to a group of signs, but it does not seem possible to separate the meanings of signs one from the other in a group found in a single grave, or at least it seems to be a daunting task, which requires solid proof in order for its findings to be validated.

Regarding the differentiated interpretation of multiple signs in a single collection, in groups found in both Tepe Yahya (Potts 1981: fig. 5) and Shahr-i Sokhta (Tosi 1983: figs. 4-5), some marks are considered to be digits with numerical values, while in the very same groups other signs are interpreted as combs or butterflies. The problem with this interpretation is that it is not fully convincing: how is it possible to separate some of the signs from a group and assign different meanings and interpretations to them with respect to the remaining signs in that group? If we assign numerical values to some signs and these interpretations are correct, it requires that we assign these same interpretations to all of the signs in the same group. The same holds true if we assign pictographic meanings to some of the signs: to preserve uniformity, we must assign the same meaning to the rest of the signs in the same group.

Although attributing meaningful and acceptable interpretations to these signs is an impossible task at the current time, it should be remembered that these signs were not meaningless or just random or arbitrary decorative designs: without a doubt, every one of them had a special meaning, and even though we do not have a clear idea of what this was, we can still be sure that for their authors they represented some special belief and concept. One of the most prominent theories is that by painting and engraving these signs, the inhabitants of Shahr-i Sokhta, as well as other protohistoric sites on the eastern Iranian Plateau, were seeking to transfer beliefs, ideas or messages to future generations.

This point, that the signs represented a kind of brief message, in which they acted as some of today's common signs do, i.e. as the abbreviations of certain phrases, ideas, thoughts or beliefs,[3] could very well be one of their functions.

Some of the signs, for example vertical straight lines, have been interpreted as digits and numbers, while others such as stars, are considered signs of Gods, and others simply represented an object. All of these meanings are assumptions however and will remain so until further information can be obtained. Another

3. In today's world and everyday life we encounter hundreds of signs without any explanation and comment, yet merely by looking at these signs we can figure out their intended meaning, for example, instead of "no smoking", z, and instead of "Auto repair shop". By the same token this sign i shows where we can obtain information, è informs us that we can find a place to park our cars and so on.

point is that whatever the functions of these signs were, whether potter's marks, workshop trademarks, signs of private ownership, counting and accounting signs, family or tribal symbols, special signs for blessing the vessel and its contents, the owner's name[4] or other meanings that we are totally unaware of, in any event, the people who marked the vessels and objects were trying to convey some kind of message to future generations. This may represent the starting point of an attempt to record and analyse the data from eastern parts of Iran, which was far from the centre of the writing innovations associated with Proto-Elamite sites.

An interesting point is that some of the signs bear a resemblance to Proto-Elamite writing signs, which could be considered a mere accident, but also raises the question of why there are so many accidental resemblances. On the other hand, considering the large distances between the sites of the 3rd millennium BC on the Iranian Plateau, can these signs be considered the result of special and directed thought processes which appeared in the region at that time?

The question of geographical distance and transfer of thought processes from one location to another, in addition to the spread of trade, commerce and exchanges among these areas, is plausible, but the close resemblances among the signs in these areas reflects the presence of some kind of unique thought or ideology, which was introduced and disseminated among the populations of a vast region.

The connections between these signs and Proto-Elamite and Harappan pictographic signs have attracted the attention of scholars. A range of hypotheses have been expressed, but the only thing they all agree on is that it is possible to decipher Harappan texts by revealing the meanings of these signs.

Regarding the possible connection between Harappan and Proto-Elamite texts, Brice (1967) sought to establish the connection between the writing structures of Proto-Elamite and Harappan signs, which he called Proto-Indian. A decade later, Fairservis (1976: 28-32) continued the same efforts to connect Proto-Elamite signs with Indian signs, suggesting that not only the 'texts', but also modern Dravidian languages could be related to what he called 'Proto-Dravidian'.

4. Writing short phrases, blessings or the name of the owner on ceramic and metal vessels and other objects was common practice in the Islamic period.

Based on previous discussions, it is probably possible to dig deeper and find the roots of the writings and Harappan texts and signs among the potter's marks of the eastern Iranian Plateau. This is supported by a number of scholars (Lal 1962: 4; Casal 1966: 19; Fairservis 1976: 279; Dales 1979: 256; Potts 1981: 114-115). For example, B.B. Lal has shown in various instances that during the Mature Harappan period (Lal 1962: 4-24; 1975: 173), when these texts were used, eastern Iranian potters' marks would also appear among Harappan and pre-Harappan texts and signs. One of the difficulties regarding these determinations is chronological: dating the Proto-Elamite and Harappan texts that have the potter's marks. However, spatial questions are also an issue.

The great distances between Proto-Elamite and Harappan sites and the eastern Iranian sites with potter's marks could be explained with reference to commerce and exchange in the 3rd millennium BC. However, the accepted date for the Proto-Elamite period is generally 3400-2800 BC, while that of Mature Harappa is 1800 to 2500 BC, a major discrepancy. This time difference reduces the chance of any direct connection between these two civilizations to zero, although there are undeniable resemblances among the signs from Shahr-i Sokhta, Tepe Yahya, Shahdad and Proto-Elamite and Harappan sites (Tables 2-5). The question remains however as to whether we can deduce or assume any meaning from these similarities. After all, these resemblances are unlikely to be meaningless.

According to Lal, in any case the potter's marks were not without influence on the progress of Harappan writings. Pre-Harappan and Harappan signs are seen in areas where 'writing' was prevalent. In support of Lal's opinion it is worth adding that among the signs we encountered were some that were used in 'texts' as well, and it seems that some of the signs and symbols of the pre-Harappan period found their way into later, more developed Harappan texts. Lal has shown that these signs were used after the Harappan period as well (Lal 1962; 4-24; 1975: 173). Therefore, in this case there should be no ambiguity concerning chronological distance between the similar signs of Elam, Harappa and Eastern Iran, despite Potts's assertion (Potts 1981: 115-116) that there are no plausible historical or chronological conditions to explain or connect them. However, without doubt,

Proto-Elamite signs had an impact on Harappan 'texts', and to confirm this we shall once more refer to Lal's reasoning, which highlights the fact that some of the Harappan and Proto-Elamite signs are identical to each other, just as some of the potter's marks of the Indian-Iranian borderlands are identical to some Harappan signs, while others share common features with Proto-Elamite signs. One explanation for the similarities between Proto-Elamite and Harappan signs is that potter's marks from before, during and after the Harappan period influenced some of the signs on Harappan seals.

Given what has been said in the preceding pages, it seems that the signs and symbols found on pottery vessels and objects of the 3rd millennium BC in Eastern Iran, the Indus Valley and Central Asia are subject to a range of different interpretations regarding their function, each of which has its strengths and weaknesses. However, two points are irrefutable: First, these signs contain silent messages from their creators, who tried to communicate their thoughts and beliefs to future generations; second, these signs were very probably precursors and initial steps towards 'writing', which first emerged in Harappan sites. This writing made use of proto-Elamite signs, which had reached these sites in circumstances yet to be determined, acting as a bridge between Proto-Elamite signs and Harappan writing

* This is an updated version of a Persian article entitled "Nešāne-ye sofālgarān dar Šahr-i Soxteh": Nāme-ye Pažuhešgāh-e Mirās-e Farhangi, Quarterly. Tehran 2004. I would like to express my warmest thanks to Prof. Y. Madjidzadeh for reading and editing the English text of the present article and to Miss Z. Sepiani for her kind help in redrawing some of the figures in the present article.

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Preliminary Study of Alabaster Vessels from Building 33 in Shahr-i Sokhta: Typology and Petrographic Analyses

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1. Introduction

The settlement of Shahr-i Sokhta is situated on a terrace between the endorheic delta of the river Hirmand to the north-east, whose headwaters are in the mountains of the Hindu Kush in Afghanistan, and one of its broad terminal lakes, the Hamun-i Hirmand to the west. The hydrographic axes of this vast plain have always been the main vectors for its inhabitants, who have traditionally supported themselves with an essentially rural economy, integrated with livestock rearing, fishing and handicraft.

Shahr-i Sokhta is located in an optimal position due to its proximity to sources of raw materials, especially stone (Costantini - Tosi 1977: fig. 334), with primary outcrops and areas of collection.

Identified around the site were numerous satellite settlements, of small dimensions, in which detritus resulting from the processing of various types of raw material, including calcite, was discovered. In Rud-i Biyaban and above all in Tepe Graziani (Ciarla 1985: 420), a village with an area of about 2 hectares

5 km east of Shahr-i Sokhta, numerous unfinished cylindrical beads, fragments of alabaster statues and detritus produced by stonemasons were brought to light.

The specialisation in production of stone artefacts in Shahr-i Sokhta seems to have reached a peak around the mid 3rd millennium: so far two processing areas have been brought to light in the site, one of which, for the production of seals and artefacts in semiprecious stone, was located in the Central Quarters (Salvatori - Vidale 1997: 77-78) and the other, for the creation of beads in turquoise and lapis lazuli, in the north-western sector (Piperno 1973; Biscione *et al*. 1974: 40-45). Numerous finished materials in calcite were both used in the settlement and exported elsewhere.[1]

2. Distributional and quantitative analysis of alabaster[2] artefacts from *Building 33*, found both on the surface and *in situ*

The alabaster vessels were discovered in a fragmentary condition, both on the surface of the rooms visible during the survey of *Building 33* (13 fragments, Table 1) and, during the excavation, in the layers inside the rooms of the building (13 fragments, Fig. 1; Tab. 2; Tab. 3).

Building 33, fragments of alabaster artefacts from the surface of the area occupied by the building

Due to its prominent position inside the site, *Building 33* is so exposed to atmospheric agents (especially the wide temperature range and the strong north-east winds) that the floors of the rooms attributed to Layer 1 (2600-2450 BC) of the building are covered by a thin layer of earth and in some cases nothing at all.

1. The site of Shahr-i Sokhta is fundamental for understanding the commercial contacts between this area and the civilisations of Sumer in southern Iraq, Elam in south-western Iran and others is the Gulf of Persia and the Valley of the Indus during the Bronze Age (Piperno - Salvatori 1982; Amiet 1986; Kenoyer 1991; Potts 1994; Lamberg-Karlovsky 1996: 128-216; Crawford 1998; Kenoyer 1998; Cortesi *et al*. 2008) In relation to their symbolic value, the alabaster artefacts make it possible to study the circulation of material goods, trade and exchange, and relations of influence and domination among the various settlements of the Near East.

2. In mineralogical terms, the alabaster artefacts described in this paper are composed of calcite (a polymorph of calcium carbonate), rather than gypsum (calcium sulphate); see below.

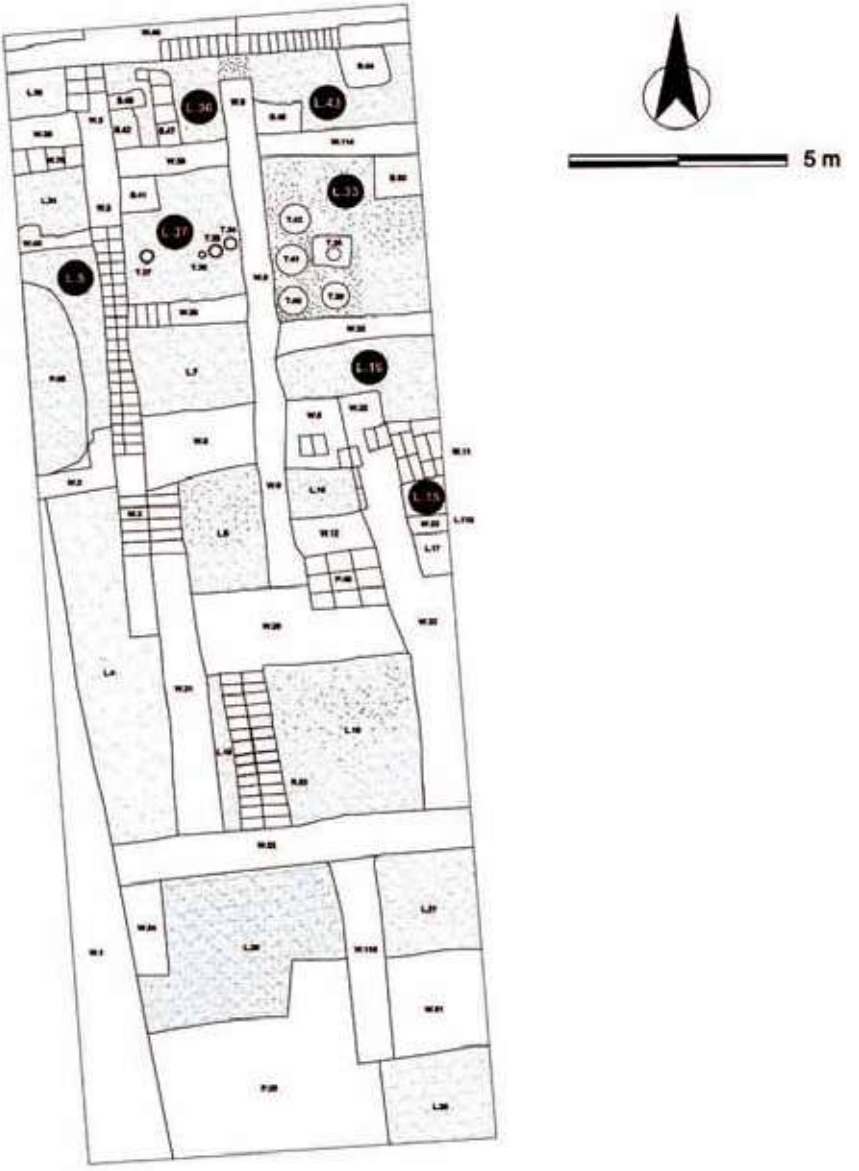

Fig. 1: floor-plan of Building 33 and distribution of the alabasters (drawing by R. Rivoltella).

The calcite artefacts from the superficial layers of the area of the building were discovered above all in the northern sector, as were the alabaster fragments recovered *in situ*.

Although the alabaster artefacts were all identified in the area occupied by the building, it became necessary to operate a distinction between those discovered on the surface and those discovered *in situ*.

Most of the calcite fragments are from conical bowls of small to medium size, while a smaller number are from containers/mortars.

Building 33, fragments of alabaster artefacts in situ

The northern sector of the building was used for the preparation and cooking of food (see the preliminary report on the excavations by E. Ascalone in this volume).

In this sector, one alabaster artefact was discovered in L.5 (Fig. 5). In L.36 there are three benches (B.42, B.47, B.49), near which two fragments of calcite conical bowls were discovered (Figs. 14-15). In the passageway connecting L.36 to L.43, characterised by two benches, four alabaster fragments were discovered (Figs. 20, 21, 26, 27). Room L.36 is separated from L.37 by a badly eroded foundation wall, composed of mud bricks (W.39). Discovered in the stratigraphic unit that covered the foundation and partially filled the two rooms L.36+L.37 were three fragments of alabaster bowls (Figs. 7, 8, 16).

In room L.37 there is a bench (B.41) and four ovens (T.34, T.35, T.36, T.37), while L.33 is characterised by the presence of five *tannurs*. An alabaster vessel fragment (Fig. 6) was discovered in room L.33, where the largest installation is found (T.38), in an almost central position, with another three hearths next to it. To the south-west of these, in room L.16, also in the kitchen part of the building, another fragment of an alabaster receptacle was brought to light (Fig. 3).

The bulk of the artefacts, especially the conical bowls, were discovered in contexts datable to a period from 2600 to about 2450 BC.

In just one case, in a deep assay performed in room L.15, a fragment of vessel (Fig. 4) attributable to Layer 3 of the building, corresponding to Phases 5a of the

Catalogue number	Locus	Alabaster pottery found on the surface	Dating
1	Northern sector	SiS.17.33.17 (Fig. 2)	2600-2450 BC
9	SiS.17.33.33/1 - L.36+L.43	SiS.17.33.95 (Fig. 9)	2600-2450 BC
10	SiS.17.33.33/2 - L.36+L.43	SiS.17.33.96 (Fig. 10)	2600-2450 BC
11	SiS.17.33.33/3 - L.36+L.43	SiS.17.33.97 (Fig. 11)	2600-2450 BC
12	SiS.17.33.33/4 - L.36+L.43	SiS.17.33.98 (Fig. 12)	2600-2450 BC
13	SiS.17.33.33/5 - L.36+L.43	SiS.17.33.99 (Fig. 13)	2600-2450 BC
17	SiS.17.33.33/9 - L.36+L.43	SiS.17.33.128 (Fig. 17)	2600-2450 BC
18	SiS.17.33.33/10 - L.36+L.43	SiS.17.33.129 (Fig. 18)	2600-2450 BC
19	SiS.17.33.33/11 - L.36+L.43	SiS.17.33.130 (Fig. 19)	2600-2450 BC
22	SiS.17.33.33/14 - L.36+L.43	SiS.17.33.133 (Fig. 22)	2600-2450 BC
23	SiS.17.33.33/15 - L.36+L.43	SiS.17.33.134 (Fig. 23)	2600-2450 BC
24	SiS.17.33.33/16 - L.36+L.43	SiS.17.33.135 (Fig. 24)	2600-2450 BC
25	SiS.17.33.33/14 - L.36+L.43	SiS.17.33.136 (Fig. 25)	2600-2450 BC

Tab.1: distributional analysis of the alabaster artefacts found on the surface in *Building 33*.

Catalogue number	Locus	Alabaster artefacts *in situ*	Dating
3	L.16	SiS.17.33.33 (Fig. 3)	2600-2450 BC
4	L.15	SiS.17.33.35 (Fig. 4)	2800-2620 BC
5	L.5	SiS.17.33.21 (Fig. 5)	2600-2450 BC
6	L.33	SiS.17.33.88 (Fig. 6)	2600-2450 BC
7	L.36+L.37	SiS.17.33.89 (Fig. 7)	2600-2450 BC
8	L.36+L.37	SiS.17.33.91 (Fig. 8)	2600-2450 BC
14	L.36	SiS.17.33.103 (Fig. 14)	2600-2450 BC
15	L.36	SiS.17.33.104 (Fig. 15)	2600-2450 BC
16	L.36+L.37	SiS.17.33.105 (Fig. 16)	2600-2450 BC
20	L.36+L.43	SiS.17.33.131 (Fig. 20)	2600-2450 BC
21	L.36+L.43	SiS.17.33.132 (Fig. 21)	2600-2450 BC
26	L.36+L.43	SiS.17.33.137 (Fig. 26)	2600-2450 BC
27	L.36+L.43	SiS.17.33.138 (Fig. 27)	2600-2450 BC

Tab. 2: distributional analysis of the alabaster artefacts found *in situ* in *Building 33*.

site, between 2800-2620 BC, was discovered.

