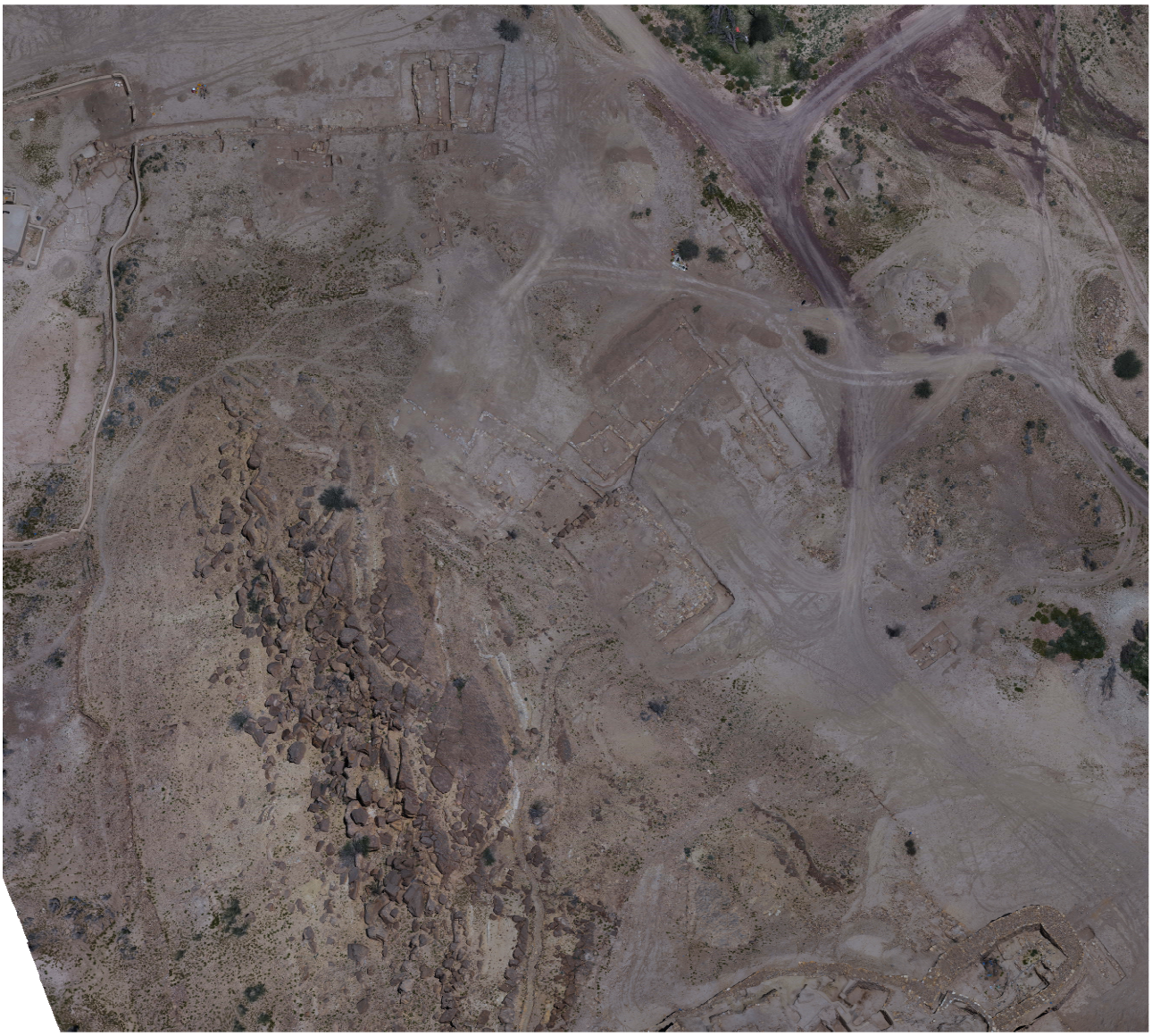
IMTO – Italian Mission to Oman
University of Pisa

Salut

EXCAVATIONS AT QARYAT SALUT (SLQ)

PRELIMINARY REPORT (JANUARY-APRIL 2016)



INTRODUCTION

Following the discovery and the first excavations at the Iron Age settlement associated with and surrounding Husn Salut, now consistently named "Qaryat Salut" and tagged as SLQ, a long campaign of field work took place between January, 14th, and April, 19th, 2016.

Principal aims of the campaign were an evaluation of the site's extension, together with a more accurate investigation of a few contexts in order to get a better idea of the general stratigraphy. Further works concerned testing the archaeological potential of two areas that may be involved in the future development of the archaeological park and visitors' centre.

As a consequence of the substantial enlargement of the excavated areas, of their increased number, and of the widened scope of the project, some renaming took place with respect to the one adopted in the initial phases of last campaign and used in the 2015B preliminary report.

Nine large trenches were either enlarged from previous season or opened for the first time. They are listed as Trench 1 to 9 (tr1, tr2 etc.). As time did not allow the complete extensive excavation of all of them, smaller soundings were opened were appropriate inside them which were named as tr*n*_s1, tr*n*_s2 etc. The extension of the site was tested with the excavation of eight soundings located outside the main trenches, listed as s-ext1 to s-ext8. Finally, s-mus1 to s-mus5 were excavated to test the archaeological remains in the area of a modern farm to the west of the site.
Structures were also listed in a new, unitary list, and this will result in some discrepancy with the former report.

During this campaign, the mission's geoarchaeologist Prof. Cremaschi joined the field work with a focus on rock art and ancient irrigation features. Related preliminary reports are included as Appendixes A and B in this report.

As the publication work for Husn Salut materials and stratigraphy is continuing, the study of animal bones from the so-called basement was started by L. Strolin, as reported in Appendix C.

SLQ_NORTH: THE FORTIFICATION WALL AND ASSOCIATED STRUCTURES (TRENCHES 1,2,3,4,9)

In this area trenches 1, 2, and 4, opened during 2015B campaign, were widened. Near the end of the campaign, trench 9 was preliminarily opened directly inside the Islamic cemetery area. Trench 3 is just a small test trenched excavated in December 2015 inside the main room of the mudbrick house, where no remains was discovered.

