RETURN TO SHAMI

PRELIMINARY SURVEY OF THE IRANIAN-ITALIAN JOINT EXPEDITION IN KHUZISTAN AT KAL-E CHENDAR

By Vito Messina* and Jafar Mehr Kian**

* University of Torino, ** Iranian Center for Archaeological Research

Abstract

On September 2012, the Iranian-Italian Joint Expedition in Khuzistan started a preliminary survey at Kal-e Chendar, in the valley of Shami (Iranian Khuzistan), a site investigated in 1936 by Aurel Stein after the accidental discovery of a well known bronze statue, portraying a Parthian nobleman, and never visited again. It must have been one of the most important religious places of Hellenistic and Parthian Elymais, and this is confirmed by the present survey, which revealed the presence of monumental terraces, built in undressed stones, decayed structures and tombs over an area extending for about 50 ha.

Keywords

Shami; ancient sanctuary; Hellenistic and Parthian Elymais; GPS survey; undressed stones terraces

I. INTRODUCTION

In 1936, during one of his last journeys through inner Asia, the famous explorer Marc Aurel Stein decided to spend a few days in Kal-e Chendar, a village located in the northernmost part of the valley of Shami (Fig. 1), in nowadays Khuzistan (ancient Elymais). Indeed he was aware of the discovery of ancient bronze and marble statues, broken into fragments, and a well preserved bronze statue portraying a nobleman in Parthian dress, larger than life size and now preserved in the Iran

Bastan Museum of Tehran:¹ these were accidentally recovered not long before, during the foundation works of modern houses, and temporarily kept in the nearby city of Izeh (Mal-e Mir).

During his brief stay, Stein opened a trench in the area where the statues (dated from the Hellenistic to the Parthian period²) were found and brought to light the remains of a rectangular enclosure built on stone foundations, a rectangular baked brick platform and several stone bases, which appeared to be the support of ancient statues now lost. Both the structures and findings seem what remains of an ancient sanctuary, built in a suggestive landscape, while the high quality of the sculpture fragments and statues³ indicate that this must have been one of the most reputed religious places of ancient Elymais, at least during the Hellenistic and Parthian periods.⁴

However, despite the importance of the site and findings, no further research was carried out after Stein's fieldwork terminated, for a small village was built in the area and both surveys and excavations appeared hindered by the presence of modern houses. Given the high interest of the site, the Iranian-Italian Joint Expedition in Khuzistan planned and carried out a preliminary survey at Kal-e Chendar, after having examined the documents of Aurel Stein now preserved in British libraries and archives, and identified the area investigated in 1936, which was preliminary sketched and published by Stein himself.⁵

II. THE STEIN DOCUMENTS

Aurel Stein's report on his 1936 excavation at Kal-e Chendar was published a few years later.⁶ this was based on the notes he took on his diaries almost daily, accompanied by a series of pictures of the fieldwork (of which only two were published) and a contour line map of the area. These documents are now kept in the Bodleian Library, Oxford, and the British Library, London: Stein's handwritten diaries can be consulted on microfilm in the Bodleian Library, where even 11 black and white pictures taken at the site are preserved, while 12 black and white pictures –the same of the Bodleian plus one– are collected in an album shelved in the British Library. According to the published report, Stein remained on the site for a week in January, even if the captions typewritten

on the sheets of the British Library album rather indicate February: the duration of stay on the field is however confirmed by all documents.