The fragments of artefacts were subdivided by locus as follows:

Context	Alabaster artefacts	Quantity
L.16	SiS.17.33.33 (Fig. 3)	1
L.15	SiS.17.33.35 (Fig. 4)	1
L. 5	SiS.17.33.21 (Fig. 5)	1
L.33	SiS.17.33.88 (Fig. 6)	1
L.36+L.37	SiS.17.33.89 (Fig. 7); SiS.17.33.91 (Fig. 8); SiS.17.33.105 (Fig. 16)	3
L.36	SiS.17.33.103 (Fig. 14); SiS.17.33.104 (Fig. 15)	2
L.36+L.43	SiS.17.33.131 (Fig. 20); SiS.17.33.132 (Fig. 21); SiS.17.33.137 (Fig. 26); SiS.17.33.138 (Fig. 27);	4

Tab. 3: quantitative analysis of the alabaster artefacts inside *Building 33*.

3. Morphology and typology

In the 2017 excavation campaign two main forms were identified: the truncated cone-shaped bowl and the mortar with a square cross-section.

The forms of the alabaster artefacts discovered in *Building 33* are the same as those identified during the research conducted at the site of Shahr-i Sokhta from 1967 to 1978 by IsMEO based in Rome[3] and since the late 1990s by the team headed by S.M.S. Sajjadi in grave goods in the necropolis[4].

Alabaster was commonly used for the production of containers of small and medium size from bowls to mortars. Regarding the morphology of the truncated cone-shaped bowls,[5] Type 16 is an open form, with a simple profile and a flat

3. A careful analysis of the craftsmanship and typology of the alabaster vessels of Shahr-i Sokhta was conducted by Ciarla from the late 1970s to the mid 1980s. The study examined 1280 fragments of calcite vessels gathered from the surface of the site of Shahr-i Sokhta and kept in the *Museo Nazionale d'Arte Orientale* in Rome. Of these, only 80 had a complete profile (Ciarla 1981). Discoveries of calcite vessels on the surface had been made in the first ever excavation campaign in Shahr-i Sokhta, which identified, among other items, conical bowls (Tosi 1968: 41-42, figs. 19a, g, i, and 20a) in the Central Quarters (Vidale - Salvatori 1997).

4. Sajjadi 2003a *et al*. See especially the note on alabaster vessels by R. Shirazi: 66-74, figs. 33, 35.

5. In the study published by Casanova on the corpus of alabaster vessels from Susa of the 3rd and 2nd millennia BC kept in the Louvre, the forms seen in Series XI and XII are comparable to those of Shahr-i Sokhta (Casanova 1991: 36, plates 8-9, figs. 8-10).

6. For comparisons with conical and truncated cone-shaped bowls found elsewhere, see: Susa (Mecquenem 1934: figs. 21:7, 60:26; 1943, fig. 71:11; Le Breton 1957: figs. 40: 4, 42: 1, 2, 5; Stéve - Gasche 1971: plate 15:15), Aliabad (Gautier - Lampre 1905: figs. 288, 290, 293), Shahr-i Sokhta (Ciarla 1981: figs. 3a, 4a, 4f, 4i, 8, 12; Tosi 1983a: 179, figs. 16-17), Bactria (Pottier 1984, n°. 195) and Tarut (Burkholder 1984, no. 16c; D.T. Potts 1989: fig. 15 from the right). In Mesopotamia, parallels have been found in Ur (Hall - Woolley 1927: plate LXI, type XVIII; Woolley 1934: plate 176, U. 11818, U. 12673; plate 241-243, RC 13, 14, 16, 19, 20a, 24, 25; Woolley 1955: type JN 27; Woolley 1974: plate 51, Ur III type V), Girsu (Heuzev - Sarzec 1884-1912: plate

base, of small or medium size, with three sub-types distinguishable by the rims. The rims all belong to the category of 'indistinct rims', which do not have a clear boundary between them and the wall of the vessel and can be sharpened, flattened or rounded by the craftsman.

The type of rim in the truncated cone-shaped bowls is considered an element of distinction giving rise to three types:

Type 1a Sharp
Type 1b Flat
Type 1c Round

The number of bowls with a sharpened rim suggests that this feature was intentionally added during the process of manufacture, whereas the rounded rim and above all the flattened rim seem to be accidental and could thus be the result of an error on the part of the craftsman during production.

In all cases the bases are flat, without feet. In some cases, the base is not perfectly flat, but slightly convex, so they would not be stable when placed on a flat surface.

The diameter and height of the vessels vary from as little as a few centimetres, 2.5 × 1.4 cm, for the smallest bowls to 20 × 30 cm, deduced from the largest fragments.

Catalogue number	Form	Type
2 SiS.17.33.17 (Fig. 2)	Bowl	Rim Type 1a
3 SiS.17.33.33 (Fig. 3)	Bowl, wall	
4 SiS.17.33.35 (Fig. 4)	Bowl	Rim Type 1a
5 SiS.17.33.51 (Fig. 5)	Bowl, wall	
6 SiS.17.33.88 (Fig. 6)	Bowl	Rim Type 1b
7 SiS.17.33.89 (Fig. 7)	Bowl	Rim Type 1a
8 SiS.17.33.91 (Fig. 8)	Bowl	Rim Type 1a

44b.1) and Sippar (Walker - Collon 1980: plates 27-21).

9 SiS.17.33.95 (Fig. 9)	Bowl	Rim Type 1a
10 SiS.17.33.96 (Fig. 10)	Bowl	Rim Type 1a
11 SiS.17.33.97 (Fig. 11)	Bowl, base	
12 SiS.17.33.98 (Fig. 12)	Bowl	Rim Type 1a
13 SiS.17.33.99 (Fig. 13)	Bowl, wall	
14 SiS.17.33.103 (Fig. 14)	Bowl, base	
15 SiS.17.33.104 (Fig. 15)	Bowl	Rim Type 1a
16 SiS.17.33.105 (Fig. 16)	Bowl, wall	
17 SiS.17.33.128 (Fig. 17)	Bowl	Rim Type 1a
18 SiS.17.33.129 (Fig. 18)	Bowl	Rim Type 1b
19 SiS.17.33.130 (Fig. 19)	Bowl	Rim Type 1b
20 SiS.17.33.131 (Fig. 20)	Bowl	Rim Type 1c
21 SiS.17.33.132 (Fig. 21)	Bowl, wall	
22 SiS.17.33.133 (Fig. 22)	Bowl	Rim Type 1b
23 SiS.17.33.134 (Fig. 23)	Mortar, base	
24 SiS.17.33.135 (Fig. 24)	Bowl, wall	
25 SiS.17.33.136 (Fig. 25)	Bowl, wall	Rim Type 1a
26 SiS.17.33.137 (Fig. 26)	Mortar? Wall	
27 SiS.17.33.138 (Fig. 27)	Bowl	Rim Type 1b

Tab. 4: morphology and typology of the artefacts discovered in 2018.

The bases discovered in a fragmentary condition appear to be circular; in some cases they are flat and in others slightly convex, giving clues as to their function. Some of the conical bowls discovered are of small and medium size, varying only slightly from one to the other, suggesting that they were stacked on top of each other.

The alabaster vessels with a quadrangular cross-section, interpretable as mortars e.g. SiS.17.33.134 (Fig. 23), have parallels in the Eastern Residential Area and in Mundigak[7]. In this case, the shape does not appear to be distinctive from the chronological point of view.

The alabaster vessel fragments examined in our study are listed in the catalogue following the text below.

7. On the vessels with a quadrangular cross-section, see Vidale - Salvatori 1997: fig. 248, 12. These are similar to those discovered in the Eastern Residential Area (Tosi 1969a: fig. 234; Ciarla 1979: fig. 8) and very similar to what is seen in Mundigak in levels dated to Period IV, 1 (Casal 1961: fig. 134, 15).

4. The manufacturing process

The entire repertoire of stone artefacts from this area is made of a highly ductile material that does not require the type of heat treatment that is absolutely necessary when working with metal and clay. Indeed, calcite lies between 1 and 2 on the Mohs scale of mineral hardness, which is based on the empirical criterion of the ability of a harder material to scratch a softer material. It can thus be considered a soft stone, more easily shaped than other types of stone present in this area. The forms obtained from the processing of alabaster reveal the techniques used to extract the material from the calcite pebbles present in Shahr-i Sokhta. These entailed drilling, rotating the bit in one direction then the other, applying pressure that was necessarily irregular, using a range of a range of tools, probably in combination with chiselling[8].

Zonal EDS showed that the circular grooves observed inside some samples contained residues that differed from the surrounding matrix. Consisting of concentrated aluminium and silicon compounds, these residues have a chemical composition similar to that of the local sands, which may have been used as abrasives during the reduction process. Alternatively, the residue may have become detached from the stone drill bit that was used for excavating the cavity. However, post-production and post-depositional processes may also have led to this result. In some cases the presence of copper residues was also identified, raising questions on the use of tools made of this metal (in combination with abrasives) during the production of the calcite bowls. This aspect clearly merits a more detailed study by means of further investigations, since the copper residues may also derive from substances that were contained in the vessels, such as cosmetics.

8. A recent article (Boccuti *et al*. 2015) presented the preliminary results of non-destructive investigations of the surface of 5 samples of calcite from Shahr-i Sokhta, performed in the *Museo Nazionale d'Arte Orientale* in Rome. The analyses were conducted by environmental scanning electron microscope (ESEM) fitted with an energy-dispersive X-ray spectrometer (EDS). The characteristics of these samples were similar to those of the alabaster vessels discovered in the excavation of *Building 33*.

The ESEM and EDS analyses have provided a better understanding of the drilling process, the interaction between the drill bits and the walls of the bowl, the possible combination with other techniques for the creation of the cavity (for example chiselling), the probable use of abrasives during production, and lastly the interesting relationship between abrasives and copper tools in the production of calcite bowls.

5. Provenance of the calcite

From the very start of the research, the large quantity of alabaster discovered on the surface of the buildings and in the tombs indicated the presence of quarries in the vicinity of Shahr-i Sokhta.

The nearest alabaster quarries to the site discovered to date are those of Malekh Siah Kuh near Zahedan, about 120 km from Shahr-i Sokhta, where deposits of calcite gravel and washed pebbles were discovered. The Chagai Hills in Afghanistan, about 280 km away from Shahr-i Sokhta, have secondary deposits of alabaster in the form of washed pebbles of marble-onyx contained in terraces of varying dimensions of the late Tertiary - early Quaternary, which are also found in Kuh-i Khan Nashin in the basin of the Hirmand in Pakistan, about 250 km east-north-east of Shahr-i Sokhta.

Considerable quantities of alabaster are also recorded in the veins and secondary deposits of the eastern part of Kuh-i Birjand, which separates one of the inland lakes of the deltaic basin of Sistan from the depression of Lut to the west. In that area there are low hills consisting of sediments of the Tertiary and of recent Quaternary, particularly rich in materials including rounded pebbles 15-50 cm in diameter. Sources of calcite are also relatively common in the basin of the lower Hirmand.

What needs to be highlighted in this preliminary phase of the study, with reference to the geological map, is the presence near Shahr-i Sokhta of various Pliocene and Pleistocene alluvial deposits. These are composed of pebbles of various rocks, including calcite, in some cases brought from long distances by the river Hirmand, on whose delta the settlement of Shahr-i Sokhta lies.

Sources of calcite are relatively frequent in the lower Hirmand basin, and Shahr-i Sokhta is situated in the terminal stretch of the river. The outcropping rock, exposed by exogenous agents such as tectonic movements, could shed material that is transformed into polished pebbles as it is transported by the river. In the geological map of the area, Shahr-i Sokhta lies in a stony alluvial plain, characterised by various types of sedimentary deposit, some of which contain washed pebbles. The sedimentary deposits near Shahr-i Sokhta might well have been the sources of alabaster in the form of pebbles, representing a rich natural resource for the production of vessels in calcite.

During the survey conducted in the area of *Building 33*, a washed pebble was discovered (Fig. 30; SiS.17.33.52). Of small dimensions, it was shown by petrographic analyses (see below) to be composed of alabaster (Figs. 28-29).

Calcite pebbles of small and medium size might have been the main raw material used for making the vessels of Shahr-i Sokhta, where some semi-processed pebbles were found on the surface[9]. The bowls are almost all characterised by polychromatic bands.

The distribution of the bowls of small, medium and large dimensions discovered in the 2017 excavation campaign was uneven: 6 small, 20 medium and 2 large. It is no accident that the calcite vessels of Shahr-i Sokhta are mainly medium-sized, with a diameter rarely greater than 20 cm. Vessels of large dimensions, such as those produced in Egypt, require the presence of quarries from which large blocks of calcite can be extracted.

6. Petrographic analyses of the alabasters discovered in *Building 33*

Petrographic analyses of some of the alabaster fragments discovered were conducted in collaboration with Dr. Domenico Mannetta10. The alabaster vessels brought to light during the excavation were analysed after first separating them into fragments with polychromatic bands, characteristic of Shahr-i Sokhta (Figs. 31-34), and marbled monochromatic fragments, mostly white, which when

9. Ciarla - Bökönyi 1985: fig. 4 cylindrical, fig. 5 conical.
10. Università di Roma 'La Sapienza', Dipartimento di Scienze della Terra.

viewed by optical microscope recall the calcite typical of the site of Jiroft.

The term alabaster is generically used to refer to evaporite minerals composed of either gypsum (hydrous calcium sulphate, CaSO4) or calcite (calcium carbonate, CaCO3) which precipitate from particularly hard waters in subterranean environments as a result of evaporation.

Petrographic thin sections with a thickness of 30 microns were observed by polarised light microscope[11] using both a single polar and crossed polars. The samples share highly similar characteristics, especially an alternation of laminae with radial and acicular-columnar textures (Figs. 28-29). The term texture refers to the geometric characteristics and the spatial arrangement of the individual crystals and the spatial ratios between them, in a level that crystallised all at the same time.

The shape and spatial arrangement of the crystals that make up the aggregate, i.e. the texture, depend on the state of saturation of the water and the rate of percolation, which is determined in turn by average annual rainfall and vegetation.

The columnar texture is formed in conditions of constant percolation, in climates that do not have a strong contrast between seasons in terms of average annual rainfall. If the solution has an average degree of supersaturation, or if the solution contains extraneous ions, such as magnesium, the faces of the columnar crystals may be curved.

As the supersaturation and in some cases the dissolved magnesium content increases, crystals elongated along the direction of growth (generally perpendicular to the substrate) are formed. These crystals, characterised by pointed ends and a ratio of width to length greater than 1/6, are called acicular. On some levels a lengthening of the crystals is observed that could indicate a transition between columnar and acicular textures. This highly porous “hybrid” texture could be the result of a highly variable flow, with wet periods alternating with dry periods.

The columnar texture is typical of stalagmites or levels of stalagmites that formed in conditions of near equilibrium, relatively low supersaturation, constant

11. Images of some of the samples examined are shown in the text (Figs. 28-34).

water flow and the absence of impurities in the solution that grows the speleothems. A succession of diverse textures in the same concretion provides information on the environmental and climatic context of formation and the availability of water resources in particular.

7. Conclusions

The study of the alabasters of Shahr-i Sokhta is still in the preliminary phase. The excavations performed during the first archaeological campaign showed that most of the vessels found *in situ* in *Building 33* were unearthed in the kitchen and storage areas, whose period of use corresponds to phase 1 of the building (from 2600 to 2450 BC). In this context, the alabaster vessels seem to reflect above all the utilitarian and functional aspects, constituting utensils of the domestic type, although their composite material confirms the prestige and ideological importance of the building.

The interesting element is that until now, no practical use of bowls – as indicated by the presence of the alabasters in the area of the kitchens – had been identified in Mesopotamian contexts[12].

The morphology of the vessels is homogeneous. Mostly bowls of medium size (only one fragment of a mortar is attested), they may be distinguished by their rims into three types; Type 1a (sharp), Type 1b (flat) and Type 1c (round).

The geological map highlights alluvial sedimentary deposits in the area of Shahr-i Sokhta, with the presence of calcite pebbles; the petrographic analysis enabled the study of the finds, identifying some characterised by the presence of other material such as quartz and those with veining arising from ferrous compounds, typical of Shahr-i Sokhta. From the technological point of view, these pebbles can be associated with the vessels. Research in the wider region will help us to analyse in greater detail the quarries of this material and the process of extraction.

12. Sippar, Girsu and Ur (see note 13).

The new excavations confirm the fundamental role of Shahr-i Sokhta in the lithic industry and technology of the cultures of the 3rd millennium in Iran, the valley of the Indus and southern Turkmenistan.

Catalogue of alabaster vessels

(Fig. 2)

SiS.17.33.17	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of small dimensions ,simple profile, indistinct rim ,sharp at the edge
Colour	orange veining on a pale background
Condition	fragmentary
Length	2.5 cm
Width	1.7 cm
Thickness	0.4 cm
US/Locus	Northern sector
Level	surface
Layer *Building33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite n°. 54a-c (Figs. 32-34)

Fig. 2: SiS.17.33.17 (photo by M. Rahmani)

(Fig. 3)

SiS.17.33.33	
Form	bowl
Type	not classifiable
Description	wall of open truncated cone-shaped bowl of medium dimensions, simple profile
Colour	pale monochrome
Condition	fragmentary
Length	4.1 cm
Width	3.1 cm
Thickness	1.2 cm
US/Locus	L. 16
Level	-0.15 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 3: SiS.17.33.33 (photo by M. Rahmani).

(Fig. 4)

SiS.17.33.35	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of small dimensions, simple profile, indistinct rim, sharp at the edge
Colour	orange veining on a pale background
Condition	fragmentary
Length	4.1 cm
Width	3.1 cm
Thickness	1.2 cm
US/Locus	L. 15
Level	-0.47 m
Layer *Building 33*	2
Period of the site	II (Phase 6)
Chronology	2800-2620 BC
Petrographic analysis	calcite

Fig. 4: SiS.17.33.35 (photo by M. Rahmani).

(Fig. 5)

SiS.17.33.51	
Form	bowl
Type	not classifiable
Description	wall of an open truncated cone-shaped bowl of medium dimensions, simple profile
Colour	beige veining on a pale background
Condition	fragmentary
Length	1.7 cm
Width	1.7 cm
Thickness	0.6 cm
US/Locus	L.5
Level	-0.10 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 5: SiS.17.33.51 (photo by M. Rahmani).

(Fig. 6)

SiS.17.33.88	
Form	bowl
Type	1b
Description	open truncated cone-shaped bowl of small dimensions, simple profile, indistinct rim, flattened at the edge
Colour	pale monochrome
Condition	fragmentary
Length	1.6 cm
Width	1.2 cm
Thickness	0.5 cm
US/Locus	L. 33
Level	-0.20 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 6: SiS.17.33.88 (photo by M. Rahmani)

(Fig. 7)

SiS.17.33.89	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	bands of orange veining on a pale yellowish background
Condition	fragmentary
Length	3.7 cm
Width	2.9 cm
Thickness	0.6 cm
US/Locus	L.36 + L.37
Level	-0.10 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 7: SiS.17.33.89 (photo by M. Rahmani

(Fig. 8)

SiS.17.33.91	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	bands of orange veining on a pale yellowish background
Condition	fragmentary
Length	4.7 cm
Width	2.0 cm
Thickness	0.8 cm
US/Locus	L.36 + L.37
Level	-0.10 m
Phase *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 8: SiS.17.33.91 (photo by M. Rahmani).