Trenches 1 and 2 mainly followed a recent, north-south mudbrick wall that is part of the fence surrounding a mudbrick house restored during the mission's works. Trench 4 instead aimed at following and further exposing wall SU61, i.e. what has been interpreted as the boundary, fortification wall of the settlement towards the north and which runs along an east-west axis.

Trenches and structures location and names in the northern part of the settlement (tr1, tr3, tr4, tr9)

In tr1, excavations were extended in order to chase the poorly preserved foundations of some apparently early walls already discovered in December 2015. These seems to define a possible room (Room 24) for which no consistent floor survives. An oval structure, seemingly a small tank, also cut and removed part of the eastern wall of the room, contributing to its difficult definition, and remains to be investigated. One point is specifically noteworthy: the foundation level of these poor walls rests at the same elevation as that of the large wall SU61. This, as already noted in 2015, would appear to suggest that wall SU61 was not a containment wall for a wide terrace located between it and the hill of Salut itself but a real perimeter wall.

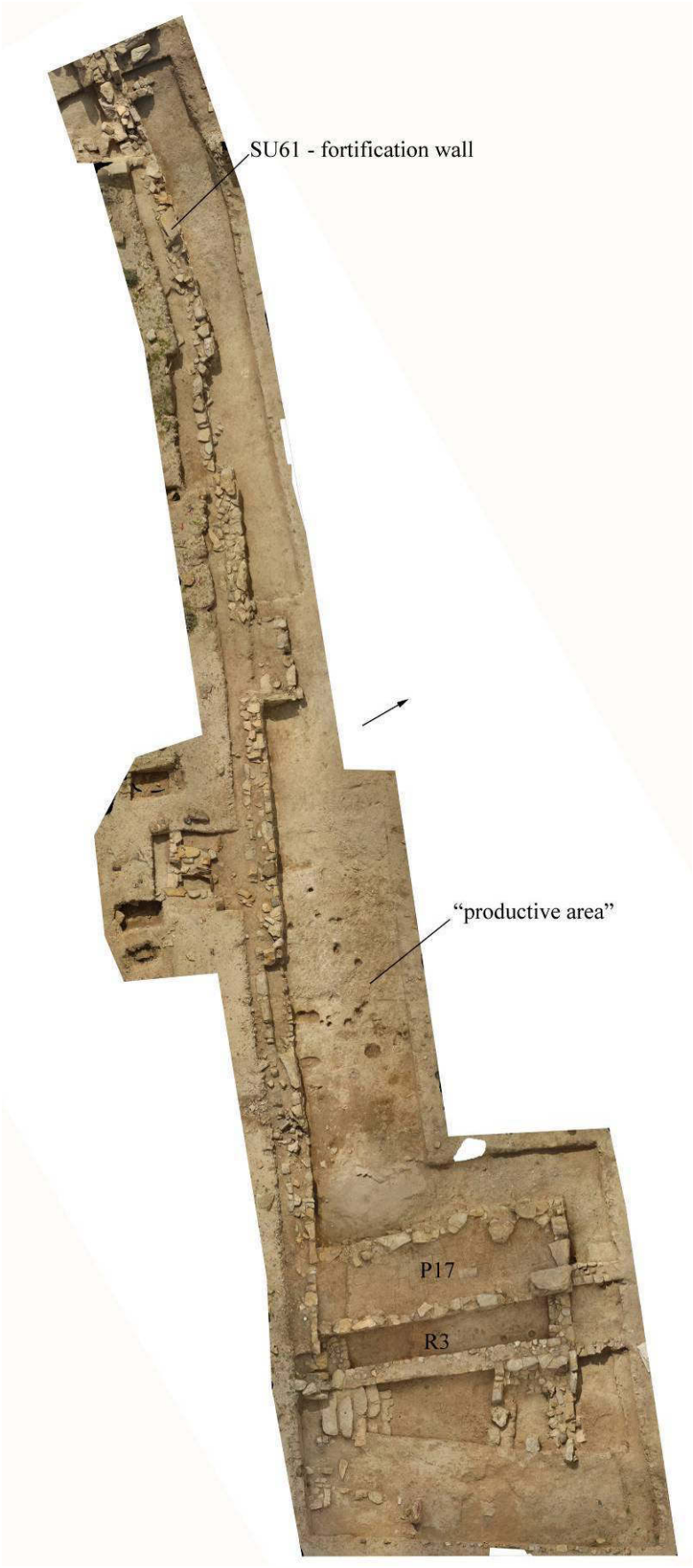
Indeed, the preliminary works carried out inside tr9, as well as the cleaning of wall SU61 surviving crest, cast some doubts on this issue. Although a more accurate cleaning and excavation is necessary, it would in fact seems that the inner (southern) face of SU61 was not meant to be free-standing and visible, rather looking like it was erected against earth. A second possibility is that

what is currently interpreted as a single, multi-facings wall, are indeed two parallel walls the inner of which still lies partly buried.
Be that as it may, the walls unearthed in tr9 all are laid down at a remarkably higher elevation that wall SU61. This can be due to the existence of more building phases, only the higher being so far exposed, or to the existence of a substantial terracing in this area, thus different from the situation in tr2. The latter hypothesis would also mean that a corner or another discontinuity must exist in SU61 separating the part in which it serves as a terrace wall from that where it is a real perimeter wall.

Tr2 showed no presence of surviving archaeological structures. Only several heaps of collapsed stones were unearthed and then remove, significantly in the eastern part or the trench, that is, against the modern mudbrick wall that delimitates it. It thus seems that the main part of the settlement did not reach this strip of flat land.

A view of the so-called "productive area" in tr4. Against the wall SU61 the bottom of large jar F34 is visible, still in situ above the upper occupational surface of the area

In tr4, as said, large part of the effort of this last campaign was directed to the exposure of a wider section of wall SU61, following it eastward in order to get a deeper insight into the overall extension of the settlement. The removal of the massive, northward sloping topsoil accumulations against the wall revealed, beyond a noteworthy "productive area", the so-called Platform 17 (P17).