At that time, the place where the statues were accidentally discovered was marked by a narrow rectangular trench measuring about 6x8 m, dug down to a depth of less than 1 m with the purpose of laying foundations for the walls of a modern house. The finding spot was shown to Stein, who recognized in the surrounding area the remains of ancient decayed walls in undressed stones, meant to support cultivation terraces in his opinion.⁷ The trench for the modern house was widened and a small rectangular building of about 12.5x23.5 m, of which only the foundations remained, was brought to light. Three stone bases found by the building's south side, and reasonably interpreted as the supports of statues, led Stein to assume that the bronze statue of the Parthian nobleman originally stood inside the rectangular building and that the latter, given the presence of a brick platform (interpreted as an altar), drums or column bases and small altars, must have been a shrine.⁸

The excavation works absorbed Stein almost completely, to the extent that he could survey the site only in a very preliminary way: indeed other ruins and a number of ancient graves were found but not precisely recorded and placed on his map.⁹

In any case, the religious character of the area investigated by Stein can be considered as certain and, even if not extensively excavated and disturbed by quarrying operations, the building unearthed provided interesting information about the latest phase of occupation of the complex: the masses of ashes and burnt wood everywhere found clearly reveal that it was wrecked and burned before have been abandoned in ancient times (probably at the end of the Parthian period). Basing upon the presence and finding spots of burnt wood, Stein proposed that this small shrine was likely roofed with a wooden roof along its four walls and left open to the sky in its centre.¹⁰

Traces of burnt material can be seen on the pictures published by Stein,¹¹ as well as on some of the unpublished pictures; furthermore, two of the latter also show a worker standing by a levelling rod inside the trench, at the end of the fieldwork, and allow the observer to verify that Stein excavated down to a depth of about 1 m below the surface for clearing the rectangular building

foundations. On the basis of this observation it must be stressed that the present ground level approximates the ancient building floor, and this seems also confirmed by the fact that, as reported to Stein by the local dwellers,¹² the sculpture fragments and bronze statue were discovered just below the soil surface. It follows that the building and sculptures unearthed by Stein are what remains of the most recent phase of occupation and that the site must have remained almost untouched up to modern times.

Despite the useful information provided by the research of Stein, many questions remain unanswered on the archaeological context of this cult place, above all concerning its extension and chronology: indeed the building seems undersized if related to the number and quality of the discovered sculptures, while, considering that it laid immediately under the surface, the presence of more ancient structures beneath its foundations cannot be completely ruled out.

III. SURVEY AT KAL-E CHENDAR

The Iranian-Italian Joint Expedition in Khuzistan started the survey at Kal-e Chendar during its 5th campaign, on September 2012, after having completed the excavation of a small open-air sanctuary in the valley of Hung-e Azhdar (1st-4th campaigns, 2008-2011), which is about 22 km south of the Shami valley.¹³ The expedition, co-directed by the present authors, conducts archaeological research on ancient Elymais and operates within the Memorandum of Understanding signed between the Centro Scavi di Torino and the Iranian Center for Archaeological Research: other institutions involved in the project are the University of Torino (Dipartimento di Studi Storici) and the Polytechnic of Torino (Dipartimento di Architettura e Design).

The valley of Shami, extending about 30 km north of the modern city of Izeh (west of the Susan plain), and the village of Kal-e Chendar are clearly indicated by road signs; however it was not easy to locate on the ground the area investigated by Stein: indeed this can be recognized only by the pictures he took while excavating, given that his map –detailed as it is– was not geo-referenced. Fortunately, the valley landscape is characterized by hills, peaks and slopes that are easy to

recognize, even when they appear on the background of excavation pictures, as the comparison between the 1936 photographs and the photographs taken during our first visit in the valley, in November 2009, clearly reveals (Fig. 2). The correct identification of the site is also confirmed by the comparison between the Stein map and a satellite image of the area (Fig. 3), which could have been acquired since local coordinates were determined by GPS.

Once the area was surely identified, the following preliminary activities were planned and carried out in order to open trial trenches and begin, thereafter, extensive excavation:

- conduct remote sensing analysis of satellite images to detect hyperspectral anomalies and, possibly, identify buried structures;
- survey the area and recognize ancient structures and materials;
- geo-reference the site and position with high accuracy the traces recognized;
- derive topography by satellite images and field survey.