(Fig. 9)

SiS.17.33.95	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	bands of orange veining on a pale yellowish background
Condition	fragmentary
Length	7.2 cm
Width	4.8 cm
Thickness	0.7 cm
Diameter	13 cm
US/Locus	SiS.17.33.33/1 L.36+L.43
Level	surface
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 9: SiS.17.33.95 (photo by M. Rahmani).

(Fig. 10)

SiS.17.33.96	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of small dimensions, simple profile, indistinct rim, sharp at the edge
Colour	orange and brown veining on a pale yellowish background
Condition	fragmentary
Length	4.2 cm
Width	3.4 cm
Thickness	0.7 cm
US/Locus	SiS.17.33.33/2 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite n°. 53a (Fig. 31)

Fig. 10: SiS.17.33.96 (photo by M. Rahmani).

(Fig. 11)

SiS.17.33.97	
Form	bowl
Description	truncated cone-shaped bowl of medium dimensions, slightly convex bottom
Colour	claret veining on a pale yellowish background
Condition	fragmentary
Length	2.2 cm
Width	2.6 cm
Thickness	0.8 cm
Diameter	3.5 cm
US/Locus	SiS.17.33.33/3 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 11: SiS.17.33.97 (photo by M. Rahmani).

(Fig. 12)

SiS.17.33.98	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	orange veining on a pale yellowish background
Condition	fragmentary
Length	3.2 cm
Width	1.9 cm
Thickness	0.8 cm
US/Locus	SiS.17.33.33/4 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 12: SiS.17.33.98 (photo by M. Rahmani).

(Fig. 13)

SiS.17.33.99	
Form	bowl
Type	
Description	wall of an open truncated cone-shaped bowl of medium dimensions, simple profile
Colour	pale beige monochrome with whitish veining
Condition	fragmentary
Length	3.3 cm
Width	2.3 cm
Thickness	1.2 cm
US/Locus	SiS.17.33.33/5 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 13: SiS.17.33.99 (photo by M. Rahmani).

(Fig. 14)

SiS.17.33.103	
Form	bowl
Description	truncated cone-shaped bowl of medium dimensions, slightly convex bottom
Colour	orange and brown veining on a pale orange background
Condition	fragmentary
Length	1.9 cm
Width	0.4 cm base 0.3 cm
Thickness	1.2 cm
US/Locus	L. 36
Level	-0.25 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 14: SiS.17.33.103 (photo by M. Rahmani).

(Fig. 15)

SiS.17.33.104	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	orange veining on a pale background
Condition	fragmentary
Length	2.1 cm
Width	1.4 cm
Thickness	0.5 cm
US/Locus	L. 36
Level	0.25 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 15: SiS.17.33.104 (photo by M. Rahmani).

(Fig. 16)

SiS.17.33.105	
Form	bowl
Type	not classifiable
Description	wall of an open truncated cone-shaped bowl of medium dimensions, simple profile
Colour	orange veining on a pale background
Condition	fragmentary
Length	2.8 cm
Width	2.5 cm
Thickness	1.7 cm
US/Locus	L.36+L.37
Level	-0.10 m
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 16: SiS.17.33.105 (photo by M. Rahmani).

(Fig. 17)

SiS.17.33.128	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of large dimensions, simple profile, indistinct rim, sharp at the edge
Colour	orange veining on a pale yellowish background
Condition	fragmentary
Length	9.4 cm
Width	8 cm
Thickness	1.2 cm
Diameter	18-20 cm
US/Locus	SiS.17.33.33/9 - L.36+L.43
Level	surface
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 17: SiS.17.33.128 (photo by M. Rahmani).

(Fig. 18)

SiS.17.33.129	
Form	bowl
Type	1b
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, flattened at the edge
Colour	orange veining on a pale background
Condition	fragmentary
Length	3.6 cm
Width	3.7 cm
Thickness	0.8 cm
US/Locus	SiS.17.33.33/10 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

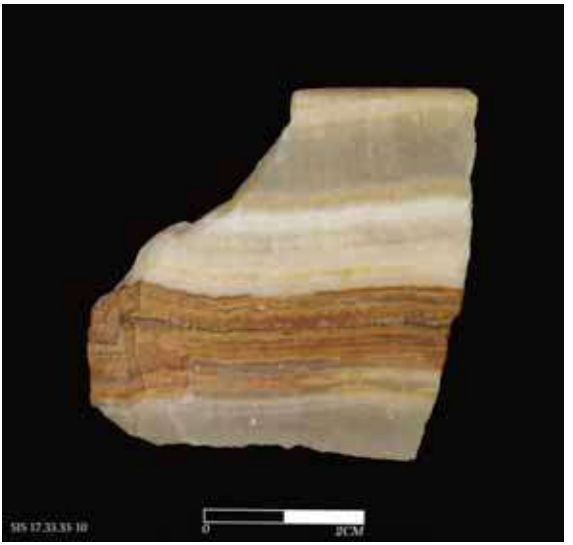

Fig. 18: SiS.17.33.129 (photo by M. Rahmani).

(Fig. 19)

SiS.17.33.130	
Form	bowl
Type	1b
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, flattened at the edge
Colour	
Condition	fragmentary
Length	3.6 cm
Width	3.7 cm
Thickness	0.8 cm
US/Locus	SiS.17.33.33/11 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 19: SiS.17.33.130 (photo by M. Rahmani).

(Fig. 20)

SiS.17.33.131	
Form	bowl
Type	1c
Description	open truncated cone-shaped bowl of small dimensions, simple profile, indistinct rim, rounded at the edge
Colour	dark and pale orange veining on a dark background
Condition	fragmentary
Length	1.6 cm
Width	1.3 cm
Thickness	0.7 cm
US/Locus	L.36+L.43
Level	-0.35 m.
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

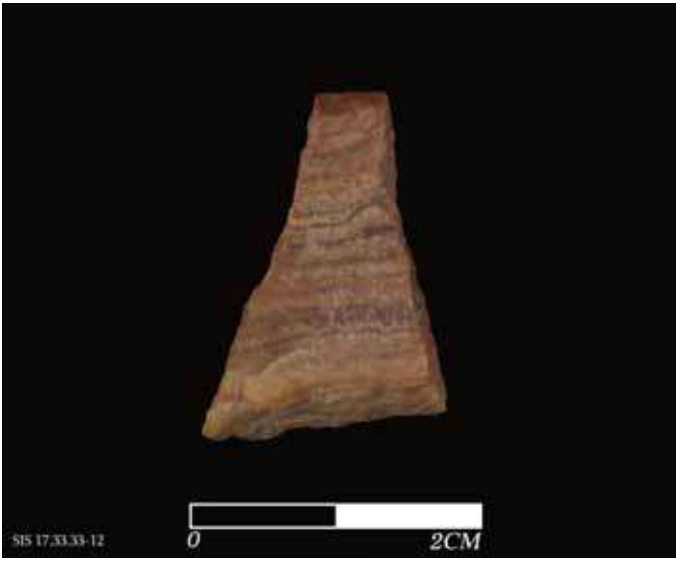

Fig. 20: SiS.17.33.131 (photo by M. Rahmani).

(Fig. 21)

SiS.17.33.132	
Form	bowl
Type	not classifiable
Description	wall of an open truncated cone-shaped bowl of medium dimensions, simple profile
Colour	pale orange and beige veining on a pale background
Condition	fragmentary
Length	6.3 cm
Width	4.1 cm
Thickness	1.2 cm
US/Locus	L.36+L.43
Level	-0.35 m.
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 21: SiS.17.33.132 (photo by M. Rahmani).

(Fig. 22)

SiS.17.33.133	
Form	bowl
Type	1b
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, flattened at the edge
Colour	pale orange and beige veining on a pale background
Condition	fragmentary
Length	2.9 cm
Width	4.9 cm
Thickness	1.0 cm
US/Locus	SiS.17.33.33/14 – L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 22: SiS.17.33.133 (photo by M. Rahmani).

(Fig. 23)

SiS.17.33.134	
Form	mortar
Description	cylindrical mortar of medium dimensions, slightly convex bottom
Colour	beige veining on a pale background
Condition	fragmentary
Length	6.2 cm
Width	1.9 cm
Thickness	1.0 cm
Diameter	8 cm
US/Locus	SiS.17.33.33/15 - L.36+L.43
Level	surface
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 23: SiS.17.33.134 (photo by M. Rahmani).

(Fig. 24)

SiS.17.33.135	
Form	bowl
Type	not classifiable
Description	wall of an open truncated cone-shaped bowl of large dimensions, simple profile
Colour	beige and orange veining on a pale background
Condition	fragmentary
Length	6.3 cm
Width	4.9 cm
Thickness	1.2 cm
US/Locus	SiS.17.33.33/16 - L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 24: SiS.17.33.135 (photo by M. Rahmani).

(Fig. 25)

SiS.17.33.136	
Form	bowl
Type	1a
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, sharp at the edge
Colour	dark and pale orange veining on a pale background
Condition	fragmentary
Length	2.5 cm
Width	1.8 cm
Thickness	0.4 cm
US/Locus	SiS.17.33.33/17 – L.36+L.43
Level	surface
Layer *Building 33*	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 25: SiS.17.33.136 (photo by M. Rahmani).

(Fig. 26)

SiS.17.33.137	
Form	mortar?
Description	wall of a cylindrical form of medium dimensions
Colour	pale brown veining on a pale background
Condition	fragmentary
Length	3.7 cm
Width	4.2 cm
Thickness	1.5 cm
US/Locus	L.36+L.43
Level	-0.35 m.
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 26: SiS.17.33.137 (photo by M. Rahmani).

(Fig. 27)

SiS.17.33.138	
Form	bowl
Type	1b
Description	open truncated cone-shaped bowl of medium dimensions, simple profile, indistinct rim, flattened at the edge
Colour	marbled, beige on a pale background
Condition	fragmentary
Length	3.7 cm
Width	4.2 cm
Thickness	1.5 cm
US/Locus	L.36+L.43
Level	-0.35 m.
Layer Building 33	1
Period of the site	III (Phase 4-3)
Chronology	2600-2450 BC
Petrographic analysis	calcite

Fig. 27: SiS.17.33.138 (photo by M. Rahmani).

Fig. 28: 50a Radial-columnar texture (linear-polarised light).

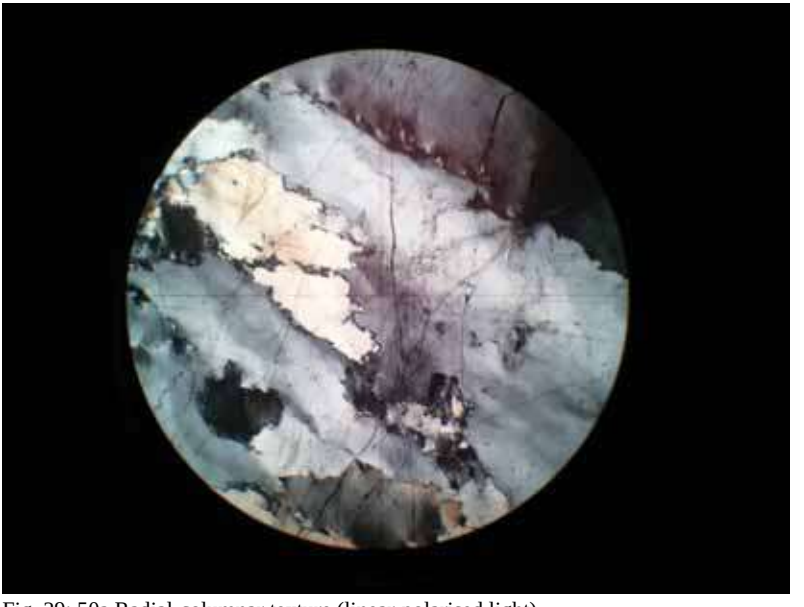

Fig. 29: 50a Radial-columnar texture (linear-polarised light).

Fig. 30: SiS.17.33.52 (Figs. 28-29 sample n°. 50a, 50b). The sample was taken from a calcite pebble from the surface in the area occupied by *Building 33*. Diameter of the photographs 4.5 mm.

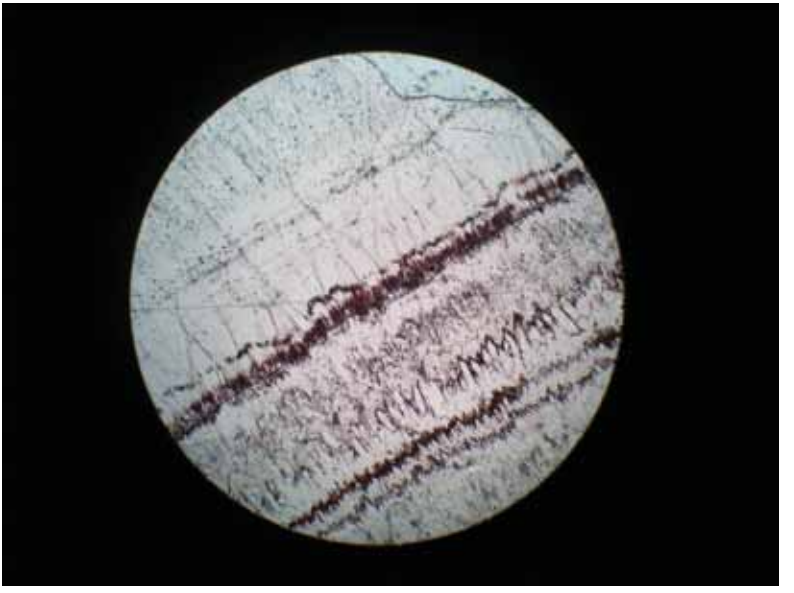

Fig. 31: 53a Radial-columnar texture, (linear-polarised light). SiS.17.33.96. Sample with coloured bands formed of calcite ($CaCO_3$) with radial-columnar and acicular textures alternating with laminae of oxides, probably of iron (Rim). Diameter of the photographs 4.5 mm.

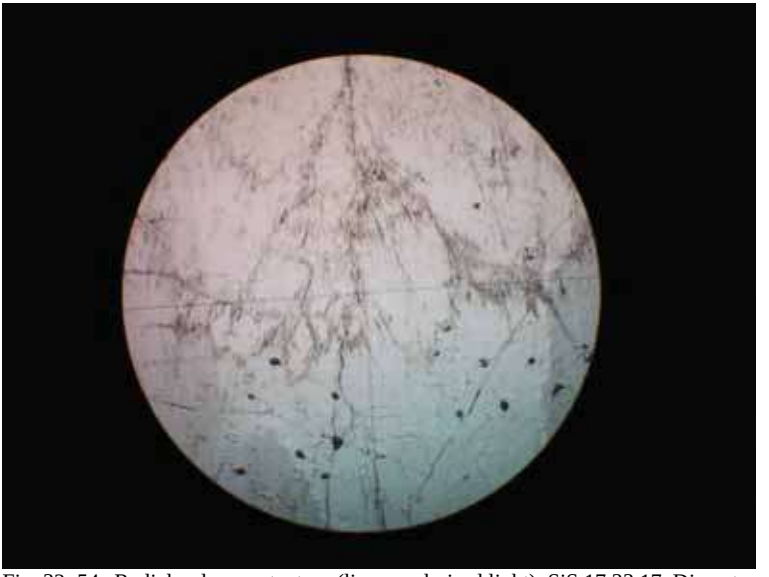

Fig. 32: 54a Radial-columnar texture (linear-polarised light). SiS.17.33.17. Diameter of the photographs 4.5 mm.

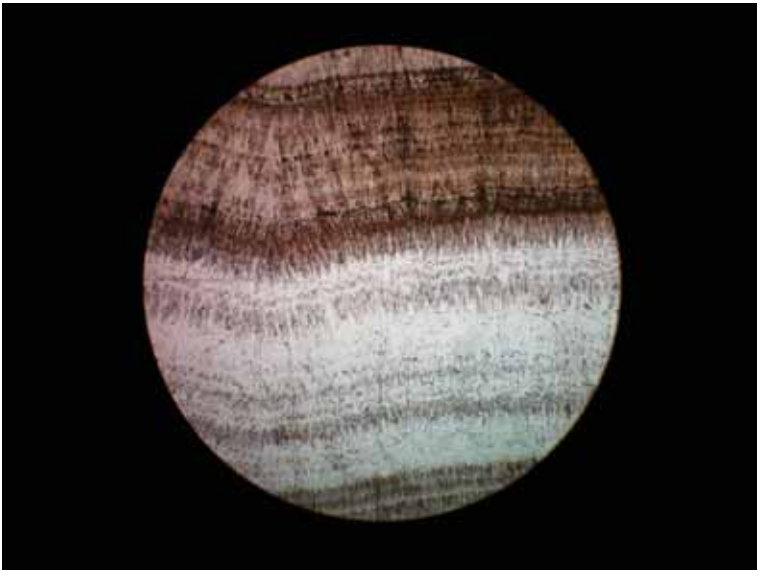

Fig. 33: 54b Radial-acicular texture (cross-polarised light). SiS.17.33.17. Diameter of the photographs 4.5 mm.

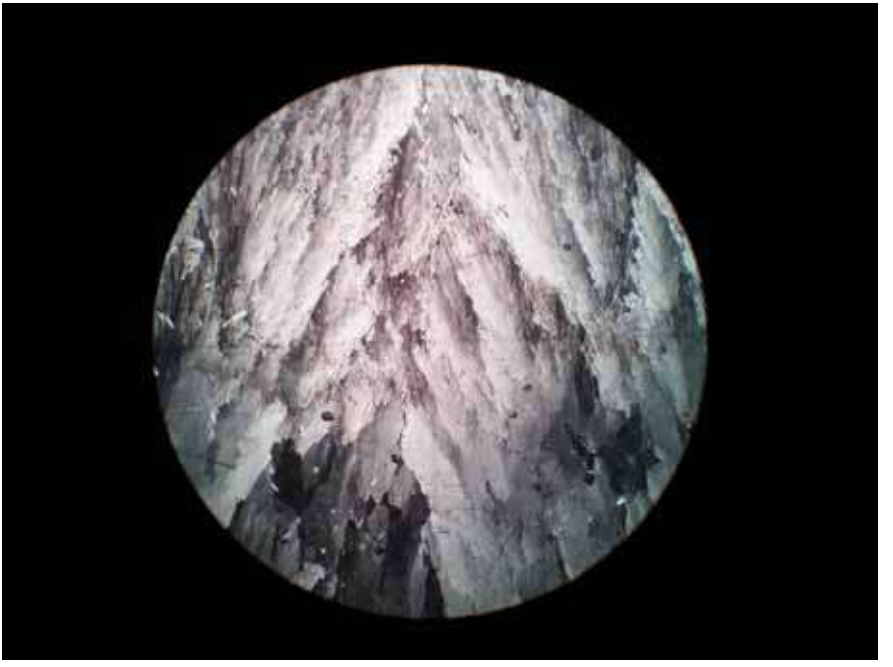

Fig. 34: 54c Radial-columnar texture (cross-polarised light). SiS.17.33.17. Diameter of the photographs 4.5 mm.