General view of tr4

It is a large, irregularly rectangular feature protruding northward from SU61, in turn associated to a system of stone walls delimiting some rooms to the north and especially to the east of P17 itself. The trench was interrupted at this point taking account of the fact that slightly to the east of P17 the fortification wall makes a 90 degrees corner bending south. Along with the removal of the upper debris covering the northern face of SU61, its crest was exposed full width.

To the west of P17, a large area was exposed, characterized by the abundant presence of postholes and small pits, many of the latter showing clear traces of fires being lit inside them and also filled with blackened, heated pebbles. While the western limit of this area was identified, to the north it surely extends north of the excavation limit, although probably not over a great length.
This area has been tentatively named “the productive area” during excavation, due to the mentioned presence of baked pits and also to the retrieval in one of them of two fragments possibly belonging to crucibles, as suggested by copper prills attached to them. A spouted cup, inaccurately shaped in a medium coarseness fabric was also found stuck in the floor of the area, and could be a lost, discarded or never used crucible. Moreover, some copper/bronze slag and droplets also came from pits in this area. They were sampled and are currently being analyzed.
These same features are shared by the two occupational levels that could be distinguished in the area. To the upper one belongs the remains of a large storage jar the base of which was found still in situ (find F34). Its function, especially since the area sits outside the settlement, can hardly be connected with food storage. More likely is a function linked with the activities carried on in the area, possibly also as a water reservoir or as a container for raw materials.

The area to the east of P17 was instead characterized by the abundant presence of decayed mudbricks’ clay and widespread ash lenses. Here the systematic investigation of the stratigraphy was started inside an enclosed premise labeled as Room 3 (R3), a later addition which runs parallel to the east side of the P17. In the southern part of R3 the first cleaning of the area highlighted two grave-pits, cut through a late destruction deposit rich in small to medium size collapsed stones (SU90) and a conspicuous layer of decayed mudbricks (SU85), showing that the burials took place after the abandonment of the originary Iron Age structures. This, along with the attitude of the two skeletons found inside (lying on their right side and facing East), the absence of grave goods and the proximity of an Islamic graveyard, undoubtedly identifies the burials as Islamic. Substantial reshuffling of the soil explains why the upper part of the graves went lost and could not be recognized from the surface.

The two skeletons inside graces G1 (left) and G2, very badly preserved.

With the removal of this two buried bodies as well as of SU90, it was possible to highlight a large semicircular fireplace (SU107) placed against the eastern wall of P17 (SU78), partially covered by the already mentioned SU85. This is a substantial deposit originating from the collapse and decay of the upper mudbrick portion of SU82, the stone wall delimiting R3 to the east, and definitively marks the end in the use of the aforementioned fireplace. A few decayed mudbricks still survive above the stone lower part of wall SU82.

Room 3, floor SU115 with postholes and large fireplace (in the background). On the left, wall SU82 is a later addition and SU 115 continues eastward.

The fireplace SU107 was cut through SU114, a compact deposit of mudbrick lumps sometimes rather indistinguishable from SU85 which covers the original clay floor of R3, SU115, and gradually thins out proceeding southward, consistently with the gradual raising of the floor level in that area. The southernmost edge of the fireplace was slightly covered by SU118, a very thin layer with horizontal attitude composed by small mudbricks lumps whose deposition did not hinder its use, as witnessed by the ash and charcoal dispersion on the surface of SU118, likely coming from the fireplace itself. Moreover a poorly made stone wall was built on top of SU118, near the short southern side of the room and parallel to it. The nature and location of this feature suggest some kind of link with SU107, where it can be interpreted as a bench used in relation with the domestic activity likely taking place in that area. Indeed, some indication of the use of this fireplace as a cooking device for food preparation is provided by the recovery of some burned seeds and bones.
With the complete exposure of the well-built floor SU115 it was possible to highlight the presence of some circular postholes and of a semicircular fireplace cut through the same floor, in the northwest corner of R3. Furthermore two elongated and thin, unclear features, were discovered also cut through the clay floor, one of which runs in front of two postholes and bends to encompass one of them. Despite the uncertainty about their function they can hypothetically be seen as shallow foundation cuts for some kind of perishable furniture, where the northern one was potentially related to an entry system.

The area to the east of Room 3 in tr4, with floor SU 115 extending beneath wall SU82 and the staircase visible in the background.