Remote sensing analysis focused on non-linear anomaly detection for hyperspectral imagery (based on the RX algorithm).¹⁴ This produced a series of RGB and panchromatic frames of the acquired scene, which evidenced the same regular alignments: in particular, two wide areas –or large structures–, having a polygonal perimeter (and indicated in Fig. 4), became visible to the north of the modern village and west of a modern road running north-southwards at about 980 m asl.

On the basis of the non-linear anomalies detected by satellite imagery, the survey was conducted using non-differential GPS locators over an area of about 0.34 km². The recognized site extends, at least, for about 50 ha, on the west slope of a narrow valley, having the shape of a triangle with its narrower vertex to the west: this is clearly a dejection cone delimited on the north and south by the beds of two streams that flow west-eastwards into a small river delimiting the site on its east side. The dejection cone approximately ranges from 920 to 1040 m asl, gently sloping in its central part, where is crossed by the modern road that is quite parallel to the river's course. To the south, a small

hill rising up to 1070 m asl supports the remains of a very small fortress (qala) of about 210 m². At the hill's foot, at an elevation of about 1010 m asl, a spring having its opening regularized by the placing of cut stone blocks flows into the south stream (Fig. 5).

The surveyed area revealed traces of ancient structures made in undressed stones, which can be generally identified as monumental terraces placed in proximity to each other, at slightly different elevations, following the natural valley slope. Cultivated fields extend over the whole area and are delimited by low enclosures made in undressed irregular stones, which are often superimposed on the remains of ancient walls: for the most, the latter are retaining walls delimiting terraces. At least three terraces have been recognized.

The upper terrace -that we called 'Stein Terrace' and corresponds to one of the areas evidenced by the non-linear anomaly detection- extends for more than 6,000 m², having an irregular quadrangular perimeter and overlooking the south stream (Fig. 6). The comparison between the satellite image of the area and the Stein map clearly indicates that its central part must include the structures investigated in 1936, while its south-east corner is now occupied by one of the eight modern houses that partially overlap the archaeological site. The trench opened by Stein was covered after fieldwork and its limits cannot be easily distinguished at present because the area is cultivated. One of the most impressive ancient retaining walls recognized during our survey is the Stein Terrace south wall, which appears to be more than 90 m long and, in some points, up to 3 m high. Its facade has collapsed, probably in ancient times, but it is possible to see that its lower part is made by a row of huge irregular stones, onto which more regular stones, of smaller size, are arranged in courses. It seems that this wall was built to regularize a natural step between the top of the terrace and the south stream and retain the earth filling of the terrace itself: for this reason, its façade is easy to recognize, being still exposed by the stream's bed. The fact that this wall is ancient is confirmed by the relation it has with the building unearthed by Stein in 1936: indeed the wall retains the same filling into which the building foundations were laid and, for this reason, it could be more ancient but not more recent. The other retaining walls of the Stein Terrace are more difficult to

see, with the exception of the east wall, which can be clearly seen at the terrace southeast corner, where it joins the south wall. In this area, where both the east and south walls have been used as foundations for a modern house, a squared and a rounded ancient column bases (E3 and E4) have been recognized (Fig. 7), together with other ancient stone blocks of masonry, which have been re-used in the walls of the modern houses. A further rounded column base (E18) was found loose on surface. The latter findings are particularly important for they testify to the fact that a monumental building stood on the top of the Stein Terrace, at about 1015 m asl, and generally confirm the preliminary results of Aurel Stein's research. A total of 18 ancient architectural elements have been preliminarily recognized on the ground, over the Stein Terrace and on the surface of the other cultivated fields, or (re-used) in the walls of the modern houses (Fig. 7), as listed below:

E1

32° 3'33.20"N; 49°41'56.10"E

Elev. 1012 m asl

Square broken stone base or lintel: 50.5x50.5(?)x10 cm.

E2

32° 3'33.20"N; 49°41'56.30"E

Elev. 1012 m asl

Stone block of masonry: 35x20x6 cm.