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Part III
Bioarchaeological Researches

Demographic Considerations Regarding the Settlement and Necropolis of Shahr-i Sokhta[1]

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1. Archaeological premise

The earliest archaeological investigations in Sistan were conducted by Sir Aurel Stein, who undertook preliminary research throughout the area, followed by subsequent journeys in Baluchistan and the Halil valley (Stein 1928; 1931; 1937). Previous work had been conducted by G.P. Tate, who drew the first detailed map of the area (Tate 1909; 1910-1912), subsequently used by E. Herzfeld in his surface reconnaissance in the regions of Rūd-i Biyaban and Rūd-i Sistan (Herzfeld 1916; 1931-32). After these pioneering steps, the first excavations were conducted by R. Ghishman in the 1930s in Nād ʻAlī (20 km south-east of Chakansur, in today's Afghanistan) (Ghirshman 1939; Ghirshman *et al*. 1959), followed by the work undertaken from 1951 to 1959 by J.-M. Casal in Mundigak, where a new cultural horizon was identified (Casal 1961; 1966). Meanwhile, in 1951 new information on the major settlements of the 3rd and 2nd millennia BC was gathered by the detailed surveys conducted by W.A. Fairservis throughout the region (Fairservis 1961).

1. Paragraphs 1 and 2 are by Enrico Ascalone and 3 and 4 by Pier Francesco Fabbri. The conclusions were written by both authors (E. Ascalone wrote the topographical and settlement notes, P.F. Fabbri wrote the anthropological notes).

Excavations began in Shahr-i Sokhta a few years later with the Italian mission headed by M. Tosi, who launched a new and intense season of research that lasted from 1967 to 1978, revealing the cultural horizons, chronological sequences and historical phases of the settlement (Tosi 1967; 1968a; 1968b; 1969a; 1969b; 1969c; 1969d; 1969e; 1970a; 1970b; 1971a; 1971b; 1971c; 1972a; 1972b; 1972c; 1972d; 1972e; 1973a; 1973b; 1974; 1975; 1976a; 1976b; 1976c; 1977; 1978a; 1978b, 1983). The excavations focused on separate sectors, yielding initial data on the topographical organisation of the settlement, which was occupied from the mid 4th to late 3th millennium BC. Six sectors were excavated: the so-called *Craftsmen's Area* (Mariani 1981; 1984; Foglini - Vidale 2000), the *Eastern Residential Area* (Biscione 1979; Cattini 2000; Fiandra - Pepe 2000), the *Central Residential Area* (Salvatori 1979; Salvatori - Vidale 1997), the *Monumental Area* (Mariani 1989), the necropolis (Piperno - Tosi 1975a; 1975b; Piperno 1976; 1977; 1978; 1979; 1986, Piperno - Salvatori 1982; 1983; 2007) and the industrial area, identified to the south of the funerary complex outside the settlement. On the basis of the investigations conducted and a new multidisciplinary approach to what was being unearthed, the Italian mission identified four periods of occupation, divided into a total of 10 cultural phases (Biscione *et al.* 1977; Salvatori - Tosi 2005; Ascalone 2021).

On the basis of more recent results the periods in Shar-i Sokhta can be divided as follows:

Shahr-i Sokhta I (ca. 3550-3000 BC): the ceramics show affinities with the *corpora* of Mundigak and eastern Baluchistan (especially the Quetta valley), while there are numerous decorative parallels with the ceramic horizons of Namazga III (Biscione 1973; 1974; 1984; Pracchia 1983; Sarianidi 1983). This period saw the appearance of so-called *Grey Streak-Burnished Ware* (seen in Yahya IVC-IVB6) and polychromatic fragments of Nal ceramics. While the cultural centre of gravity seems oriented towards Turkmenistan and Baluchistan, a tablet and cylindrical seals of clearly proto-Elamite origin were discovered, making it possible to establish a stratigraphic connection with Susa IIIA (levels 16-14A of the *Acropole*), Tall-i Malyan (Ancient and Middle Banesh period) and Yahya IVC (Amiet - Tosi 1978; Amiet 1979; 1983).

Shahr-i Sokhta II (ca. 3000-2600 BC): the second period is better known, thanks to the more abundant and more widespread architectural evidence, found in many sectors of the settlement (Biscione 1990; 1993). The ceramics follow the evolution of the previous period with new standardised morphologies that are close to the horizons of Namazga IV (Biscione - Bulgarelli 1983; Pracchia 1984), Bampur III-IV and Mundigak IV1-2. Intense relations with the so-called Turan culture are attested (Bulgarelli 1977; 1981; 1983; 1998; Biscione *et al*. 1981), with bronze and stone stamp seals showing a homogeneity not seen in the previous period (Baghestani 1997).

Shahr-i Sokhta III (ca. 2600-2400 BC): *Fine Black Painted Grey Ware* has clear parallels in Bampur IV2-3 (Wright 1989). The production technique of the individual artefacts also has analogies with what has been found in Baluchistan, while the glyptic *corpus* is highly similar to that of Margiana and Bactria (Ferioli *et al*. 1979; Fiandra 1981).

Shahr-i Sokhta IV (ca. 2400-2300 BC): Reddish Ware seems to have spread more rapidly, with a loss of decorative features and a general impoverishment in terms of craftsmanship. Parallels are recognised in Namazga V and Yahya IVB. Shahr-i Sokhta seems to have participated actively in the extensive cultural interferences of the period, in which an integrated cultural system seems to have emerged in the mid 3rd millennium BC, involving the Indus and Oxus valleys, Jiroft and the Hirmand valley (Ascalone 2014; 2018).

Shahr-i Sokhta V (ca. 2100-2000 BC): the centre is partially reoccupied after a period of neglect in the area of the Burnt Building, this period is also documented in the settlement of Rūd-i Biyaban and in the Sistan region where BMAC material is widely attested. Modest amounts of new black-painted burnished grey ceramics also appear.

More recent and highly significant discoveries have been made during the new excavations conducted by the Iranian mission headed by S.M.S. Sajjadi, which began in 1997 and have yielded extraordinary evidence regarding the settlement's IV period (especially Areas 1, 20, 26 and 28) and the entire necropolis complex (Sajjadi 1999a; 199b; 2000; 2001a; 2001b; 2002; 2003a; 2003b; 2004a; 2004b; 2004c; 2005a; 2005b, 2006; 2014a; 2014b; Sajjadi - Moradi 2017).

2. Areas investigated and the periodisation of Shahr-i Sokhta

It is difficult to give a precise estimate of the size of the settlement during the four periods identified, although, as we will see, the data resulting from the surface reconnaissance conducted by the Italian mission in the 1960s and 70s are fundamental in this regard (see especially Salvatori - Tosi 2005 and Biscione *et al*. 1977).

The main areas excavated show an elaborate topographical layout during Periods II and III of the site, yielding a linear and uninterrupted stratigraphic sequence in the first half of the 3rd millennium BC. Unfortunately, the settlement's early formative period (Period I) is attested only in the *Eastern Residential Area* in the *House of the Foundation*, which has yielded an uninterrupted sequence up to Shahr-i Sokhta IV. It is difficult to verify, without systematic and extensive step trenches in the various sectors of the settlement, whether this fairly sporadic presence of the I period in Shahr-i Sokhta is in some way due to archaeological chance and/or the fact that, for obvious reasons, Period I ceramics are numerically far less frequent on the surface of the site. A detailed study of the grave goods of the necropolis that can link the stratigraphic sequences detected in the settlement with the ceramic horizons of the individual funerary complexes has yet to be conducted. In the meantime, the previous surveys by the Italian mission paint a rather homogeneous picture, although this has been slightly modified in the light of the most recent investigations, which have made it possible to propose a broader topographical layout than was previously thought for the final period of the settlement (Sajjadi - Moradi 2017).

The southern sector plausibly developed as area for processing stone, as indicated by the numerous finds gathered on the surface (fragments of jasper, chalcedony and flint). It lies to the south of the necropolis and has been generically dated to the settlement's final period, perhaps also the terminal stages of Period III, on the basis of the seriations of the ceramics gathered on the surface (Biscione *et al*. 1977: 81). The area does not seem to have yielded any evidence of the more ancient periods and specifically no ceramic horizon coeval with *Building 33*.

The residential area, within which lies the entire eastern sector of the settlement, including the *Burnt Building*, has an area of 16 hectares and is, to date, the only area in which all the site's periods of occupation are documented (Shahr-i Sokhta I-IV). In contrast, the area known as the *Central Quarters*, covering about 20 hectares, has yielded a habitational sequence that runs from Phase 8 (Period II) until Phase 3 (Period III), chronologically from about 3000 to about 2450 BC. The same chronological sequence has been verified for Area 33, which is not believed to have lasted beyond 2450 BC, indicating a close topographical and occupational fit with the above-mentioned *Central Quarters*.

In the same way, the so-called *Monumental Area*, in the northern part of the settlement, seems to provide evidence of occupation from the Period II to Period IV (Phases 8-1), while the *Craftsmen's Area*, located in the north-western corner of the site, yields a ceramic horizon that is fairly close to what has been found in the *Burnt Building* and can be reliably dated to the settlement's final phases of life.

This diachronic reconstruction of the settlement of Shahr-i Sokhta, which posits an initial settlement about 15.5 hectares in size that grew gradually until reaching its greatest extent around Phase 3 of Period III and then underwent a general collapse in the final phase (Shahr-i Sokhta IV, Phases 2-1) (Biscione *et al*. 1977: 84), must now be modified however to take account of the new evidence discovered by the Iranian mission headed by S.M.S. Sajjadi. Indeed, the excavations of new sectors have demonstrated Period IV occupation throughout the central part of the settlement, with the final phases of the settlement attested in Area 1 (levels A-E = Periods II and III and level F = Periods III and IV), Area 20 (Periods III and IV, with Phases 2 and 1 verified for the latter), Area 26 (Period IV, Phase 1) and Area 28 (Period IV, Phase 1) (Sajjadi - Moradi 2017).

3. Estimates of the population

In order to estimate the number of inhabitants of a site, reference is usually made to indicators linked to the number and dimensions of the dwellings, as well as the size of the site itself and the area used by the site (Site Catchment analysis,

Chamberlain 2006). Very often, for these indicators to be usable in archaeology, they have to be assessed with reference to a modern-day sample. It is widely held that estimating the population of a site on the basis of the population of the necropolis is a rather unreliable approach that generally results in lower estimates than are produced by other methods (Peroni 1994; Bietti Sestieri 1996). This is not because the method is unreliable in itself (Hilpert - Zimmermann 2008). On the contrary, according to Peroni (1994: 225) "If we wish to remain on a truly firm footing, there exists only one type of evidence that can be relied on for assessing the demographic weight of a given community: funerary (our translation)". Rather, it is because reliability requires the fulfilment of a number of criteria that are rarely met all together. According to Peroni, the main criteria are the following: the necropolis must have been excavated in its entirety, it must be the only one and it must have been used by the whole of the population. Another requirement, in our view, is that the human remains are in a good state of conservation regardless of individual age, gender, type of burial and topographical position inside the necropolis.

4. The necropolis of Shahr-i Sokhta

After almost 50 years of research, the only known necropolis today in Shahr-i Sokhta was discovered in September 1972 by the Italian mission, which in successive excavation campaigns found 220 burials. Descriptions of the human remains were published by E. Pardini and colleagues (Pardini - Sarvari-Negahban 1976; Pardini 1977; 1979; Pardini - Lombardi Pardini 1990; 1992; 1997; Mannucci *et al.* 1985). Another 52 individuals were analysed, after the Italian excavations ended, by Macchiarelli and Passarello (1988). About 900 burials were excavated during the Iranian excavations of 1997-2015 (Sajjadi 2015a), of which 525 were anthropologically studied by Forunzafar (2010). The Italian excavations were mainly directed at the northern and central areas of the necropolis, whereas the Iranians concentrated on the central area, with limited assays to the north and south. In this paper we propose to assess whether it is possible, considering the data provided by the authors who originally studied the

skeletal remains and estimated the size of the necropolis, to obtain an estimate of the size of the population that inhabited the site during its roughly 14 centuries of existence.

Assuming that Shahr-i Sokhta had only one necropolis – in 50 years of research no other burials have been discovered in the settlement – this would mean that Peroni's criterion (1994) of it being used by the whole population was met. The necropolis has not been completely excavated, but knowing its physical extent and having excavated a rather large sample of it, including a total of more than 1,100 burials, it is possible to calculate the area in m2 occupied by each burial and extend it to the necropolis as a whole. Unfortunately, the fourth requirement, i.e. that all the human remains be in a generally good state of conservation, is not met. As we have been able to verify in person, the state of conservation of the human remains in the necropolis of Shahr-i Sokhta is highly variable: some skeletons are in an excellent condition, with even part of the hair still present (Lorentz 2010), while others are reduced to corroded and indeterminable fragments. In the sample considered by Sajjadi (2014a), 153 skeletons out of 596 (24%) were not studied due to their very poor state of conservation. The state of conservation varies in relation to the topography of the necropolis and the depth of discovery of the burials (Sajjadi 2005b). Therefore, the decay may have selectively affected certain phases of use of the necropolis and certain types of tomb, while the average density of the burials and the number of individuals per burial is clearly the result of a conservative estimate.

In a small sample (n=138) of skeletons whose age was determined at least qualitatively, drawn from Sajjadi *et al.* (2003; 2006) and Lorentz (2008; 2010), we have only 6 (51‰) children of less than a year (Macchiarelli - Passarello 1988), while in a sample (n=237) from the Italian excavations we find 22 individuals of less than a year (93‰). The raw demographic parameters based on the sum of the two samples (see Table 1) indicate an infant mortality (D0-1) of 77‰, mortality before the age of 5 (D0-4) of 189‰ and a ratio of non-adults to adults (D0-19/ D0+) of 387‰. From the sample of Sajjadi (2015a), it is not possible to derive the ages by numerical class, because the individuals are assigned to qualitative

classes (*newborn*, *child*, *male*, *female*), although the ratio of non-adults to adults (D0-19/D0+) is 488‰. These data are simply not consistent with Bronze Age demographics. For example, Masset (1976), on the basis of parish registers in France under the Ancient Régime, found an under-5 mortality rate of 500‰-550‰, and a ratio of non-adults to adults of 500‰-620‰. It is clear that among the skeletal remains that were sufficiently well conserved to allow determination of the age of death, individuals of low age, dying below the age of 5, are under-represented. Regarding the older age classes, in the Shahr-i Sokhta sample as a whole the ratio of 5-9 to 10-14 years old (D5-9/D10-14, see Table 1) is 2.5. According to Bocquet and Masset (1977) in archaeological samples the ratio is almost always above 2, indicating that the 5-9 age class is not under-represented and thus does not need to be estimated.

The general scarcity of remains of very young individuals, and of infants (0-1 years) in particular, in archaeological samples requires the use of indices that estimate the demographic parameters of a skeleton population without taking account of the unrealistic percentage of infants discovered (Bocquet-Appel - Masset 1982, Bocquet-Appel - Naji 2006). The index (d) is derived from the ratio of juvenile individuals (aged 5-19) to all individuals aged 5 and above, i.e. d = D5-19/D5+. The index is calculated on the basis of the remains of individuals who have a greater probability of resisting diagenesis. The index is closely correlated with certain demographic parameters, which can thus be estimated using samples in which children are highly under-represented, so as to avoid including extremely low infant mortality values recorded in the archaeological samples in the calculations. This method is based on the hypothesis, that of the null growth rate, which is generally very difficult to verify in an archaeological population. In the specific case of Shahr-i Sokhta we have at least two indicators that the opposite is true: since the site existed for about 14 centuries and was then completely abandoned, for it to have had a stationary population its inhabitants must have all moved there at the same time, remaining at the site until they just as suddenly all left together, not a plausible hypothesis. The archaeological data suggest that the settlement varied in extent, and did not occupy the entire site

for the whole of its duration. This variation in physical area is assumed to have reflected variation in the size of the population and thus a growth rate that was not null (Biscione *et al.* 1977, Salvatori - Tosi 2001). In our favour is the long duration of the occupation of the site, about 14 centuries. In such a long period it is probable that variations in the growth rate, positive and negative, cancelled each other out, producing a growth rate near zero (Bocquet-Appel - Masset 1977). Salvatori and Tosi (2001: 189, fig. 12) present a graph that estimates the size of the settlement on the basis of surface discoveries, which show growth during the first half of the site's occupation and shrinkage in the second. If this is correlated with the population, our hypothesis of long-term null growth in the period is not too far from the truth. More recent data seem to refute this hypothesis however, indicating that in its later phases, the settlement actually occupied a much larger part of the site (Tab. 1).

D0-19 = individuals dying before 20 years of age (non-adults); D20+ = individuals dying at least 20 years of age (adults); D0+ = total individuals; D0-1 = individuals dying before one year of age (infant mortality); D2-4 = individuals dying at more than one year of age and less than five; D5-9 = individuals dying at more than 5 years of age and less than 10; D10-14 = individuals dying at more than 10 years of age and less than 15; D15-19 = individuals dying at more than 15 years of age and less than 20. The totals for sample 1 are not equal because for two young individuals the age was not determined.

The following estimates of the number of burials present in the necropolis of Shahr-i Sokhta, distributed over an area of 20-25 hectares (Sajjadi 2015a) have been made: more than 19,000[2] (Piperno - Tosi 1975); 18,000 (Bonora *et al.* 2000); 22,000 (Piperno 1976); 31,000-37,500 (Sajjadi - Forunzafar 2001; Sajjadi *et al.* 2003); and 37,500-40,000 (Sajjadi 2015a). We decided to use the higher figure, 40,000, which takes account of the more recent excavations in the necropolis.

The population of the necropolis cannot be derived directly from the number of supposed burials, because not all the graves identified are single-occupancy.

2. In reality, on the basis of the data presented in the article, which posits 1 burial every 12.75 m2 in a necropolis 21.5 ha in size, there should be 16,863 burials.

	1 Sample		2 Sample		1+2 Samples	
	n	‰	N	‰	N	‰
$_{19-}D_0$	39	279	108	156	147	390
$_{+}D_{20}$	101	721	129	544	230	610
$_{+}D_0$	140		237		377	
$_{+}D_0/_{19-}D_0$		268		456		387
$_{1-}D_0$	7	51	22	93	29	77
$_{4-}D_2$	9	65	33	139	42	112
$_{9-}D_5$	9	65	26	110	35	93
$_{14-}D1_0$	9	65	5	21	14	37
$_{19-}D_{15}$	3	22	22	93	25	67
$_{+}D_{20}$	101	732	129	544	230	613
$_{+}D_0$	138		237		375	
$_{+}D_0/_{19-}D_0$		268		156		387
$_{14-}D_{10}/_{9-}D_5$		1000		520		250
$_{+}D_5/_{19-}D_5 = D_5$		172		291		243

Tab. 1: raw demographic parameters drawn from: sample 1, Sajjadi *et al.* (2003; 2006) and Lorentz (2008; 2010); sample 2: Macchiarelli - Passarello (1988).