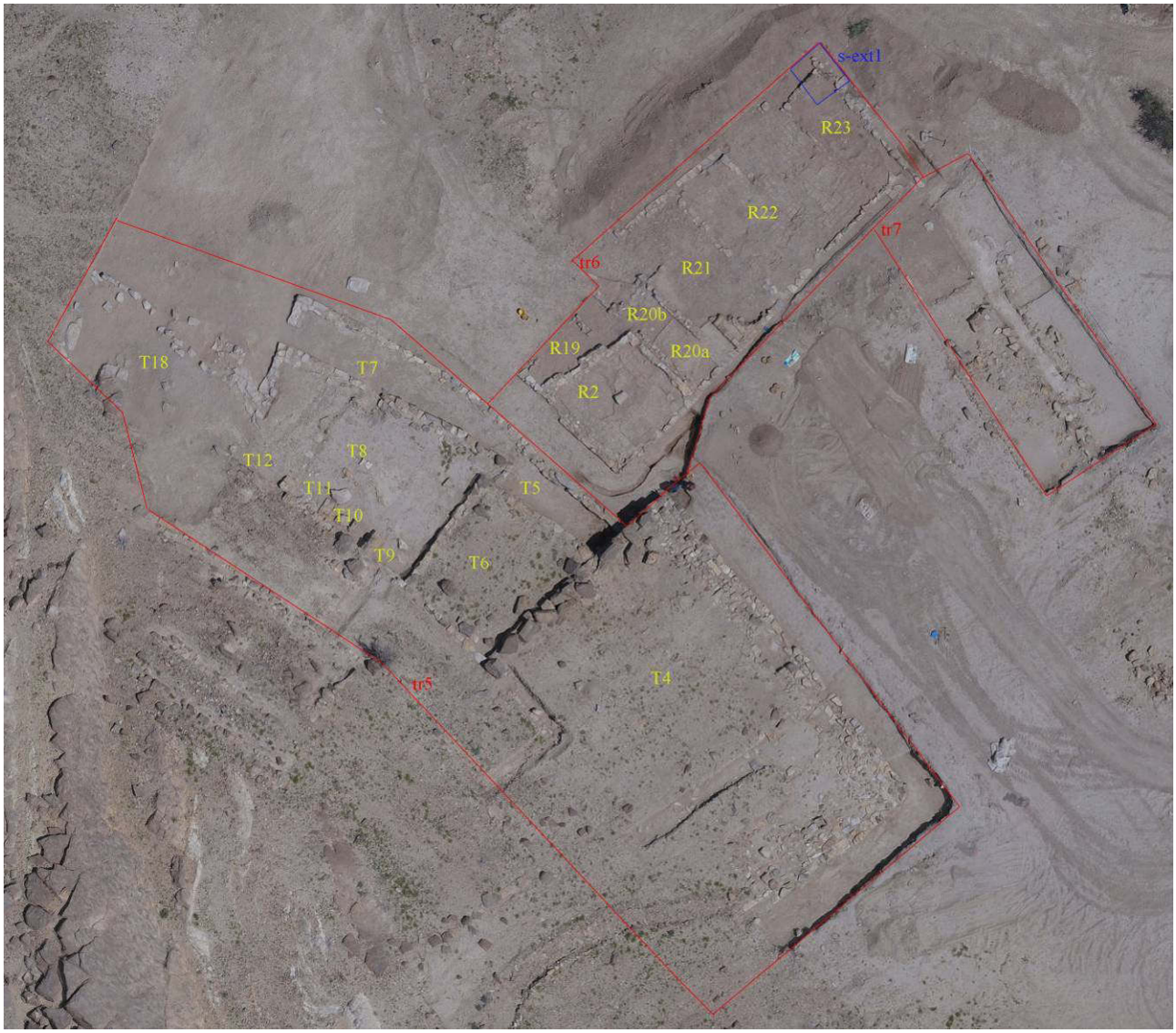
Floor SU115 presents at least two phase of use, the first linked to an original room that was definitely larger. The location of the negative features already mentioned correlates them with the walls which delimit the room to the east and to the north (SU82 and SU80), thus allowing to attribute these cuts most likely to the second phase of existence of the floor. The two walls also are later additions. Beside the fact that SU115 continues below these two walls in fact, the southern part of SU82 lies above a floor surface (SU142) added at a later time to cover a heap of small stones and pebbles in a sandy-clayish matrix, interspersed with traces of pulverized charcoal and characterized by the presence of some ash lenses. This accumulation, comprising different layers, is concentrated in the area just below the fortification wall SU61. Its northward sloping attitude, along with its composition and the rather abundant cultural material (some of which blackened by soot), could suggest an interpretation as a dump layer, possibly resulting from hearths cleaning and removal and hypothetically thrown from beyond or above wall SU61. SU142 follows the sloping attitude of the heap and gradually joins the earlier floor SU115, creating a new built surface.
Outside R3, to the north, other small walls were built in later phases. Their precise stratigraphic position will have to be examined in the future.

Later walls built to the north of Room 3 and Platform 17

Further investigations were conducted to the east of SU82 where some buried walls were visible throughout the untouched archaeological sequence, keeping a section to serve as a reference during the excavation (section 1). The uppermost safe context was SU83, a brown loamy deposit with clay inclusion from mudbricks decay that gave back a few fragments of smelting slag and covered some ash dispersions and a gravel layer rich in small bronze scraps. After its removal it was possible to reach a loose compact deposit rich in small lumps of mudbricks that probably has been exposed for a period of time (erosion-deposition and reshuffling phenomena involve the upper part of it). Its removal lead to the exposure of the western portion of the clay that to the north covers a substantial stairway made up of huge boulders and big size stones (some of which present noticeable pounding signs). The presence of this stairs, apparently leading to a higher part of the site corresponding to the Islamic cemetery area, adds evidence in favor of the presence of an actual terrace, although it could also belong to a later phase and rest over earlier structures collapses.
Floor SU115/SU142 also covers SU113, the southern wall of an earlier premise only partially investigated. At some point after the raising of its perimeter walls, whose stone texture remind that of P17, wall SU82 was built against them. Inside this compartment, below some destruction deposits, it was possible to expose a probable built surface rich in small caliche (?) crumbles embedded in a mainly sandy matrix (SU156), a kind of anthropic surface already attested elsewhere at the site. Anyhow, further investigation will need to be directed to the understanding of this area.

SLQ_EAST: FURTHER REVEALING THE TERRACE SYSTEM (TRENCH 5)

During this season, activities inside this trench were relatively limited. Main objective was extending northward the cleaning of the hill slope in order to find the possible end of terraces T7 and T8. This goal was actually achieved, and a lateral entrance to T7 was also discovered.
Further north, the terraces extends less toward the flat land, and only the poor remains of another terrace wall were unearthed. The layout of this other possible terrace needs to be clarified with further research.
A short terrace wall was also quickly brought to light to the west of this new terrace, laid to span the distance between two parallel rocky outcrops near their northern end.
Minor intervention were carried out on the monumental terrace T4. The most relevant was the excavation of a small sounding (tr5_s2) that exposed a short portion of what could be the eastern perimeter wall of the terrace, in continuity with the north-south wall that backs terraces T6 and T8 (and the small subdivisions of the latter).



Trenches and structures location and names in the eastern part of the settlement (tr5, tr6, tr7)

SLQ_EAST: THE EXTENSIVE SETTLEMENT ON THE PLAIN (TRENCHES 6,7)

In December 2015, the perimeter of an irregularly trapezoidal room now labelled as Room 2 (R2)was exposed. Its excavation only concerned its southern part, where the remains of a large storage jar (find F13) were found still *in situ*. During this campaign, the whole room was excavated down to its mudbrick floor SU 33, through which the jar was set. It seems that this can be the original floor of the room, but a sounding will be excavated through it during next season in order to verify this issue.

The trench was then extended slightly to the northwest, to outline another room (R19) that appears as a late addition or a late re-arrangement of a larger room possibly still to be outlined.

More substantially the excavation was widened toward the northeast. Here, a long alignment of walls, with orthogonal partition ones, defines a series of at least four rooms (R20, R21, R22, R23), all only rapidly outlined in their perimeters (that remains incomplete) and in their floors. The latter are of great interest in that they are mainly made with mudbricks, apparently with the exception of the easternmost room R23.