E3

32° 3'33.70"N; 49°41'56.40"E

Elev. 1013 m asl

Stone column base with a pivot hole, decorated with a ribbon on the upper edge: 25x16 (Ø) cm;

pivot hole 13 (Ø) cm.

E4

32° 3'33.90"N; 49°41'56.20"E

Elev. 1013 m asl

Square moulded stone base: 52x52x15 cm (mould 45x4x3 cm).

E5

32° 3'32.20"N; 49°41'56.90"E

Elev. 1003 m asl

Stone block of masonry (?): 52x30x? cm.

E6

32° 3'31.40"N; 49°41'56.40"E

Elev. 1001 m asl

Stone block of masonry (?): 66x34x? cm.

E7

32° 3'31.00"N; 49°42'2.40"E

Elev. 992 m asl

Stone block of masonry (?): 54x32x? cm.

E8

32° 3'31.00"N; 49°42'2.40"E

Elev. 992 m asl

Stone block of masonry (?): 60x40x? cm.

E9

32° 3'30.60"N; 49°42'2.20"E

Elev. 990 m asl

Stone block of masonry (?): 76x40x? cm.

E10

32° 3'30.00"N; 49°42'2.00"E

Elev. 989 m asl

Stone block of masonry (?): 74x30x? cm.

E11

32° 3'29.50"N; 49°42'1.70"E

Elev. 992 m asl

Stone block of masonry (?): 74x30x? cm.

E12

32° 3'23.60"N; 49°41'57.40"E

Elev. 976 m asl

Stone block of masonry (?): 84x51x? cm.

E13

32° 3'44.50"N; 49°41'56.50"E

Elev. 995 m asl

Fragment of stone capital (?): 18x24x28 cm.

E14

32° 3'45.35"N; 49°41'58.45"E

Elev. m asl

Fragment of carved (?) stone: 18x8x8 cm.

E15

32° 3'45.34"N; 49°41'59.72"E

Elev. m asl

Fragment of carved (?) stone: 21x7x3 cm.

E16

32° 3'28.90"N; 49°42'1.40"E

Elev. 987 m asl

Stone block of masonry (?): 78x32x? cm.

E17

32° 3'28.59"N; 49°42'0.79"E

Elev. 987 m asl

Stone block of masonry (?): 70x32x? cm.

E18

32° 3'33.20"N; 49°41'56.30"E

Elev. 1012 m asl

Stone column base with moulded edge: 27x35 (Ø) cm.

The possibility that many other ancient elements, re-cut or broken on purpose, were used during the building of modern houses and enclosures cannot be ruled out. These are indeed surely recognizable when they are in a quite good state of preservation, because of their size –which, as a rule, is larger than the other stones used in the courses of modern walls– and polished surface, but become almost undistinguishable when they are broken into small pieces or re-cut. It will be not surprising to discover that the site, during the ages, was used as an open-air quarry of easy-access stone materials.

Further to the N of the Stein terrace, a smaller squared terrace of about 56x60 m can be clearly seen both from the satellite image of the site and on the ground (Terrace 2). This is next to the Stein Terrace and, despite the fact that its east façade seems about 10 m indented from the east front of the former, they could have been part of the same complex, given that their tops are almost at the same elevation: indeed it is unclear whether their upper surfaces –namely the ground of each terrace– were separated by a wall running east-westward (now completely disappeared) or they were rather a unique monumental building.

About 110 m north-east of Terrace 2, the corner of a third terrace (Terrace 3) still emerges from the present ground level, as well as its well preserved east façade, which seems built following the same technique of the south wall of the Stein Terrace. Terrace 3 is slightly differently oriented, however, for it follows the natural conformation of the ground: its top, corresponding to the second area evidenced by the non-linear anomaly detection, is about 9 m lower than that of the other terraces and revealed the presence of a wide number of baked brick fragments. The terrace size cannot be determined, for its south and west fronts are unknown, but it would be not surprising that, at least westward, it extended up to the feet of Terrace 2.