On the basis of the data derived from a sample of 324 burials containing 468 individuals (Sajjadi *et al.* 2003; 2006; 2008; 2015b; Salvatori 2007), there are 282 single burials (87.04%), 34 multiple burials (12.96%) and an average of 1.44 individuals per burial (Fig. 1). Figure 1 shows that the only burial with more than 10 individuals contained 68 individuals, while no other multiple burial contained more than 8. The presence of this burial (n° 2301 in Square IPB) significantly affects the ratio of 1.44 individuals per burial. Indeed, removing it from the sample, the ratio falls to 1.24. Another burial, n°1003 in Square GTT, not included in our sample, contained at least 13 individuals (Piperno - Salvatori 1983), but its inclusion would have not unduly influence the ratio, which would increase from 1.44 to 1.48 if we also count n° 2301, and from 1.24 to 1.27 if we exclude it. Burials with such a high number of individuals as n° 2301 are probably highly exceptional in Shahr-i Sokhta, and its inclusion in the sample to determine the average number of individuals per burial would cause more harm than its exclusion. If we consider 40,000 burials with an average of 1.24 individuals per

burial, we have an estimated total of 49,600 individuals. Even admitting that there are another 10 burials with a similar number of individuals to n° 2301 (i.e. with an average of 60 individuals), the total would be 50,200, corresponding to a variation in the total number of individuals of just 1.01%. If in contrast we use the average of 1.44 individuals per burial, there would be an estimated 57,600 individuals, but if we again suppose the presence of 10 burials with a total of 600 individuals, the correct total would again be 50,200 and we would have thus overestimated the population by 14.7%. For these reasons we shall use the average of 1.24 individuals per burial and 40,000 burials, corresponding to an estimated total for the necropolis of 48,800 individuals.

From Sajjadi *et al.* (2003; 2006) and Lorentz (2008; 2010) we derived a sample of individuals (n = 138) whose age was determined at least qualitatively, i.e. including those classed only as adults (23 out of 138), and on the basis of these we calculated the value of the d-index (Tab. 2).

Before using the calculated ratio, d = 17.21, it is necessary to assess whether it is reliable. To this end we will adopt the criteria proposed by Barbiera and Dalla Zuanna (2007) in their demographic analysis of Italian medieval necropoleis (Tab. 3).

The three criteria are met and we can therefore estimate, using the index, certain demographic parameters of the population being studied. We will use both the “West” and the “South” family models proposed by Coale and Demeny (1983) which are considered the most suitable for populations like ours (Tab. 4).

Life expectancy is practically identical in the two families: 22.4 years for West and 22.3 years for South. Macchiarelli and Passarello (1988) found a similar value, 22.69 years, in their sample of 134 individuals, which are not included among those used by us here, previously analysed by Pardini. Comparison with the data arising from our sample (n = 138) (Sajjadi *et al.* 2003; 2006; Lorentz 2008; 2010) confirms the extreme under-representation of the younger age classes (<5 years), which make up only 116‰ while they should be almost 600‰. In the sample (n = 237) that Macchiarelli and Passarello (1985) derived from Mannucci *et al.* (1985), there are also few individuals aged less than 5 with respect to the almost

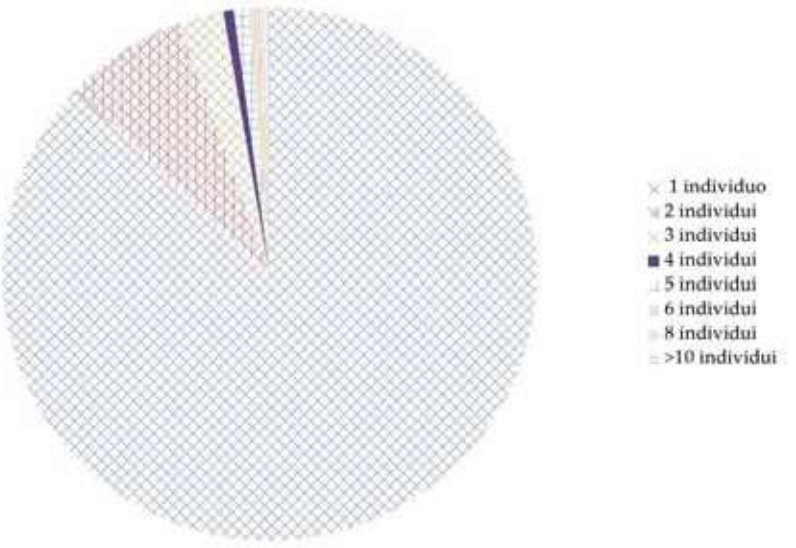

Fig. 1: number of individuals per burial in the necropolis of Shahr-i Sokhta in a sample (n = 290) taken from Sajjadi *et al.* (2003; 2006; 2008).

Age	n°	‰
Newborns	7	51
D1-4	9	65
D5-9	9	65
D10-14	9	65
D15-19	3	22
D20+	101	732
Total	138	1000
D5-19	21	
D5+	122	
D = D5-19/D5+	17.21	

Tab. 2: demographic composition of a sample from the necropolis of Shahr-i Sokhta, from Sajjadi *et al.* (2003; 2006) and Lorentz (2008; 2010) and calculation of the d-index (d = D5-19/D5+), Bocquet-Appel - Naji (2006).

Barbiera and Dalla Zuanna (2007)	Shahr-i Sokhta
30>d>10	17.21
%20> Skeletons of indeterminate age	23/138 = 17%
40<Samplen	138 = n

Tab. 3: criteria for judging the reliability of the juvenile index according to Barbiera and Dalla Zuanna (2007) and values observed in the sample from the necropolis of Shahr-i Sokhta.

d			West	South	Average of samples from Shahr-i Sokhta
17.21	q_0	Infant mortality	345.5	287.9	77
17.21	$_{4}q_{1}$	Mortality from 1 to 4 years	226.6	310.6	112
17.21	$_{9}q_{5}$	Mortality from 5 to 9 years	61.3	74.1	93
17.21	m	Raw mortality	42.4	42.2	
17.21	e_0	Life expectancy	22.4	22.3	

Tab. 4: estimate of certain demographic parameters (in ‰) for the population of Shahr-i Sokhta considering a d index of 17.21 (Bocquet-Appel - Naji 2006), adopting Coale and Demeny's West and South families (1983), compared with the average of the values observed in: sample 1 (n = 138) drawn from by Sajjadi *et al.* (2003; 2006) and Lorentz (2008; 2010) and sample 2 (n = 237) derived from Macchiarelli - Passarello (1985); Mannucci *et al.* (1985).

600‰ expected, despite being double the previous sample, reaching 232‰. If in contrast we consider the values for individuals dying in the 5-9 age group, the percentages observed in the skeleton samples from Shahr-i Sokhta and those predicted by means of the d index are similar, lying between 50‰ and 100‰, confirming the indication derived from the ratio $D_{5\text{-}9/D10\text{-}14.}$

Assuming the maximum estimated number of burials (n = 40,000) and 1.24 individuals per burial (Fig. 2), the necropolis should contain 49,600 conserved individuals, i.e. individuals whose remains are still in a condition that might enable at least a qualitative determination of their age. Of these, considering that children under 5 years of age on average make up 189‰ of the known skeletal samples, we would expect to find the remains of about 9,400 children under five 5 years of age and about 40,200 individuals dying at 5 years of age or over. Based on the estimated number of individuals aged at least five, we calculated the expected number of individuals aged less than five by means of the statistical parameters for West and South families shown in Table 3 obtained using a d index

of 17.21. Considering about 40,200 dead individuals aged at least 5, we would expect to see many more dead individuals aged under five than the roughly 9,400 estimated to be sufficiently well conserved to allow determination of age: about 53,800 and 59,900 for the West and South families respectively, while the total population of the necropolis would be about 94,000 for the former and about 100,000 for the latter (see Tab. 5). The two values are very close and therefore we will use the average of the two, about 97,000.

Considering a population (P) of 97,000 individuals, a duration of use (T) of 1400 years and a life expectancy at birth (e0) of 22.35 years, the average population (pmed) can be directly calculated using the formula

pmed = P*e0/T = 1550

A		Estimated burials	40,000	
B		Individuals per burial	1.24	
C		Population of the necropolis	49,600	
D	q0-4	Individuals aged less than 5 years	18.9%	
E	q0-4	Estimated individuals aged less than 5 years	9,391	
F	q5+	Estimated individuals aged more than 5 years	40,209	
			West	South
G	q0-4	Expected individuals aged less than 5 years	53,800	59,900
H	q0+	Expected necropolis total	94,000	100,000

Tab. 5:
A) Estimated burials, (Sajjadi 2015a); B) Individuals per burial, based on a sample of burials (n = 290) taken from Sajjadi *et al.* (2003; 2006; 2008); C) Population of the necropolis = A) * B)
D) Percentage of individuals aged less than 5 years in the skeletal samples from Shahr-i Sokhta (Tab. 3); E) Estimated number of individuals aged less than 5 years estimated in the population of the necropolis, C) * D); F) Estimated number of individuals aged at least 5 years in the population of the necropolis, C) – E); G) Expected number of individuals aged less than 5 years given an adult population of 46,700 individuals based on the estimates produced using the d index (Table 4); value rounded up to the nearest hundred; H) Expected total population of the necropolis, F) + G); value rounded up to the nearest hundred.

or by introducing a correction factor (k = T/10, Sellier 1989) and using the formula:

pmed = k+P*e0/T = 1689

The population of Shahr-i Sokhta is unlikely to have remained constant during the occupation of the site. Salvatori and Tosi (2001) have published a graph in which the size of the part that was actually inhabited is estimated on the basis of the surface discoveries. Considering an average population of 1550-1700 inhabitants, with an initial and final population of about 75 individuals, we simulated the likely population of the site by supposing that it followed a similar pattern to that of the size of the settlement. We assumed a growing rate of increase of the population in the initial six centuries (i.e. 0.50% in the first two centuries, 0.75% in the next two and 1.00% in the next two), followed by zero growth in the two central centuries and a symmetrical decrease in the six final centuries (Fig. 2). On the basis of this simulation, the population of the site at its zenith would have been about 6800 (average 1550) or 7400 inhabitants (average 1700). These rates of growth are high however. Assuming lower rates, i.e. 0.25%, 0.50%

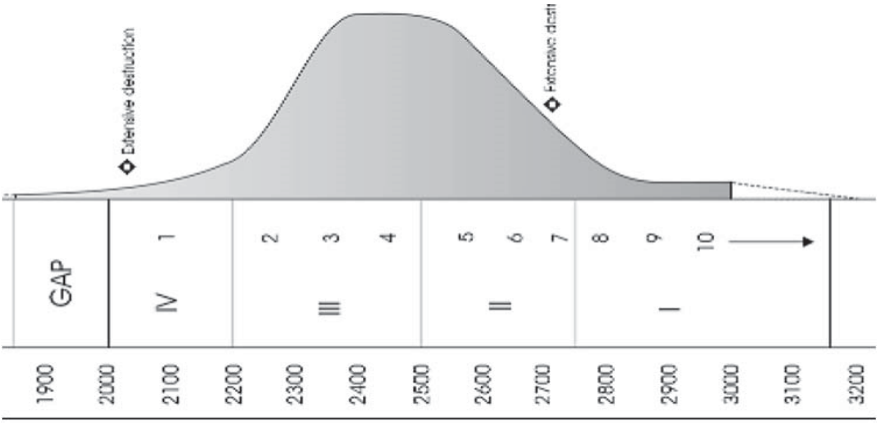

Fig. 2: above: size of the settlement on the basis of superficial discoveries, from Salvatori and Tosi (2001: 189, fig. 12). Below: site population trend assuming that it reflects that of the size of the settlement, starting from an initial population of about 75 individuals and maintaining an average population of about 1550 individuals over 14 centuries. Figures not to scale.

and 0.75%, to obtain the same average of 1550 inhabitants the initial population would have had to be 275 inhabitants, reaching a maximum population of about 5800 inhabitants in the two central centuries. On the basis of these and other simulations we performed, we believe that with a total population of 97,000 for the site's entire duration of 14 centuries, the peak population in the central centuries would have been somewhere between 5000 and 10,000 inhabitants.

The annual population growth rates that we use here are much higher than the reconstructed global average for prehistoric populations, which is about 0.04% (Goldewijk *et al.* 2010; Zahid *et al.* 2016). Having said this, we stress that the latter rate is – precisely – global, calculated for the Holocene as a whole, which cannot be used to describe the population dynamics in specific areas and periods such as those examined here. However, since such high annual rates of increase as suggested here are unlikely to have resulted from the natural intrinsic growth of the starting population (which would have required a considerable fall in infant mortality for example), we must assume that the rapid rise and fall in the population was largely the result of migration between the settlement and outlying areas.

The number of inhabitants per hectare of a settlement is estimated on the basis of the few ethno-archaeological studies of the number of inhabitants in modern-day rural villages in the Middle East. According to Kramer (1979), a Kurdistan village of 15 hectares had a population of 1500-2000, with a density per hectare of 100-133. Based partly on the same data used by Kramer (1979), Aurenche (1981) observed that in villages of more than 10 hectares in size, the average density is 53.3 inhabitants/hectare, but the figure is highly variable (3-181 inhabitants/hectare). Sumner (1989) studied the population of rural villages in the basin of the river Kur in Iran, which have an average density of 160 inhabitants/ha, but here too the variability is high (50-400 inhabitants/hectare). A recent study determined the number of inhabitants per hectare in a small number (n = 3) of rural villages in Sistan today (Abbasi *et al.* 2017), finding an average of 38 inhabitants/hectare, close to the minimum values recorded in previous works. The value recorded in modern villages near Shahr-i Sokhta does not necessarily provide a more reliable estimate of the density of the settlement than the previously cited studies because

the current environmental conditions of Sistan are probably different from those of the period in question.

Estimates of the number of inhabitants of a site based not on the overall size of the settlement but the size of the inhabited area and its subdivision into dwelling units (for which an average number of residents is assumed) generally produce higher population densities than ethnographic methods. Analysing the literature on the topic relative to Mesopotamia, for sites with inhabited areas ranging from 0.3 to 65 hectares in size, Wossink (2009) found densities that varied from 115 to 1050 inhabitants per hectare, with an average of 456.

The settlement of Shahr-i Sokhta was once believed to have occupied an area of about 151 hectares (Piperno - Tosi 1975), although this estimate has risen to 200 hectares on the basis of the ongoing research (Sajjadi 2014a). Considering the higher value, in the two centuries when the population was at its height, i.e. 5000-10,000 inhabitants, a density of 25-50 inhabitants per hectare would be close to the minimum values recorded in the modern-day settlements (Aurenche 1981, Kramer 1979; and Sumner 1989), and would include the value of 38 inhabitants per hectare recorded in the villages of Sistan today (Abbasi *et al.* 2017). Considering only the maximum *built* area, i.e. 120 hectares (Biscione *et al*. 1977), the density would be 41.5-83 inhabitants per hectare, within the variability of the cited samples.

If in contrast we assume the indications regarding the greatest extent of the inhabited area of the site in its final phases (see Ascalone in this volume; fig. 3), and we accept that they indicate the continuing presence of a high number of inhabitants in this period, then the maximum number of inhabitants would probably be close to the lower limit of the range previously proposed (5000-10000 inhabitants).

5. Conclusions

Before tackling the aspects arising from the anthropological analyses performed during the first two excavation and research campaigns at Shahr-i Sokhta, certain considerations of a preliminary and non-exhaustive nature can be made regarding the occupation of the settlement during its lifetime.

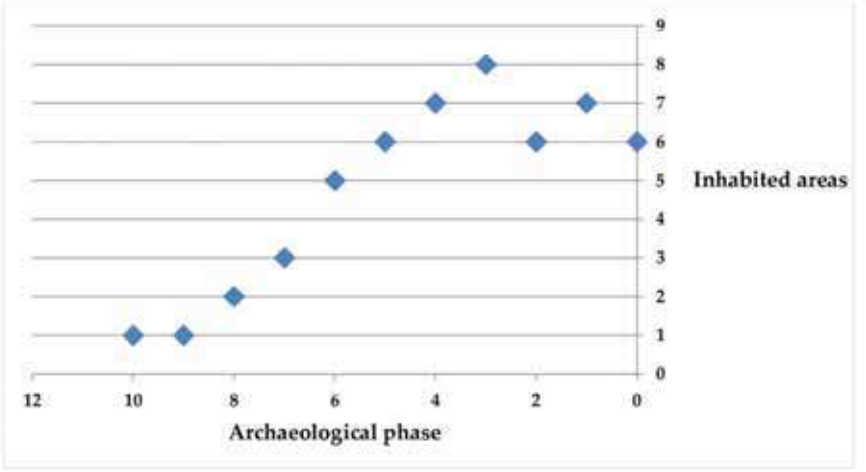

Fig. 3: size of the settlement on the basis of data from Ascalone (present paper).

Preliminary topographical and demographic observations

Despite the successful excavations conducted by the Italian and Iranian missions, the size of the site and the task still remaining make it hard to fully determine the exact extent and topographical organisation of Period I in Shahr-i Sokhta. Phases 10-8 have been verified only in the eastern residential area, specifically in the sequences of the *House of the Foundations*, which have yielded clear references to the material culture of Namazga III and more western Proto-Elamite elements. Period I appears to be absent from all the remaining parts of the settlement, although, as previously mentioned, the virgin soil of the site has not been reached in all sectors. On the basis of the initial analysis, supported by the sequences of the *Central Quarters*, it appears plausible that the passage from Period I to Period II was also marked by a westward shift in the occupation of the site, towards the current depression which in the past is believed to have been a lake, presumably of salt water[3]. The sequences identified have yielded evidence of Periods II and III throughout the settlement, confirming the demographic growth indicated

3. Palaeo-botanical analyses of core samples taken from the depression will be conducted by G. Fiorentino in order to obtain information with which to reconstruct the palaeo-environment of Shahr-i Sokhta and understand the relationship between the inhabited sectors and the depression.

by previous studies, which in the first half of 3rd millennium BC made Shahr-i Sokhta one of the biggest settlements in the Near and Middle East.

However, despite the limited reach of the research and what still remains to be done, the most recent excavations by the Iranian mission allow preliminary considerations on the subsequent period (i.e. Period IV, Phases 2-1) that do not align with what has so far been proposed on the basis of the research conducted in the last century (Sajjadi - Moradi 2017: 167). Specifically, the investigations in Areas 1, 20, 26 and 28, topographically located in the central part of the settlement (between the *Monumental Area* and the *Eastern Residential Area*), seem to show that the settlement of Shahr-i Sokhta was more extensive in its final phases than what has so far been imagined. The assumption that Shahr-i Sokhta in Period IV covered an area of just 5 hectares, as a result of a collapse marking the end of Phase 3 (Biscione *et al*. 1977: 84), does not seem to be at all confirmed by the new Iranian research on the ground. Although not detected on the eastern edge of the depression (the *Central Quarters*, *Building 33* and the *Monumental Area*), Period IV does seem however to have unfolded along the entire central spine of the settlement, greatly exceeding the previous determinations, according to which Phases 2-1 were marked by almost total abandonment (Tab. 6). Period IV is also widely documented throughout the southern area, which was probably used for the processing, transformation and production of stone tools. It therefore seems to have unfolded across a significant area, involving almost all of the main topographical sectors of the site.