The floors and the mudbricks were not accurately cleaned and outlined as the area was discovered toward the end of the season, and many questions about the precise structure of these rooms remain open. However, it is already remarkable the fact that the same kind of mudbrick was not used in all the rooms. In particular, the mudbricks used in R22 appear slightly longer and narrower than those used in R2; besides, they have a whitish nuance that may suggest they were made using a different mix that possibly comprised some inclusion of ground substratum, here represented by the same caliche largely exposed at ST1.

One detail in particular that deserves further study, apart from stratigraphic relations among them, is the building technique of these rooms. In fact, apart from the perimeter walls, that anyhow seem to have one single good face – the external one – other smaller walls were partially unearthed that were made with smaller stones laid edge on. At least in a few places (due to the mentioned incomplete cleaning) it seems that these walls are actually covered by the floors mudbricks, and this would mean that more than actual dividing walls they represent internal partition of the rooms compartmented foundations.

SLQ_WEST: THE STRATIGRAPHY BELOW THE "MOSQUE" (TRENCH 8)

Near the southwestern foots of the hill of Salut, right below the massive mudbrick buttress of the Husn, an elevated area showed the remains of a rectangular structure. Standing to the locals, the building was a small mosque used until recent times. As part of other walls also appeared through the sandy sediments covering the "mosque", and a more complicated walls stratigraphy surely lied beneath the rectangular structure, a large trench was placed which comprised the whole building and extended north, south and westward, while it was kept more limited to the east.

The excavation completely revealed the "mosque" (Building 13) structure, comprising two roughly squared rooms the larger of which (R14) occupies its eastern part. A central door in the partition wall gave access to the western room. That B13 actually was a mosque has been debated after showing that the orientation was not precisely in the Mecca's direction; however, the overall structure is convincing and two modern incense burners were also discovered (one complete) that could support this interpretation.

The possible mosque only represents the third (broadly speaking) building phase witnessed in tr8, together with three roughly north-south stone walls two of which abutted against the opposite end of B13's western perimeter wall.

General view of T8

As mapping was pending, B13 has not been removed yet, and it will be at the start of next season. This hampered a more clear view of the underlying phases, some elements of which could anyhow be identified.

The earliest phase can be dated, standing on the rather abundant pottery collected, to the Iron Age, with poorer evidence for a continuation into the late part of the period (or Iron Age III) compared to the other parts of the settlement. Structures belonging to this phase were unearthed to the north of the B13 and comprised a series of stone walls located close to a feature that needs more investigation but that at first seems possible to identify as a cistern. In fact, a bending channel already discovered in December 2015 apparently conveyed water into this structure, but their contemporaneity remains to be proven.

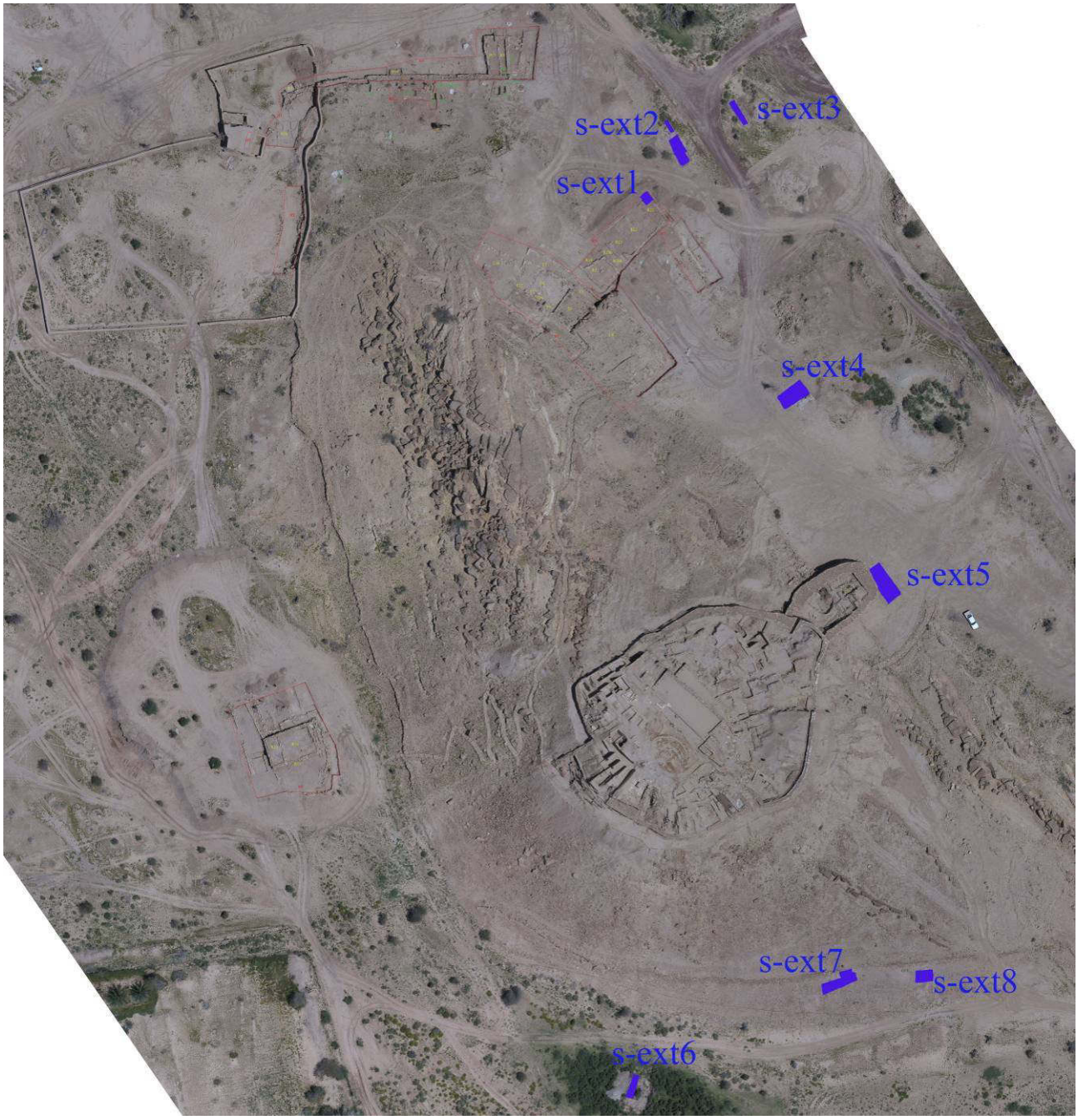
The larger room of the "mosque" (R14)

To a second intermediate phase belongs a long, curved wall discovered at the eastern end of the "mosque". Though at first its plan and the fact that its external face is made with large boulders could suggest it was part of a more ancient, Bronze Age circular structure (a tower?), the stratigraphy investigated so far points to a date at least in the Iron Age. The "mosque" was clearly built after this wall had decayed, and its presence can have influenced the choice of the place on the one hand (for the availability of stones) and its misorientation on the other.