Remains of other structures of unclear purpose have been even recognized in the northernmost part of the valley slope and also east of the modern road. In particular, the corner in undressed stones of a further small terrace or building can be clearly seen north of Terrace 3 (Fig. 8), while the walls of two other buildings are still preserved south of the north stream, not far from the point where it flows into the river.

During this survey, no potsherds or other artefacts were collected according to the request of the Iranian co-director. In any case, it must be said that surface potsherds are rare, particularly when compared with brick fragments.

It is even noteworthy that, as also reported by Stein, a number of tombs of different types have been recognized. These are located on the whole area surrounding the terraces, but have been particularly recovered east of the modern road. Tombs are underground saddle-roofed chambers built in undressed stones or simple graves, and generally lean against the gentile slopes of the ground, even if they can also be placed against rock cliffs or near the steams. While chambers are easily recognizable in spite of their bad state of preservation, graves can be identified only when they have been completely filled in modern times by rubble and stones with the purpose of avoiding incidents during agricultural works or hide unauthorized excavation. Sometimes, the stones that fill the graves can be part of a collapsed roof. During our survey, 19 tombs have been marked by GPS as listed below, but it must be stressed that their number could have been considerably higher:

T1

32° 3'28.80"N; 49°42'8.84"E Elev. 960 m asl **T2** aside T1

T3

32° 3'28.20"N; 49°42'8.40"E

Elev. 960 m asl

T4

32° 3'27.80"N; 49°42'8.30"E

Elev. 958 m asl

T5

32° 3'31.40"N; 49°42'8.00"E

Elev. 967 m asl

T6

32° 3'29.80"N; 49°42'6.50"E

Elev. 972 m asl

T7

32° 3'38.40"N; 49°41'54.90"E

Elev. 1014 m asl

Chamber in undressed stones, with saddle roof.

T8

32° 3'40.10"N; 49°41'57.90"E

Elev. 1006 m asl

Grave filled by rubble and stones.

T9

32° 3'40.10"N; 49°41'57.90"E

Elev. 1029 m asl

Chamber of 1.5x2.2 m, made in undressed stones.

T10

32° 3'42.30"N; 49°41'59.20"E

Elev. 992 m asl

Chamber of 3.4x.1.7 m, made in undressed stones.

T11

32° 3'42.10"N; 49°42'8.50"E

Elev. 971 m asl

Grave covered by stones and rubble of 1.9x.2.87 m, cutting W-1 of Structure 2.

T12

32° 3'35.90"N; 49°42'9.50"E

Elev. 963 m asl

Two graves filled by rubble and stones.

T13 aside T12

T14

32° 3'35.90"N; 49°42'9.50"E

Elev. 963 m asl

Remains of a chamber?

T15

32° 3'36.00"N; 49°41'47.40"E

Elev. 1035 m asl

Remains of a chamber (1x1.5 m), made in undressed stones.

T16

32° 3'35.90"N; 49°42'9.50"E

Elev. 960 m asl

Grave filled by rubble and stones.

T17

32° 3'35.90"N; 49°42'9.50"E

Elev. 961 m asl

Chamber with saddle roof of 4x1.8 m, made in undressed stones. Almost complete.

718

32° 3'35.90"N; 49°42'9.50"E
Elev. 961 m asl
Chamber (?).
T19
32° 3'35.40"N; 49°42'9.00"E
Elev. 962 m asl
Grave filled by rubble and stones.

All the recovered tombs are heavily disturbed, with the exception of T17, a chamber whose perimeter walls and roof are still almost entirely preserved (Fig. 8).

Among others, three unauthorized trenches, opened in recent times and dug down to a depth of 2 m or more, have been marked by GPS.