These preliminary assessments provide the basis for introductory considerations in a diachronic key regarding the urban development of Shahr-i Sokhta during the 3rd millennium BC. Indeed, although it would be entirely premature to gauge the extent of the settlement during Shahr-i Sokhta I, given the fairly limited nature of the excavations (which were aimed at reaching the deeper layers in the sectors thus far investigated), it does however seem possible to propose that the settlement grew strongly in Periods II and III, whose cultural horizons are present across the surface of the site and in the individual areas investigated. In the same way, the

	10	9	8	7	6	5	4	3	2	1	0
Southern area											
Eastern Residential Area											
Burnt Building											
Central Quarters											
Building 33											
Building 1											
Monumental Area (including Area 20)											
Craftsmen's Quarters											
Area 21 and 26											
Area 28											

Tab. 6: diachronic analysis of the individual excavated areas.

contraction accompanying the transition from Period III to Period IV seems to be extensively documented in Area 33 and the *Central Quarters*, without however confirming the more generalised collapse of the settlement, which, according to the estimates in Salvatori - Tosi 2005 and Biscione *et al*. 1977, saw the inhabited area shrink by up to 94%.

These new estimates concerning Period IV open up new fields of investigation that cannot be tackled here. However, at this point it is legitimate to ask (1) what effectively happened at the end of Period IV when the occupation of the settlement ceased and (2) what exactly prompted the inhabitants of Shahr-i Sokhta, at the end of Period III, to shift the settlement's centre of gravity away from the large central depression, abandoning the buildings of Area 33 and the so-called *Central Quarters*, in a period that is also marked by a drastic change in the settlement's ceramic horizons.

On the basis of what has been written and verified, the radical changes in the pattern of settlement accompanying the passage from Period III to Period IV, the reasons why Phases 2-1 are not found in the eastern sector adjacent to the lake (now a depression), and the reasons for the shift towards the remaining part of the settlement (the central and eastern sectors) will be among the objectives of future research. This research will seek, where possible, to determine whether the aforementioned shift can be explained with reference to changes in the relationship between the settlement and the lake, reflecting socio-economic

developments among the inhabitants and/or groups that occupied the *Central Quarters* and *Building 33*.

Preliminary anthropological observations

Considering the uneven state of conservation of the human remains with regard to age, analysis of the anthropological data associated with the site's only known necropolis suggests that about 97,000 individuals were buried there, and hence that the average population of the site in its 14 centuries of existence was about 1550 inhabitants. Estimates of the settlement's size on the basis of surface discoveries (Salvatori - Tosi 2001; 2005) indicate that the population of Shahr-i Sokhta would have reached a maximum of between 5,000 and 10,000 inhabitants in the centuries of its greatest development. During this period the built-up area of 120 ha would have had a population density of 41.5-83 inhabitants/hectare. Estimating the number of inhabitants of Shahr-i Sokhta with reference to the necropolis produces reasonable results if based on a reconstruction of its real population, but not if we refer only to the number of individuals whose state of conservation allows us to estimate their age. The claims of Peroni (1994) and Bietti Sestieri (1996), expressed without reference to concrete cases, that estimating a site's population from the population of the necropolis generally produces lower estimates than those produced using other methods is probably due to the fact that the conserved population of the necropolis, which apart from exceptional cases, is necessarily lower than the real number of individuals buried there.

Many estimates and hypotheses have emerged in the course of the work and it is not possible to provide an objective assessment of their reliability. We started from the data on the maximum size of the necropolis, which may have been larger than what is believed or what is currently verifiable. As Piperno and Tosi (1975) point out, the southern area of the site, where the necropolis lies, has been affected by intense erosion. We argue that the density of burials, the average number of individuals per burial and the degree of conservation of the bones in the excavated areas can be extended to the whole of the necropolis, but according

to Sajjadi (2005b) the conservation of the bones also depends on the topography. We used palaeo-demographic data obtained from studies by a range of authors using a variety of methods, meaning that the data are not always comparable. We also used palaeo-demographic indicators that should ideally be employed when considering stationary populations, while this was clearly not the case in Shahr-i Sokhta, assuming that in the long term the oscillations would have cancelled each other out. Significant errors in any of these estimates would have grave consequences for the proposed values, which must therefore be understood as rough indications based on the evidence available at the time.

In the future it will be interesting to compare our values with those obtained from other indicators independent of the necropolis, such as the size of the area that was actually inhabited and the number of dwellings in the site, since the use of independent indicators is the best way to obtain more precise palaeo-demographic estimates for a site (Chamberlain 2006).

In conclusion, we share Sajjadi's appeal (2003: 94, note 6) for prudence with regard to estimates of the number of burials *"...all these statistics must be considered only as a temporary attempt..."*, and we advise similar prudence in the use of the figures we propose.

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Preliminary Results of the Study of Animal Remains from the Site of Shahr-i Sokhta, Iran: New Research

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1. Introduction

2017 saw the start of the study of the animal remains from the site of Shahr-i Sokhta (Iran) that were collected in the course of the excavation campaigns conducted by the Iranian Archaeological Mission from 1997 onwards, as an integral part of the Multidisciplinary International Archaeological Project in Shahr-i Sokhta (MAIPS) headed by the University of the Salento (Lecce). The aim was to investigate the exploitation of animals at the site during the period from the 4th to the 2nd millennia BC via the analysis of animal remains, with a view to obtaining a better understanding of the local environment, the economy of the settlement (including animal husbandry and the role of the main domestic and wild species) and the diet of the inhabitants.

2. Materials and methods

The archaeo-zoological analyses in Shahr-i Sokhta were first applied to the animal remains from *Building 1*, located in the so-called Monumental Area of the site (Sajjadi - Moradi 2014). They constituted an ideal sample of fauna due to

both the continuity of use of the building from Period II to Period III of the site and the large quantity of bone materials that it provided. This paper presents some preliminary results.

The study of the animal finds was conducted in accordance with the traditional methods of the discipline. For the scientific nomenclature of the domesticated animals, reference was made to Gentry *et al*. (2004). The distinction between sheep and goat is based on the observations of Boessneck *et al*. (1964) concerning anatomical features (humerus, radius, metapodials, astragalus, calcaneus, phalanges); Kratochvil (1969) for the distal tibia; Payne (1985) for the lower deciduous teeth; and Halstead - Collins (2002) for the lower permanent teeth. The age of death was determined on the basis of the fusion of the articular epiphyses, in accordance with the methods proposed by Silver (1969) for cattle and by Bullock - Rackham (1982) for caprines. Tooth wear stages were assessed with reference to Payne (1973; 1987) for caprines and Grant (1982) for cattle. Bone measurements were performed in accordance with the methods indicated by von den Driesch (1976) and Davis (1992), although they are not discussed here.

In this early phase of the work, just over 1400 animal finds were identified to the level of the species, anatomical feature, age and sex. Small fragments were classified as non-identifiable. Ribs and vertebrae were sorted into three size categories: large (cattle), medium (caprines) and small (hare).

Most of the animal remains were found in an excellent state of conservation, which enables the recovery of fragile tissues such as the keratin encasing the horn. Many traces of gnawing by both carnivores and rodents were observed. The high incidence of these traces suggests that the burial of the materials was a slow process.

3. Preliminary results

The animal remains analysed belong above all to mammals. The other classes of animal such as birds account for a much smaller quantity of remains. Among the domestic species identified were humped cattle (*Bos taurus indicus*), sheep (*Ovis aries*), goat (*Capra hircus*) and dog (*Canis familiaris*). The wild species

included urial (*Ovis orientalis*), wild goat (*Capra aegagrus*), roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), gazelle (Gazella sp.), jackal (*Canis aureus*), mongoose (*Herpestes edwardsi*), long-eared hedgehog (*Hemiechinus* sp.), Indian gerbil (*Tatera indica*) and various birds not yet identified to species level (Tab. 1).

Sheep and goats are the predominant domestic species, followed by cattle; the wild species account for a smaller proportion of the remains.

The composition of the sample analysed to date is consistent with the results obtained by previous studies performed on the animal remains discovered during the excavation campaigns conducted by the Italian Archaeological Mission from 1967 to 1977 (Bökönyi - Bartosiewicz 2000).

Caprines represent the dominant category of domestic animals, accounting for 82%. Sheep are slightly more numerous than goats, accounting for 56% of the caprines identified to species level. The broad variety of sheep horn cores already

	NISP	**%**
Cattle	233	16.4
Sheep or goat	551	38.9
Sheep	268	18.9
Goat	213	15.0
Dog	4	0.3
Red deer	6	0.4
Roe deer	3	0.2
Urial	14	1.0
Wild goat	8	0.6
Gazelle	67	4.7
Jackal	4	0.3
Mongoose	7	0.5
Hedgehog	11	0.7
Rodents	3	0.2
Indian gerbil	1	0.1
Birds	25	1.8
Total	1418	

Tab. 1: number of Identified Specimens (NISP) by species, with relative percentage.

observed in previous studies is confirmed by the new data (Bökönyi - Bartosiewicz 2000: 120). Specimens with short and straight horn cores (turbary) and wide and twisted horn cores (copper) were identified, but to date no specimens of zackel horn cores have been recorded.

The contribution of game animals to the food supply was marginal. The presence of urial, wild goat, red deer, roe deer and above all gazelle has been documented by previous studies (Table 2). The identification of some species, such as red deer, is particularly important for understanding the environment of the settlement. A forest environment typical of red deer probably characterised the area not far from the site. Regarding gazelles, a small specimen that might correspond to the mountain gazelle (*Gazella gazella*), already documented by previous studies (Bökönyi - Bartosiewicz 2000), was identified. However, the new data are still insufficient to exclude the presence of the Persian gazelle (*Gazella subgutturosa*), identified in Shahr-i Sokhta by Compagnoni (1978).

Other wild species identified include the small Asian mongoose, and the long-eared hedgehog. The mongoose lives in scrublands and dry forest, whereas the long-eared hedgehog prefers dry river valleys, gullies, riparian forest, abandoned irrigation ditches and shrubby areas.

Albeit on a purely preliminary basis, the new data seem to confirm the absence of wild and domestic pigs among the animal remains discovered in Shahr-i Sokhta, as suggested by analyses of material from the Italian excavations (Bökönyi - Bartosiewicz 2000: 124). This finding is not consistent with either the presence of numerous clay figurines of pigs or the presence of marshy habitats, forests with dense undergrowth and reed beds, as indicated by the archaeobotanical analyses (Costantini 1979).

The mortality data obtained from the analysis of the epiphyseal fusion of the bones show that the majority of the caprines were slaughtered at least four years of age, with a small part of the remains belonging to animals killed between the first and fourth year of age (Tab. 3). Tooth wear stage data confirm these results, showing that about 30% of the caprines were killed from the first to the fourth year of age and that most of the animals were killed at a mature age.

Taxon	NISP	%
Red deer	6	4
Roe deer	3	2
Urial	14	9
Wild goat	8	5
Gazelle	67	45
Jackal	4	3
Mongoose	7	5
Hedgehog	11	7
Rodents	3	2
Indian gerbil	1	1
Birds	25	17
Total	**149**	

Tab. 2: Number of identified Specimens (NISP) of wild species, with relative percentage.

The results obtained suggest that most of the caprines were butchered after having been extensively used for secondary products (mainly wool), while a smaller group were killed for the direct consumption of their meat (Fig. 1). These data appear to be consistent with the presence of a textile workshop in *Building 1* and with the documented presence of wool fibres and various objects associated with craft textile production (Sajjadi - Moradi 2014). However, this scenario is broadly susceptible to change as the study of animal materials is still ongoing.

Examining the data on epiphyseal fusion in cattle, a high percentage of animals are killed from the first to the fourth year of age, with just 30% of the animals killed after the fourth year of age (Tab. 4). This suggests that the livestock was mainly exploited for meat and only secondarily for the production of milk and as beasts of burden.

4. Burial of a macaque (Tomb 9319)

Discovered in the 2017 excavation campaign on the western edge of square NFA in the central part of the necropolis was a burial of a macaque (Fig. 2). In the same area there were also forty-six human graves, mainly dated to Period II of the site (Minniti - Sajjadi 2019).

	Age	NF	For
Humerus d.	-12 months	0	53
Radius p.	-12 months	0	35
Coxae a.	-12 months	1	45
Scapula d.	12 months	6	25
Phalanx 1 p.	14-35 months	2	49
Phalanx 2 p.	14-35 months	0	19
Tibia d.	35 months	8	39
Femur p.	35 months	11	13
Femur d.	48 months	6	7
Metacarpal d.	48 months	2	32
Metatarsal d.	48 months	5	6
Metapodial d.	48 months	4	3
Tibia p.	48 months	3	8
Humerus p.	48-60 months	1	3
Radius d.	48-60 months	8	8
Ulna p.	48-60 months	3	3
Calcaneus p.	48-60 months	8	19

Tab. 3: frequencies of unfused (NF) and fused (F) bones of caprines (p. = proximal, d. = distal, a = acetabulum). Age categories in accordance with Bullock – Rackham (1982).

The animal was identified as belonging to the Asiatic species *Macaca mulatta* (Zimmermann, 1780) from the upper and lower dental arches with reference to Swindler (2002), and by comparison with photographs of the skulls and jawbones of various species from the reference collection kept in the National Museum of Natural History in Pretoria, South Africa. It was distinguished from the tailless Barbary macaque (*Macaca sylvanus* L.), the only species of macaque to inhabit North Africa, which could have arrived in Shahr-i Sokhta from Egypt, by the presence of several post-sacral vertebrae (four proximal vertebrae and four transitory or distal vertebrae were recorded) in accordance with Russo (2015).

The animal was buried in a simple oval-shaped pit. The skeleton lay on the right side with its body and legs stretched out, and the arms extending forwards, on an east-west axis. Near the skull was an unpainted pear-shaped beaker dated to Period II on the basis of its shape and the paste and temper of the pottery (Buson - Vidale 1984).

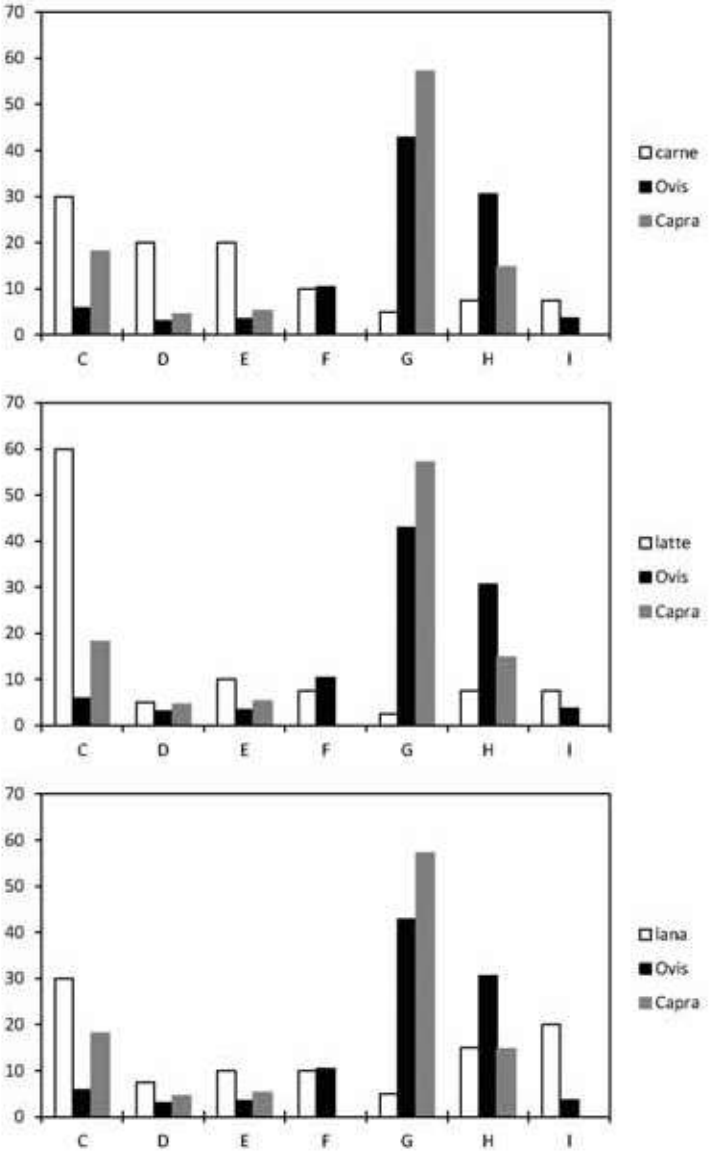

Fig. 1: mortality data for caprines in accordance with the age categories in Payne (1973), compared with ideal values when exploiting the animals for meat, milk and wool (A = 0-2 months, B = 2-6 months; C = 6-12 months; D = 12-24 months; E = 24-36 months; F = 36-48 months; G = 48-72 months; H = 72-96 months; I = 96-120 months).

	Age	NF	F
Scapula d.	7-10 months	1	3
Pelvis a.	7-10 months	0	3
Humerus d.	12-18 months	0	3
Radius p.	12-18 months	1	5
Phalanx 1 p.	18 months	1	14
Phalanx 2 p.	18 months	0	21
Metacarpal d.	24-30 months	1	3
Tibia d.	24-30 months	2	3
Metatarsal d.	24-36 months	2	2
Metapodial d.	30-36 months	2	0
Calcaneus p.	36 months	5	4
Femur p.	42 months	4	2
Humerus p.	42-48 months	2	0
Radius d.	42-48 months	5	3
Ulna p.	42-48 months	1	0
Femur d.	42-48 months	2	1
Tibia p.	42-48 months	2	

Tab. 4: frequencies of unfused (NF) and fused (F) bones of cattle (p. = proximal, d. = distal, a = acetabulum). Age categories in accordance with Silver (1969).

Although the skeleton was found complete and the bones still connected, the state of conservation was poor due to the crystallisation of salts on the surface. The skull and bones at the extremities of the limbs were badly damaged. No sign of combustion was found. Of particular interest is the fact that the macaque was buried in a tomb used mostly for children (Sajjadi 2014: 670), perhaps because of the animal's young age. The age of death is suggested by the stage of epiphyseal fusion and the dental eruption pattern. On the basis of Cheverud (1981), the macaque was determined to be about 5 years old at death. The teeth erupt about 6 months earlier in females than males (Fooden 2000: 39), and the timing of dental eruption and epiphyseal fusion of the skeleton found in the specimen seem to coincide with that of a male. However, no baculum was found and it is not known whether this absence is due to preservation or recovery factors. In the middle third of the diaphysis, on the posterior lateral side, cuneiform and tubular calcified formations growing in a proximal direction were observed on the surface of both

Fig. 2: burial of a rhesus macaque (tomb 9319).

femurs, probably representing calcification of the tendon or muscle insertion. This could be interpreted as a by-product of bone regeneration in response to skeletal injury. A similar condition affecting the diaphysis of both femurs was recently observed in a 6-year-old Javan macaque (*Macaca fascicularis* L.), raised in captivity in the Korean National Primates Research Centre. In this case, histological analysis showed that these anomalous bone formations had been produced by rapid bone regeneration of fractures (Lee *et al*. 2008; Hamada *et al*. 2012; Pritzker - Kessler 2012: 666).