Recent incense burners discovered inside the "mosque"

EVALUATING THE SITE EXTENSION (S-EXT3 TO 8)

Of the test trenches excavated outside the main trenches (but that will in the future become part of new excavation areas), all but one gave back clear evidence of the Iron Age settlement. Here the results for soundings s-ext4 to s-ext8 are shortly outlined, soundings s-ext1 and s-ext2 already being mentioned in the 2015B report. S-ext1, previously referred to as “trench 1”, is now included in trench 6 (see above), while s-ext2 includes former “trenches” 2 and 3.



Location of the test trenches s-ext1 to s-ext8

s-ext3

This sounding was cut to the east of the road that leads to the site, after this splits into two branches one leading north and the other south. Below recent sandy deposits, a more compact layer was hit that contained Iron Age sherds and was directly covering the surviving crests of two parallel stone walls. so far, this is the easternmost point where the continuation of SLQ has been confirmed.

The two parallel walls discovered in s-ext3

s-ext4

Only a few tens of centimetres below the current, sandy and soft surface, the crests of a few walls were unearthed, that even at this preliminary stage can be assigned to two different building phases. However, apart from a C shaped, largely incomplete structure clearly belonging to the second building phase inside this sounding, the layout and nature of the others walls still remains unknown. A complete, large storage jar of typical Iron Age shape and fabric was discovered inside this trench, right in the space delimited by the later walls. The jar was completely buried, and only the rim was visible at the level of the later walls foundation; conversely, the level where it was set seems to be consistent with the earlier walls' elevation, but this remains something to be ascertained with further excavation.

Rectified ortho-photo of s-ext4

The complete Iron Age jar discovered in s-ext4

s-ext5

This sounding was opened against the foot of the main tower of Husn Salut. Here, the presence of small stone walls was also known from previous excavation, and the sounding was meant to slightly extend their exposed portion and to made evident to public that this area also hosts archaeological features that will be in the future revealed.

Walls in s-ext5, against Husn Salut's main tower footings

s-ext6

Located to the south of the hill, this sounding was aimed at the re-opening of a sounding cut during 2015A campaign, where the remains of a fireplace had been located, associated with Iron Age pottery. Actually, while the burned stuff was relocated, the trench was cut deeper in order to reach the geological substratum and this revealed that a deep channel had been cut in this area. Clearly, there is no mean to determine the channel (or cistern) orientation from this small sounding. A glazed fragment was collected from the trench, that apparently can be dated to the Islamic period but requires more study.

View of the deep trench in s-ext6, looking southwest

s-ext7

This sounding actually only consisted in the cleaning of a portion of an east-west wall located at the base of the southern slope of the hill, in an area densely scattered with Iron Age sherds.

The poorly preserved wall unearthed in s-ext7

s-ext8

The last excavated sounding is the one that gave back the most unexpected results. Here, a large boulders structure was chosen for investigation as it indeed looked like a possible grave.

Its excavation confirm this interpretation, the structure being laid down inside a shallow cut through the hill's bedrock; the grave was labelled as Grave 13. What was not expected was instead the fact that on the basis of the artefacts collected, the tomb has to be better dated to the Early Bronze Age. As a result of looting and reshuffling, only a few scattered bones belonging to at least two individuals and up to four (anthropologic analysis will take place during next season) were retrieved in the mixed backfilling of the grave. Together with them however two almost complete (one actually complete) soft stone vessels were collected, whose shape and decoration leave no doubt about their date.

Rectified ortho-photo of G13 in s-ext8.

One of the two stone vessels discovered in the reshuffled filing of G13

Nizwa, April 20th, 2016

Michele Degli Esposti
Marzia Sasso
Enrica Tagliamonte
Philip Ramorino

ROCK ART IN THE AREA OF NIZWA. A PRELIMINARY REPORT

Mauro Cremaschi

1 - Introduction

Upon the request of the Office of HE the Advisor to HM the Sultan for Cultural Affairs (Muscat), I have been charged by prof. Alessandra Avanzini , director of the IMTO, to investigate the rock art in the area of Salut, in order to evaluate its significance, chronology, consistence, and state of preservation, in the perspective to insert it and promote it in the project of the Archaeological park of Salut. Furthermore, I have also been requested to provide a preliminary evaluation on the state of preservation of the well-known rock art site of Hasat Bin Salt.