IV. CONCLUSION

The preliminary survey conducted by the Iranian-Italian Joint Expedition in Khuzistan at Kal-e Chendar after the hyperspectral anomaly detection of satellite imagery gives clear indications about the wide extension of the site and monumental layout of some of the structures recognized. The latter, which can be seen on the geo-referenced map derived by satellite imagery and field survey (Fig. 9), can be defined as monumental terraces built with the purpose of regularizing the gentle slope of the dejection cone over which they still stand and supporting buildings made in cut stone and/or baked brick.¹⁵ Of these buildings nothing remains but re-used (or loose on surface) stone blocks of masonry, column bases and brick fragments, because their floor must have corresponded, approximately, to the present ground level and it is probable that their decayed walls and columns stood in ruins for a long period, having been progressively plundered over the centuries. However, Aurel Stein's 1936 excavation shows that their layout could be traced on the basis of their foundations, while the wide extension of the terraces that supported them lead to suppose that they must have been large buildings or even complexes of buildings.

The discovery of dedicatory stone or bronze sculptures attests that at least the Stein Terrace supported a temple or sanctuary, while, at present, nothing can be said about the structures recognized over the whole surveyed area, even if the extension of the site –at least 50 ha– appears to be that of a small settlement, grown around the sanctuary itself (as also the presence of a spring, fortress and tombs seems to confirm).¹⁶

On the basis of the recognized structures, it can be inferred that the small enclosure unearthed by Stein was only a very small part of the cult complex built on the Stein Terrace and, probably, not the main building. Furthermore, if its religious character can be considered as certain, it could be hardly interpreted as a shrine in our opinion. The latter assumptions are based on the following observations:

- the rectangular 12.5x23.5 m enclosure unearthed by Stein appears undersized if related to the number and quality of the sculptures discovered;
- it appears too small for the terrace extension;
- the ancient architectural elements recognized seems rather related to a much more great monumental building.

In addition, it seems that this rectangular enclosure was located in a quite peripheral part of the terrace. The trench opened by Stein was not located on the ground, for its limits cannot be easily distinguished. However, on the basis of the comparison made between the 1936 and 2009 photographs, it is possible to estimate that the trench was opened in an area approximately corresponding to the south-east part of the terrace: indeed the landscapes appearing on the background of the 1936 pictures (looking to the south and east of the terrace) can be framed only

from the backyard of the modern house that still stands on the south-east corner of the terrace itself; if the camera is placed on the terrace centre, both landscapes, to the north and east, change.

Finally, the archaeological context described by Stein appears heavily disturbed by quarrying operations and makes his assumption regarding the original placement of the discovered sculptures inside the rectangular enclosure doubtful. Basing on his report it seems more probable that the fragments and bronze statue were accidentally discovered in relatively unstratified layers, having been displaced from their original position in antiquity, during the temple's destruction or soon thereafter. The fact that these statues did not stand inside the enclosure seems also confirmed by the reconstruction proposed by Stein himself: that this small building was likely roofed with a wooden roof along its four walls and left open to the sky in its centre.

It may be supposed that not all the recognized terraces were built for cult purposes and, as stated above, only the Stein Terrace supported a temple: in any case, the building size and monumental setting that can be inferred from the data acquired on its top lead to assume that the sanctuary at Kal-e Chendar could have rivalled those at Majid-e Sulayman and Bard-e Nechandeh.

Acknowledgements

The Iranian-Italian Joint Expedition in Khuzistan is financed by the Italian Ministry of Foreign Affairs and supported in Izeh by the Ayapir Cultural Heritage NGO. If not specified, all images are courtesy of the Centro Scavi di Torino and the Iranian Center for Archaeological Research. The map reproduced in Fig. 11 has been elaborated by Cristina Bonfanti (Polytechnic of Torino). The authors acknowledge the kind support and collaboration of the Directors of the Iranian Center for Archaeological Research and the Research Center of the Iranian Cultural Heritage, Handicrafts and Tourism Organization, in Tehran, Ahwaz and Izeh, the Governors of the District of Izeh and the village of Kal-e Chendar, and all the people of Izeh and Kal-e Chendar. The authors are also grateful to the staff of the Bodleian Library, Oxford, and the British Library, London.