The area of Shahr-i Sokhta does not lie within the natural range of any non-human primate species. Rhesus macaques inhabit central, southern and south-eastern Asia, all to the east of Sistan-Baluchistan (Fooden 2000: 2-7; fig. 21).

It may be readily surmised that the macaque found in Shahr-i Sokhta was brought from the valley of the Indus. Several finds from the site document contacts between the cultures of the Oxus, Jiroft, Hirmand and Indus in the third millennium BC (Cortesi *et al*. 2008; Jarrige *et al*. 2011; Moradgholi - Srivastav 2017). On the basis of Cortesi *et al*. (2008), these relations seem to reflect sporadic contacts, marriages and individual exchanges rather than systematic and specialised forms of long-distance commerce. However, increasing evidence suggests a more nuanced system of relations that gave rise to a process of cultural syncretism between Sistan and the other cultures of the Middle East (Ascalone 2016).

Although no other macaque or monkey species have ever inhabited the Near East or Mesopotamia, they were certainly well known in antiquity. Their presence in the Near East is attested in written sources, as well as seals, plaques and statuettes dated to a period from the 4th to the 2nd millennia BC. The most famous have already been analysed in detail (Dunham 1985; Collins 2002; Greenlaw 2011; Dotan - Regev 2011). A careful analysis of the sources has demonstrated that monkeys were generally considered symbols of prosperity and power, being rare animals, and often were presented as gifts to royalty. In written

texts they were usually listed together with other exotic animal species. They were typically kept as pets, sometimes chained (Dunham 1985: 265, fig. 1). In some cases they were depicted with human features (Dunham 1985: 265, fig. 10), dancing or playing the flute (Dunham 1985: 265, fig. 8), although Sumerian texts use the term monkey pejoratively (Dunham 1985: 242-244). It is also possible that monkeys were used in medical practices, as it was believed that their hairs and bones had curative or magic powers (Dunham 1985: 251).

Some species of monkey may have been imported from Egypt. Representations of non-human primates were certainly common in Egypt during the third millennium, spreading from here throughout the Mediterranean. An example is the statuette of a baboon found in the settlement of El Miqne-Ekron in Israel, dated to the 13th or 12th century BC (Dotan - Regev 2011). It probably represents the sacred baboon (*Papio hamadryas* L.) originating from North Africa and associated with the divinity of the moon. Most representations of primates from the Levant are not easily identifiable to the species level, although there are exceptions (Masseti in print). An example is the small red limestone statuette of a seated monkey found in Susa (Iran), dated to the third period (3100 - 2900 BC), with the characteristics of a rhesus macaque (Aruz 1992: 97, pl. 61).

Discoveries of remains of non-human primates in the Near East are rare. At the moment, some remains, identified as belonging to Barbary macaques and thus plausibly imported from Egypt, are documented in the settlement of Tell Rad Shaqrah (northern Syria), dated to the Early Dynastic Period (2500 - 2300 BC) (Piątkowska - Koliński 2015).

More recently, an incomplete skull of a new extinct species of gibbon was found in a tomb dated to about 2200 years ago in the ancient Chinese capital of Chang'an (Gabbatiss 2018). In contrast, the skull and jawbone of a young Barbary macaque discovered in Constantinople during the excavation of the Theodosius Gate near Yenikapı (Onar *et al*. 2013) are dated to the Byzantine period.

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Tools Made of Hard Material of Animal Origin from Shahr-i Sokhta: Preliminary Analysis

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1. Introduction

This paper sets out the preliminary results of the study of some of the tools made of hard material of animal origin from two buildings (*Building 1* and *Building 26*) and the areas outside them in the Bronze Age settlement of Shahr-i Sokhta. The tools were discovered during excavations conducted from 1997 onwards by the Iranian Archaeological Mission.

The tools analysed are from trenches excavated both inside the buildings and in the areas outside them, and can be dated to Shahr-i Sokhta Periods II and III (2800-2200 BC), considered to be proto-urban and proto-state phases (Biscione *et al*. 1977: 84).

Building 1 (Fig. 1) is of large dimensions and is located in the residential area of Shahr-i Sokhta, where the excavations began in 1999. Occupying an area of about 1600 m^2, it is situated in the north-east corner of Square O, which measures 250x250 m. Six levels of occupation were identified in *Building 1* (levels A-F): the first five are attributable to Periods II and III of the site (2800-2400 BC), while level F can be chronologically assigned to Phases 2 and 3 of Period III (2600-

Fig. 1: Shahr-i Sokhta, general view of *Building 1* (in Moradi 2015: 36 Fig. 1в).

Fig. 2: Shahr-i Sokhta, general view of *Building 26* (da http://shahresokhteh.com/Explain/8/Area_No_26).

2400 BC). Levels D and E contain the most important architectural structures (Moradi 2015: 36).

Building 26 is found in the northern part of the residential quarter (Fig. 2). The excavations have unearthed a series of parallel rooms stretching towards the east and a long corridor.

The building is datable to the final phases of occupation in this area, what has been labelled Period IV (2200-1800 BC) (Salvatori - Tosi 2005: 290).

2. Methods

The methods adopted are based on a detailed analysis of each tool, taking account of the stratigraphy of the finds and their position within the buildings. The study had the following aims:

- Determination of the tool;
- Determination of the species, part of the anatomy and age of the animal from which the tool was obtained;
- Description of the tool's characteristics;
- Assessment of the tool's state of conservation;
- Analysis by microscope of the traces of processing and/or wear;
- Measurement of the dimensions of the tool.

The tools were first sorted on the basis of their typological characteristics, (Camps Fabrer 1979; Camps Fabrer *et al*. 1990a; 1990b) subdividing them into the functional categories of awls, points, handles, plaquettes, necklace beads, pouring sticks and generically "worked bones".[1]

The next step was to identify the part of the bone used to make the tool and the species of origin. These determinations were made with recourse to the relevant reference manuals (Pales - Lambert 1971; Schmid 1972; Barone 1974; Bokony - Bartosiewicz 2000). The genera *Ovis* and *Capra* were distinguished where possible on the basis of the observations made by Boessneck, Müller and Teichert

1. The phrase "worked bones" refers to all those tools that show traces of processing and/or retouching but cannot be included in any specific category.

(Boessneck *et al.*, 1964; Boessneck 1969: 331-358), combined with the studies of Prummel - Frisch (1986: 567-577) and the more recent work by Zeder - Lapham (2010: 2887-2905).

The animals were divided into adults and sub-adults on the basis of the fusion of the articular epiphyses, with reference to the studies by Silver (1969: 283-302; De Grossi Mazzorin 2008) and Wilson, Grigson and Payne (1982).

The description of the tools involved a detailed analysis of each individual morphological characteristic. The distinctive features of each object were described analytically, focusing on the processing techniques and the state of conservation.

The next step was the identification of traces that could indicate the specific techniques used to make the tool and its function. These traces were photographed with a digital *RoHS* microscope with an optimal resolution of 640x480 pixels and a maximum magnification of 500X. The traces identified were determined and classified in terms of the type of contact on the bone, i.e. production; abrasion; use; gnawing (De Grossi Mazzorin 2008).

The last operation in this phase of study was the measurement of each tool in terms of maximum length, width and thickness. For the awls it should be pointed out that when the epiphysis that the tool was made from is conserved, the width and thickness were measured at the point of maximum expansion of the diaphysis: this is because the epiphysis is not the functional part of the tool and its measurement would considerably distort the dimensional characteristics of the object.

3. Bone industry

A total of 112 tools obtained from hard animal material were analysed. Of these, 56 are not from specific buildings, 44 are from *Building 1* and 12 are from *Building 26* (Fig. 3).

Pointed tools are predominant (Fig. 4): the sample analysed is composed of 67 awls (60% of the tools), 13 points (12%), 7 handles (6%), 9 pouring sticks

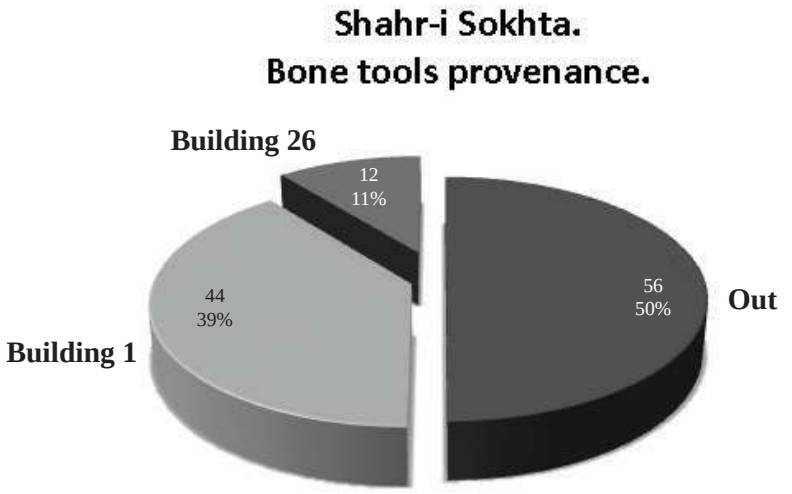

Fig. 3: Shahr-i Sokhta, provenance of bone tools.

(8%), 6 plaquettes (5%), 2 necklace beads (2%) and 8 worked bones of uncertain functional attribution (7%).

Subdividing the sample by provenance (Fig. 5), awls are the most representative objects made of hard material in all contexts.

4. Awls (67)

A total of 67 awls (Camps Fabrer *et al.* 1990a) were analysed, 29 of which were from trenches outside the buildings, 32 from *Building 1* (Periods II and III) and 6 from *Building 26* (Period IV). They were all made from long bones and they exhibit no typological differentiation with respect to the different periods. In those cases where it was possible to determine the species of the animal of origin, only caprines were recognised, distributed as follows: for the external trenches, 17 cases out of 29 (58.6 %); for *Building 1*, 26 cases out of 32 (81.2 %); for *Building 26*, 4 cases out of 6 (66.6 %). It was also possible in some cases to distinguish between sheep (*Ovis aries*) and goat (*Capra hircus*), with a general predominance of the former (Tab. 1).

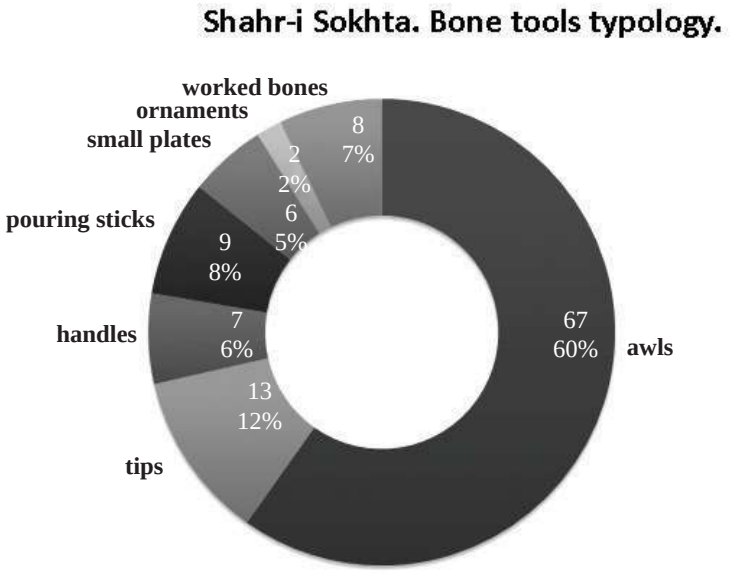

Fig. 4: Shahr-i Sokhta, type of bone tools.

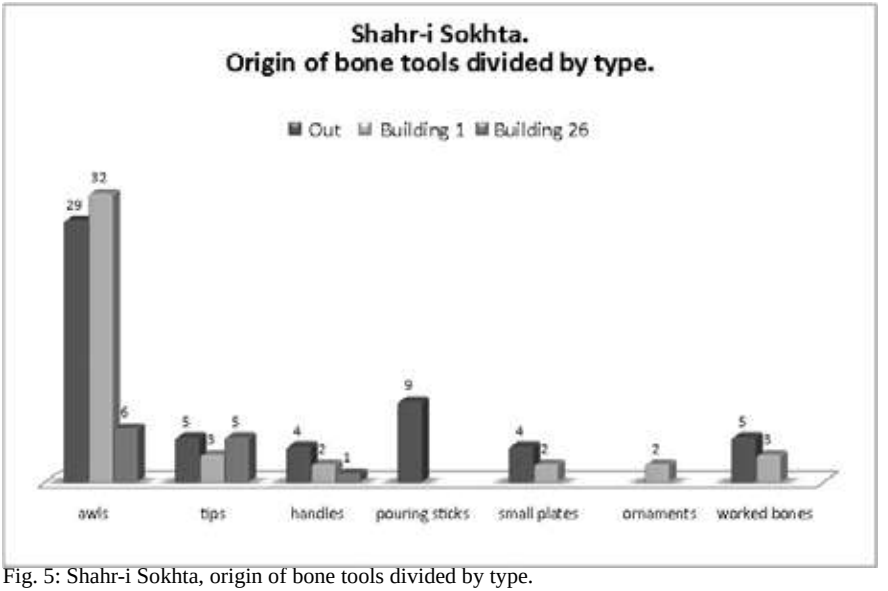

Fig. 5: Shahr-i Sokhta, origin of bone tools divided by type.

Punteruoli (67)						
				Ovis aries	Capra hiurcus	Ovis vel. Capra
		Out		3	2	12
Su ossa determinabili	47	Edificio 1		15	2	9
		Edificio 26		2	1	1
		Out	12			
Su ossa indeterminabili	20	Edificio 1	6			
		Edificio 26	2			

Tab. 1: identification of the species from which the awls were obtained.

5. Points (13)

The points differ from the awls in terms of morphological characteristics, post-depositional fractures, state of conservation and dimensions. In this study it was decided to separate them from the awls because, as they are almost all fragmentary, they might be the extremities of composite tools with handles.

Of the 13 points analysed, 5 are from the trenches outside the buildings, 3 are from *Building 1* and 5 are from *Building 26* (Fig. 9).

They are all obtained from diaphyses of indeterminate mammal bones, and they measure from 20 to 60 mm. In 7 cases the extremity is flattened, sharpened and roughly triangular, in one case elongated cone-shaped and 5 cases sharpened.

6. Handles (7)

This category includes bones that have been carved into a cylindrical shape, polished on both edges, inside which a bone or stone point was inserted. They are considered handles because in some cases, sharpened pieces of bone have been found inside them, having possibly been held in place by pieces of wood (Bulgarelli 1977: 272).

They are all obtained from the long-bone diaphyses of caprines, generally tibiae. Four were discovered in the external trenches, 2 inside *Building 1* and one in *Building 26* (Fig. 10). There is no typological differentiation in terms of the various periods of occupation of Shahr-i Sokhta.

Fig. 6: Shahr-i Sokhta, awls. 1: awl on distal part of O/C metapodial; 2: awl on distal part of *Ovis aries* metacarpal; 3: awl on distal part of *Ovis aries* metatarsal; 4: awl on distal part of O/C tibia; 5: awl on distal part of *Capra hircus* tibia; 6, 7: awls on proximal parts of O/C ulna; 8: awl on undefined long bone diaphysise; 9: awl on proximal part of *Ovis aries* radius; 10: awl on distal part of *Capra hircus* radius.

Fig. 7: burning awls.

Fig. 8: awls with abrasion marks.

Fig. 9: Shahr-i Sokhta, tips.

7. Pouring sticks (9)

The term pourer (Bulgarelli 1977: 272) refers to elongated objects with a semicircular cross-section obtained from the diaphysis of the humerus of a large bird, which was probably used for mixing liquids.

Pourers have been discovered in Shahr-i Sokhta in both urban contexts inside the necropolis as part of the grave goods of burials dated to Periods II and III (Piperno - Salvatori 2007). Studies performed on the bones of large migratory birds (Cassoli 1977: 173-182; Gala - Tagliacozzo 2014: 327-329) including the humeri of greylag goose (*Anser anser*), bar-headed goose (*Anser indicus*), cinereous vulture (*Aegypius monachus*), Siberian crane (*Grus leucogeranus*), steppe eagle (*Aquila nipalensis*), eastern imperial eagle (*Aquila heliaca*) and Dalmatian pelican (*Pelecanus crispus*) confirm the presence of traces of butchering. Regarding the pourers, although the part of the diaphysis used to make the tool and the processing of the bone make it impossible to determine the species of origin, they were probably made from the humeri of the above-mentioned species.

All the pourers analysed in this study are from the excavation of the trenches outside the buildings of Shahr-i Sokhta and are highly fragmentary given their

Fig. 10: Shahr-i Sokhta, handles.

delicate nature. In those cases in which they were retrieved intact or it was possible to reconstruct them, they are rounded at both ends and polished all over. In only one case, the proximal extremity is pointed (while the distal extremity is broken). The edges are carefully polished (Fig. 11).

In only one case, the dorsal face of the tool has nine small circular decorative notches along the longitudinal axis.

8. Bone plaquettes (6)

Some fragments of small bone plaquettes, incised and decorated, were discovered inside the settlement of Shahr-i Sokhta. These small plaquettes can be interpreted as decorative elements, stamps or small gaming counters. Plaquettes made of stone, wood, ivory and bone associated with board games are very common in Iranic cultures (Jarrige *et al.* 2011: 24-25). Such objects are often associated with burials in Shahr-i Sokhta (Piperno - Salvatori 2007).

The objects analysed and attributed to this category are highly fragmentary and poorly conserved. Four are from the external trenches and two are from levels

corresponding to Periods II and III of *Building 1* (Fig. 12). They have geometric decorations with zigzags and concentric circles.

9. Necklace beads (2)

Two small cylindrical objects were interpreted as necklace beads (Camps Fabrer *et al.* 1990b), obtained from the diaphysis of a long bone of a small indeterminate mammal. Found in *Building 1*, they are both intact and polished all over. Tapering along the edges, they have a hole through them and were probably used as ornaments (Fig. 12).

10. Worked bones (8)

This generic term refers to all those bone fragments that have traces of processing but cannot be attributed to a specific type of tool, either due to their fragmentary nature or because they are unfinished.

This category includes 8 items, 5 of which are from the trenches outside the buildings and 3 from *Building 1*. No object of this type was discovered in *Building 26*.

Among the worked bones from outside the buildings, we find:

- a fragment of indeterminate bone with a rounded polished edge, on which small abrasion marks due to processing can be seen;
- a fragment of indeterminate long-bone diaphysis, polished all over, which forms a hollow cylinder polished at one end and broken at the other (possibly a fragmentary handle);
- a fragment of indeterminate bone with a rounded polished edge, on which small abrasion marks due to processing can be seen;
- a fragment of indeterminate long-bone diaphysis, polished all over, cylindrical in shape but tapering slightly towards the proximal extremity;
- a fragment of a bone object, probably circular in shape, polished on both edges and decorated on the dorsal face, with two grooves incised on each side running parallel to the edges.