2 - Results of the survey in the area of Salut

24 rock art sites, corresponding roughly to one hundreds single engravings, have been discovered and located in the surrounding of the Salut citadel on the eastern margin of the fluvial plain of wadi Sayfam (fig.1). The sites are distributed at the base of the western slopes of the limestone hill of Salut, of the one close to the Bronze age monument ST2, and of Jabal Salut.
The petroglyphs are carved on the surfaces of rock outcrops of facing and on the large boulders collapsed at the base of them. Boulders with rock art often have stone circles and shallow walls at their bases, indicating their particular role in the archaeological landscape as for instance acting as land marks (fig.2). Engravings were also recorded on the stone blocks of archaeological monuments, as at the ST2 Bronze Age Monument and the archaeological wall, delimiting the base of Jabal Salut.
Petroglyphs (Appendix 1) occur isolated or in groups composed of a few figures; in a few cases they occur in dense clusters of superposed figures as for sites 17 and 19 (fig.3).
The subjects represented consist of very schematic figures including animals and humans (anthropomorphic figures, often holding weapons, camels, horses, horsemen, snake) and in few cases abstract symbols. The engravings were almost obtained through an hammering technique. However, dissolution features and patina on their groves, different states of preservation of the stone surface on which petroglyphs occur and superposition of figures of contrasting physical state permitted to distinguish three different rock art groups and styles, possibly of different ages:
1 - Horses and fighting horsemen, some dromedaries also occur in this group (fig.4). The petroghlyphs are obtained through light hammering; patina is almost absent ore very thin; some Arabic writing is often associated with this group.
2 – Warriors with open legs and open harms, wearing a dagger, sex in evidence (fig.5; fig 8). The petroglyphs are obtained with heavy hammering, are covered of a dark patina and are affected by strong dissolution processes.
3 - Standing men holding halberds, sex in evidence (fig.6) . The petroglyphs are obtained with heavy hammering, they occur on weathered surfaces, and are often covered with iron oxide patina deriving from microbiological activity. Standing halberds also occur alone (fig.7), without associated anthropomorphic figure and in this case they may have light patina, but are generally in a corroded state.
By a stylistic point of view the rock art observed around Salut may be compared with similar engravings observed in other localities of Oman and of the Arabian peninsula. It is interesting that the ‘ Animal style’ is not represented in that area as it is related to oldest cultures (Mesolitic, Neolithic ?) not represented on the spot.
According to the classification of Fossati (FOSSATI A. F. 2015, *Rock Art in Jebel Akhdar, Sultanate of Oman: An Overview*, in Keyser J.D., Kaiser D.A. (eds.), *American Indian Rock Art*,

ARARA, Vol. 41, pp. 1–8) the rock art of Salut fits in groups 3 and 4, which are attributed to later archaeological periods .
However, the study of the patina and of the state of corrosion of groves has permitted a better dating of Salut rock art, further supported by a good knowledge of the local archaeological context. On the basis of these characteristics, group 1 - Horses and fighting horsemen - appears to be rather recent and may date from the Islamic era up to modern day, while group 2 - Warriors with open legs and open harms – and group 3 - Standing men holding halberds - are to be attributed to oldest periods, which may range from the Bronze to the Iron ages.

3 - Survey at Hasat Bin Salt

The Hasat bin Salt site is the most famous piece of rock art in Oman, and consists of a boulder naturally shaped as a gigantic standing stone, emerging from the gavel of a wide wadi bed , at the base of a towering rock peak, along the road from Bahla to Al Hamra. A set of life size figures realized in bas relief are on the southern face of the boulder , three/four meters from the present soil surface, while at its base , the stone is covered by recent horse and horseman engravings and writings. The figures have been the subject of a long discussion about their age and cultural meaning (see for instance Cleuziou S., Tosi M. 2007, *In the Shadow of the Ancestors. The Prehistoric Foundations of the Early Arabian Civilizations in Oman*. Ministry of Heritage and Culture, Muscat, Oman) . Our attention is focused on the state of preservation of monument.
The figures have been carved through hammering on a nodular limestone breccia (limestone angular blocks cemented by limestone) which is inhomogeneous and crossed by many small fractures, with detaching stone slabs that at present appear to be in unstable equilibrium. This inhomogeneity make often difficult to identify the outline of the figures. Also at a larger scale, the boulder is dissected in several parts by vertical fractures.
Apart from three large vertical bands of iron oxides, the surface of the rock does not display patina but it appears to be heavily corroded by dissolution processes. These affect also the surface of the engravings and are critical to evaluate the age of the monument.

4 - The preservation of the rock art features

The rock art sites of the area of Salut do not have threats deriving from the environmental setting. They survived for more than thousand years to the climatic and environmental changes and they may survive in the future for a comparable time span.
A different problem arise with the Hassan Bin salt monument. The dissolution acting on the surface of the rock will further damage and, in a long perspective, completely erase the figures. While this process may ask a long time, the visibility of the monument will drop year by year, and an effort should be done to preserve the present state of the monument without waiting further decay. This may be done conducting a detailed 3D survey (by laser scanner for instance) aimed to the production of a life size model or mold, which may be exposed in a protected environment as a museum hall.
In both areas, Salut and Hasan Bin Salt, the main threat that endangers the preservation of rock art, is not the environment but is the human impact. Recent artificial breakages and writings by hammering and paintings can be observed almost at all location, often associated with heaps of trash. However, these threats cannot be mitigated by means of physical protections as fences, roofs and other barriers. The remedy for them falls into the educational level persuading people that rock art represents an important part of their cultural heritage and of their national identity, and, as such, it has to be respected and preserved.

This goal may be reached in within the archaeological park of Salut, keeping the area of each sites clean and connecting them with structured tracks along a visit itinerary, implemented with tracing routes and educational boards.
The same applies to the Hasat Bin Salt area: its scientific and historical relevance, together with the outstanding beauty of the landscape, make it worthy to be included in a specific archaeological park area.

Nizwa, April 6th, 2016

Prof. Mauro Cremaschi – University of Milan

Addendum 1 - LIST OF THE ROCK ART SITES IN THE SURROUNDINGS OF SALUT

Coordinates (latitude / long ; degrees, minutes and seconds)