Vito Messina

Dipartimento di Studi Storici

Università di Torino

Torino

Italy

vito.messina@unito.it

Jafar Mehr Kian

Iranian Center for Archaeological Research

Tehran

Iran

mehr_kian@yahoo.com

Bibliography

- Cumont, F. 1939. "Les bronzes gréco-parthes de Shami", Syria 20(2): 167-168.
- Curtis, V. 1993. "A Parthian Statuette from Susa and the Bronze Statue from Shami", *Iran* 31: 63-69.
- Kawami, T.S. 1987. *Monumental Art of the Parthian Period in Iran*, Acta Iranica 26, Textes et Mémoires XIII, Peeters, Leiden.
- Mathiesen, H.E. 1992. *Sculpture in the Parthian Empire. A Study in Chronolgy*, Aarhus University Press, Aarhus.
- Messina, V.and Mehr Kian, J. 2010. "The Iranian-Italian Joint Expedition in Khuzistan. Hung-e Azhdar: 1st Campaign (2008)", *Parthica* 12: 31-45.

2011. "Ricognizione dei rilievi partici d'Elimaide. La piana di Izeh-Malamir", Vicino & Medio
 Oriente 15: 215-231.

Sherwin-White, S.M. 1984. "Shami, the Seleucids and Dynastic Cult: a Note", *Iran* 22: 160-161. Stein, M.A. 1936. "An Archaeological Tour in the Ancient Persis", *Iraq* 3: 111-225.

- 1938. "An Archaeological Journey in Western Iran", *The Geographical Journal* 92(4): 313-342.
- 1940. Old Routes of Western Iran. Narrative of an Archaeological Journey, Macmillan and co., London.

<captions>

Fig. 1. Map of the area of Izeh and the valley of Shami in Iranian Khuzestan (elaborated by V. Messina)

Fig. 2. Comparison between the Stein photographs (after Stein 1940: figs. 52-53), on the left, and those of the Iranian-Italian Joint Expedition in Khuzistan (November 2009), on the right.

Fig. 3. Comparison between the Stein map (after Stein 1940:142, plan 10), on the left, and a GeoEyel scene of the Kal-e Chendar area (© Digital Globe licensed in 2011), on the right.

Fig. 4. Frame of a satellite scene of the Kal-e Chendar area after XR anomaly detection (elaborated by V. Messina)

Fig. 5. Kal-e Chendar. Spring flowing into the south stream

Fig. 6. Kal-e Chendar. The Stein Terrace from the south-west

Fig. 7. Kal-e Chendar. Square column base loose on the top of the Stein Terrace (E4), on the left, and stone block of masonry re-used in the wall of a modern house (E6), on the right

Fig. 8. Kal-e Chendar. Remains of a wall in undressed stones north of Terrace 3, on the left, and saddle roofed tomb in undressed stones (T17), on the right

Fig. 9. Plan of Kal-e Chendar after the survey of the Iranian-Italian Joint Expedition in Khuzistan

¹ This statue is widely published and discussed. See for instance Kawami 1987: no. 8, pl. 11; Mathiesen 1992: 166-167 and related bibliography.

² The first study and chronology of the sculptures from Kal-e Chendar was published by F. Cumont (1939).

³ See in particular Kawami 1987: 59-64, 169-174; Mathiesen 1992: 165-168; Curtis 1993.

⁴ Sherwin-White 1984.

⁵ Preliminary notes on his 1936 journey were published by Stein soon thereafter (1936); (1938).

⁶ Stein 1940: 141-159.

⁷ Stein 1940: 143-144.

⁸ Stein 1940: 144-147, plan 11.

⁹ Stein 1940: 157-158, plan 10.