Fig. 11: Shahr-i Sokhta, pouring sticks.

Fig. 12: Shahr-i Sokhta, small plates (1-6) and ornaments (7-8).

From *Building 1* we have:

– a fragment of sheep or goat horn, polished on one end, flattened and roughly rectangular. It has four holes;

– an object obtained from a fragment of indeterminate long-bone diaphysis, with the back part missing, polished all over and carved to form what was probably a cylindrical ornament. At about a quarter of the way along its length it has a deep polished groove that divides the object into two distinct parts;

– a fragment of indeterminate worked bone with a rounded polished edge and a hook on the rear face. Along the ventral face there are three large almond-shaped notches in an irregular pattern. The distal portion is broken off, making it impossible to determine the object's function.

11. Conclusions

This paper presents a preliminary analysis of a number of tools obtained from hard animal material from Shahr-i Sokhta. The sample analysed comes from two

buildings (*Building 1* and *Building 26*) datable to two different but consecutive phases of occupation (Moradi 2015: 36), while a third group of objects comes from trenches excavated outside these buildings.

In the sample analysed, the processing of the hard animal material appears unsophisticated, aimed at producing a small number of classes of tool, consisting mostly of pointed objects used for perforating or incising fabrics, ceramics and various utensils. Indeed, awls and points predominate in all phases of occupation and every environment analysed. In quantitative terms, these objects are followed by bone handles (also linked to tools for incising or perforating), derived mainly from long bones of caprines, in particular metapodials, tibiae, radii and ulnae.

No technological differences in the creation of pointed objects are observed, attesting to a morphological and typological continuity in production.

A special class of bone tools is that of the pourers, elongated in shape and semicircular in cross-section obtained from diaphyses of humeri of large birds, discovered in both urban contexts (such as the 9 specimens considered in this preliminary analysis) and inside the necropolis (Piperno - Salvatori 2007). Their actual use remains uncertain and is the object of study.

Extremely rare in contrast are ornamental objects. Some bone plaquettes have decorative motifs similar to stone stamp seals discovered in Shahr-i Sokhta and throughout the Middle East from the Mediterranean to the Indus (Tusa 1977: 257).

Another interesting issue is the quantity of objects discovered in the different buildings: while *Building 1* (dated to Periods II-III of the site) (Biscione *et al*. 1977: 84) yielded 44 tools, in *Building 26* (dated to the settlement's final phases of occupation, i.e. Period IV) (Salvatori - Tosi 2005: 290) just 12 objects were discovered. This quantitative difference might be related to a progressive decline in population and a crisis of urban civilisation seen across eastern Persia at that time (Biscione 2008).

However, in order to clarify their use and the degree of specialisation of production, a full analysis of all the bone tools discovered in the new excavations at Shahr-i Sokhta is necessary.

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The Activities of the Laboratory of Archaeobotany and Palaeoecology at Shahr-i Sokhta

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1. Introduction

In 2017, as part of the *Multidisciplinary Archaeological International Project at Shahr-i Sokhta* (MAIPS), the Laboratory of Archaeobotany and Palaeoecology of the University of the Salento began a series of research activities aimed at the systematic recovery of plant macro-remains from the new areas of excavation at the site of Shahr-i Sokhta and the spatial, chronological and stratigraphic contextualisation of the data arising from the previous archaeobotanical research.1 The analyses described in this study focused on the material sampled in the 2017 excavation campaign, in particular from the so-called *Building 33*, a structure 2 characterised by at least three phases of occupation. Two of these phases were structural, corresponding to late Period II and Period III of the site, i.e. 2600/2500-2450/2400 BC and 2450/2400-2350/2300 BC. The building is positioned between the central area of the site of Shahr-i Sokhta to the east and the large depression to the west. The latter probably represents the legacy of what once was a lake inside the site. The archaeobotanical sampling strategies and the objectives of the research were determined by the size of the structure

(which probably had an upper floor), its key position beside the lake and the diversification of the rooms in terms of function, with some of them probably used for the management, storage and processing of foodstuffs.

2. Sampling strategies and methods of analysis

In the course of the excavations of *Building 33* in 2017, systematic sampling was conducted in areas that were potentially interesting from the archaeobotanical point of view, such as ovens and open-air areas. Both sediment and charred plant material were sampled, the latter by naked eye. A total of 12 samples were taken, from the environments corresponding to the most ancient phases of the building (L.15, L.16), the rooms used for the preparation and cooking of food (L.33, L.36), the state rooms (L.4, L.21) and the residential area (L.6). Of particular interest was L.19, an open-air environment linked to both the staterooms and the residential area. It yielded much information regarding the processing of cereals before storage and subsequent preparation as food. Given the mainly sandy nature of the terrain, sediment samples were dry-sieved through 4.0, 1.0 and 0.5 mm meshes in order to recover plant macro-remains in a range of size classes. After selecting the organic component using a stereo-microscope, the plant component was sorted into seeds/fruits, parts of these and combusted woody tissue.

3. Materials and methods

A total of 845 fragments of carbonised woody tissue pertaining to trees and shrubs underwent anthracological analysis. In almost all cases, the remains are characterised by a good state of conservation and good legibility of the anatomic features. In addition, the region's dry climate has enabled not just the recovery of combusted plant material, but also the conservation of fragments of non-combusted wooden artefacts (Costantini 1977b). The anthracological remains were identified with reference to the three fundamental sections of woody tissue. The anatomical features were therefore observed in the three main planes (transversal, tangential and radial), obtained by manual fracture. The diagnostic

elements were examined by inverted microscope (Nikon Eclipse 501) at a range of magnifications (from 100x up to a maximum of 400x). For the taxonomic determination, anatomical atlases of wood[1] and samples of modern vegetation in the area were used.

Regarding the carpological analysis, a total of 109 seeds/fruits or parts of cereal spikelets (chaff remains), all in a charred state, were recovered. The morphological and biometric examination of the remains was conducted in the three fundamental views (dorsal, ventral, lateral) using a stereo-microscope. The taxonomic determination was based on comparisons with carpological atlases[2] and the Laboratory's extensive reference collection of modern plants.

4. Results

Anthracological analysis

Recognition of the anatomical elements still visible on the charred fragments made it possible to distinguish four taxa with non-random spatial distribution, while a modest number of fragments (104) remained indeterminate (Tab. 1).

taxa												
	Locus 4	Locus 21	Locus 19	Locus 33	Locus 36	Locus 6	Locus 13	Locus 15	Locus 16	Locus 28	Locus 45	Totale
Tamarix sp.	122	61	70	2	5	10	10	110	60	15		465
Capparis sp.	22	22	22	2		1	1	78	29	83		260
Populus/Salix sp.	1	1	6					1			1	10
Chenopodiaceae			1			1			4			6
Indeterminati	24	16	37			3	4	10	8	2		104
Totale	169	100	136	4	5	15	15	199	101	100	1	845

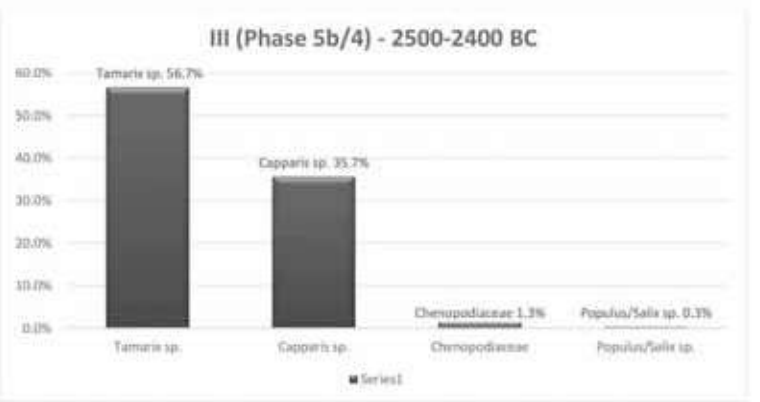
Tab. 1: anthracological analysis of *Building 33* and the spatial distribution of the remains.

The specimens belonging to the *Tamarix* genus have characteristic diagnostic features: distribution of vessels in porous and semi-porous rings, with vessels of medium size, mostly solitary with simple perforations; the heterogeneous rays are very wide (up to 20 cells).

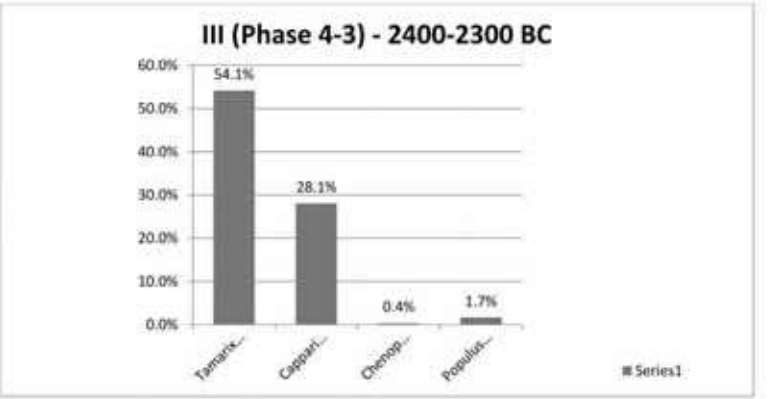
1. Crivellaro - Schweingruber 2013; Fahn *et al*. 1986; Neumann *et al*. 2000; Pajouh - Schweingruber 2001; Schweingruber 1990.
2. Jacomet 2006; Nesbitt 2006.

The *Capparis* genus was recognised on the basis of the rather solitary distribution of the vessels, sometimes present in small groups, simple perforations of the vessels and heterocellular rays from 1 to 10 cells wide.

Populus/Salix was identified on the basis of the semi-porous distribution of the vessels, arranged in small radial groups, simple perforations and monoseriate rays. The distinction between the two genera is problematic due to the limited number of fragments available and the variability of the homocellular or heterocellular character of the cells of the rays.



Graph 1: Anthracological diagram of *Building 33*, phase 3. Period II of the site (Phase 5a)



Graph 2: Anthracological diagram of *Building 33*, phase 1. Period III of the site (Phases 4-3)

The Chenopodiaceae are recognisable thanks to the presence of concentric or foraminate phloem in groups of 2-3, simple perforations and rays that are not easily distinguishable.

The taxa are distributed homogeneously across the two chronological phases attested, with a slight increase in *Populus/Salix* from the more ancient to the more recent phase, at the expense of the Chenopodiaceae (see Graphs 1 and 2):

The spatial distribution of the taxa is characterised by greater variability in the loci pertaining to the dumping of material removed from structures of combustion (L. 4 – L. 21) and charred material in open-air spaces (L.19).

Carpological analysis

All the carpological remains analysed come from a single environment, Locus 19, identified as a courtyard or in any case as an open-air environment. In this central space, on to which several rooms faced, it was possible to recognise caryopses of cereals belonging to various species of hulled and naked wheat (*Triticum monococcum*, *Tr. aestivum/durum*), barley (*Hordeum vulgare* in both hulled and naked varieties) and plants and fruits pertaining to wild and synanthropic vegetation (see Table 2 and Graph 3). Most of the remains of wild plants are of the Chenopodiaceae family, but there are also Graminaceae and a small quantity of grape pips (*Vitis vinifera*). Of considerable importance for the purposes of interpretation is the discovery of chaff remains, a by-product of the processing of grain. The presence of remains of forks, glumes, palea, rachides and fragments of culm, in addition to those of caryopses, makes it possible to better determine the taxonomic variability of the cereals, highlighting the two main species of hulled wheat (*Triticum monococcum* and *Tr. dicoccum*) (see Graph 4 and Graph 5). It also helps to identify the types of processing and the specific function of the spaces.

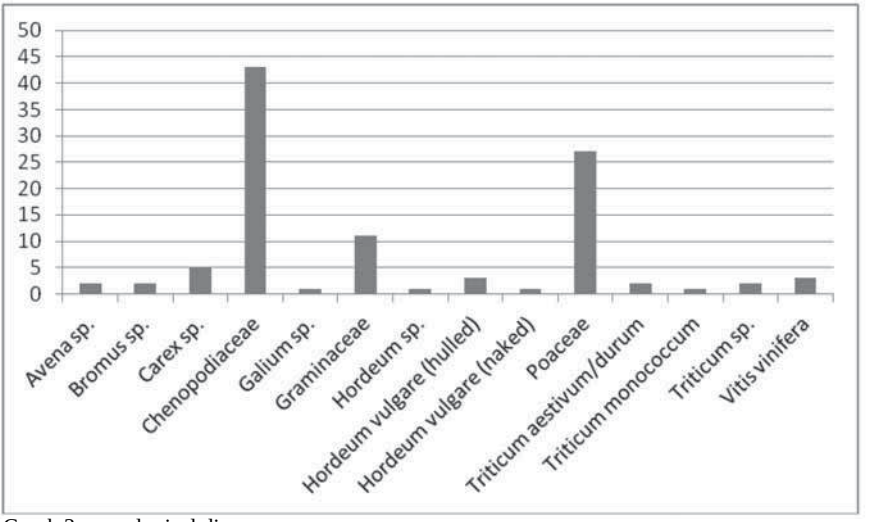
5. Discussion

Despite the reasonable size of the sample analysed (845 charcoals and 109 seeds/fruits), the archaeobotanical analyses conducted to date in *Building 33* have

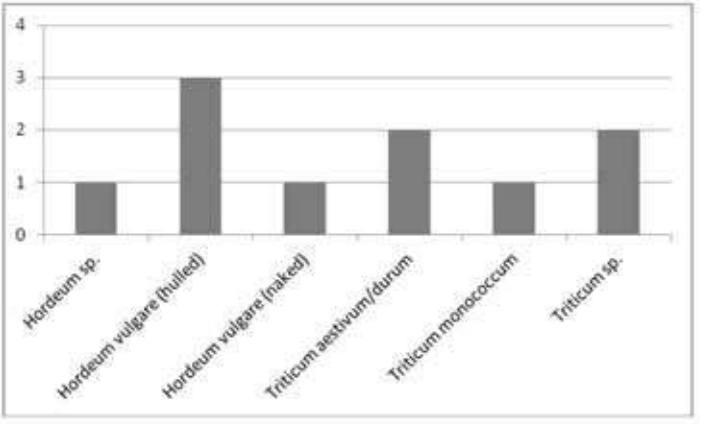
Seeds/Fruits	
taxa	Locus 19
Avena sp.	2
Bromus sp.	2
Carex sp.	5
Chenopodiaceae	43
Galium sp.	1
Graminaceae	11
Hordeum sp.	1
Hordeum vulgare (hulled)	3
Hordeum vulgare (naked)	1
Poaceae (wild)	27
Triticum aestivum/durum	2
Triticum monococcum	1
Triticum sp.	2
Vitis vinifera	3
Undeterminate	5
Totale	109

Chaff remains	
taxa	Locus 19
Hordeum sp.	7
Triticum aestivum/durum	5
Triticum monococcum	17
Triticum dicoccum	1
Cereal culm	3
Undeterminate	2
Totale	35

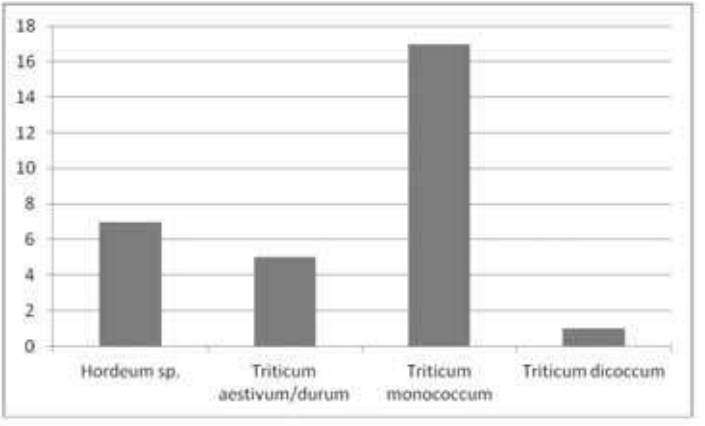
Tab. 2: analysis of the carpological remains and chaff remains from *Building 33*.



Graph 3: carpological diagram.



Graph 4: Taxonomic variability of the caryopses of cereals



Graph 5: Taxonomic variability of the cereals on the basis of the features of the chaff remains

yielded few taxa for the trees and shrubs used as fuel, while greater variability has been found for the plant macro-remains of seeds/fruits.

Despite the limited taxonomic variability of the anthracological analyses, what emerges is a clear distinction between the strictly steppe-type elements characterised by Chenopodiaceae and *Capparis* with respect to plants that are more sensitive to the presence of water such as *Tamarix* and *Populus/Salix*. A similar pattern was also seen in previous anthracological analyses conducted on other areas of the site associated with different phases of the settlement. Specifically, the analyses conducted in 2006 (Shirazi - Shirazi 2012) on charcoals dated to Period II of the site (1218 charcoals) and Periods II-III (264 charcoals) highlighted a gradual shift from vegetation characteristic of steppe environments in Period II to plants requiring greater moisture in Periods II-III. The Period III anthracological data analysed in this study confirm the greater presence of riparian vegetation, indicating progressively higher availability of water in the period 2450-2300 BC. This tendency may be due to the different nature of the archaeological contexts analysed, or the vicinity of *Building 33* to the depression, which functioned as a reservoir. It may also reflect micro-variations in the climate that influenced seasonal rainfall patterns. Although the palaeolimnological analyses conducted in the area of the Hamoun basin (Hamzeh *et al.* 2016) highlighted complex palaeo-environmental dynamics in the course of the mid-Holocene, the chronological resolution of these data does not allow for precise correlation with the various phases of occupation of Shahr-i Sokhta. In this regard, during the 2018 campaign, a pit was excavated inside the depression to the west of *Building 33*, the results of which have yet to be published, in order to gather information on the palaeo-environmental dynamics of this basin in relation to the life of the settlement.

In a semi-desert environment characterised by high temperatures in summer and low average annual rainfall (below 150 mm/year), the presence of more or less stable water resources is clearly a factor of attraction in the cultivation and management of crops. In this regard, the analyses of the plant macro-remains highlighted the presence of a range of cereals (barley and various species

of wheat), which however might also be the result of a complex network of exchange of foodstuffs from other areas. The discovery of the remains of weeds and chaff, a by-product of the processing in loco of cereals, seems however to indicate that they were cultivated in the vicinity of the settlement, in a period when sufficient water was available for rainfed crops and the presence of vines may have been the result of greater water flows in the basin of Hamoun as a whole. The research currently in progress will seek to investigate these aspects more thoroughly, using new methods such as carbon and nitrogen stable isotope analysis of archaeobotanical remains, which has had promising results in arid and sub-arid environments elsewhere (Fiorentino *et al.* 2015).

1 See Costantini 1977 a; 1977b; Shirazi - Shirazi 2012.

2 For a greater understanding of the dynamics associated with the structure called *Building 33*, see in this volume Ascalone (‘Preliminary report on the 2017 excavations in Area 33 in Shahr-i Sokhta’).

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