¹⁰ Stein 1940: 149.

¹¹ Stein 1940: figs. 52-53.

¹² Stein 1940: 144.

¹³ For preliminary reports on the research of the Iranian-Italian Joint Expedition in Khuzistan see Messina and Mehr Kian 2010; 2011.

¹⁴ Non-linear anomalies have been detected on a GeoEye1 orthorectified scene, acquired on purpose in 2011.

¹⁵ The presence of terraces was even reported by Stein, even if in his opinion these were built to support cultivated

fields (see above, note 7).

¹⁶ In this context, it must be stressed, however, that surface potsherds are rare.

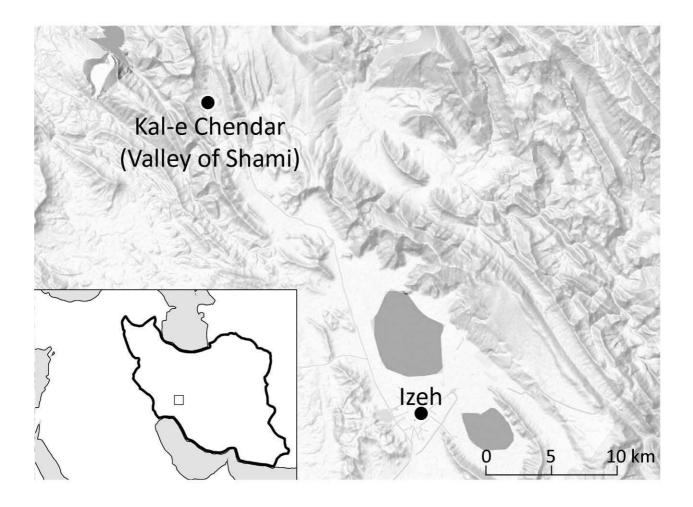


Fig. 1



Fig. 2

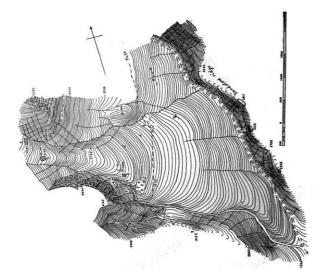




Fig. 3

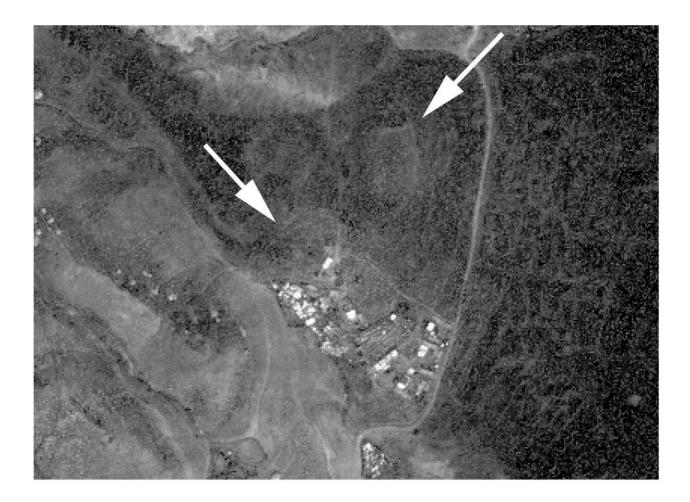


Fig. 4



Fig. 5



Fig. 6



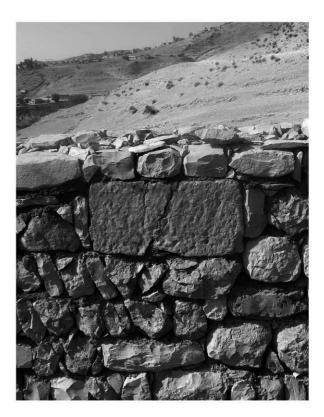


Fig. 7





Fig. 8