1 - 22 44 50,1 / 57 14 00.6; anthropomorphic figures and dromedaries , no patina
2 – 22 44 44.8/ 57 14 05.0; mythical animal , corroded patinated
3 - 22 44 39.7 / 57 14 16.9; anthropomorphic figures , corroded, patinated
4 – 22 44 39.5 / 57 14 13.4 ; horse and knight , no patina
5 – 22 44 39.6 / 57 17 13.5; at least two anthropomorphic figures , corroded, patinated
6 – 22 44 45 / 57 14 06.5; horses and knights , no patina.
7 - 22 44 45 / 57 14 06.5; halberds and figure difficult to be interpreted, corroded, patinated
8 – 22 44 53.7 / 57 13 55.0; horses and horsemen , Arabic writings , no patina
9 – 22 44 53.1 /57 13 55.4; discontinuous marks , corroded, patinated
10 – 22 44 52 / 57 13 56.1; horses, horsemen and dromedaries dromedaries, no patina
11 – 22 45 04.7 / 57 14 09.7; anthropomorphic figures holding halberds, corroded, coated with concretions, on an isolated boulder with stone wall at its base.
12 – 22 45 14 / 57 13 53.5; horses, horsemen and dromedaries, slight patina
13 – 22 44 59.1/ 57 14 24.4; anthropomorphic figures and solar symbol, corroded, patinated.
14 – 22 44 59.3 / 57 14 23.9; halberds , patinated and coated with concretions; horses no patina
15 – 22 49 59.2 / 57 14 23.6; part of an halberd ?, snake ? , corroded, patinated.
16 – 22 45 13.1 / 57 13 56,2; horses and dromedaries, no patina.
17 – 22 45 14.3 / 57 13 53.7; halberds, horses and dromedaries , slight patina, some unpatinated
18 – 22 45 10.3 / 57 13 52.8; halberds on a building stone of the ST2 monument, corroded
19 - 22 45 44.9 / 57 13 52.9; many engravings: halberds, horses and knights, dromedaries , some corroded and patinated, some unpatinated, on an isolated boulder , with stone wall at its base.
20 - 22 45 54.3 / 57 13 46.9; horses , horsemen and dromedaries, unpatinated.
21 – 22 45 57.4 / 57 13 39.7 , horses and horsemen fighting , slight patina
22 – 22 45 02.7/ 57 14 05.7 ; horses, horsemen and dromedaries, unpatinated, on a block of monumental stone wall
23 - 22 45 00.8/ 57 14 07.2 ; horses , horsemen and dromedaries, unpatinated. on a block of monumental stone wall
24 – 22 45 01.2/ 57 14 13.4; discontinuous marks , corroded, on an isolated boulder , with shallow stone wall at its base.

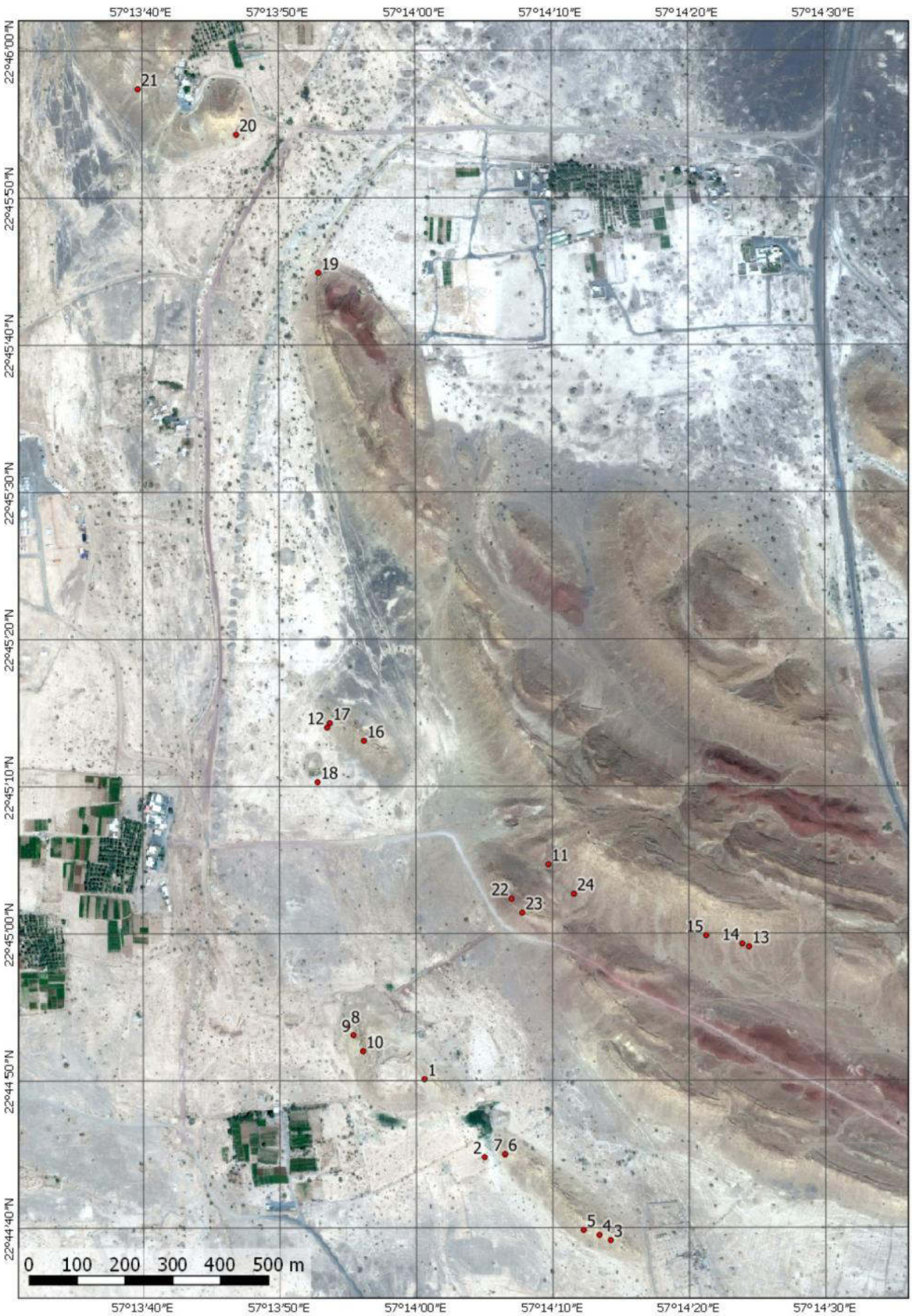


Fig. 1 – location of rock art sites in the surroundings of Salut.

Fig. 2 - rock boulders on the slopes of hills to the East of Salut. In the foreground, site 11.

Fig. 3 - site 19, horsemen, dromedaries, halberds; light patina.

Fig. 4 – site 17, superposed figures with different patinas.

Fig. 5 - site 3, anthropomorphic figure with open arms, open legs and wearing a dagger; corroded surface, patinated.

Fig. 6 - site 11, anthropomorphic figure holding an halberds; corroded surface and groves. Notice black iron oxides concretions inside the groves.

Fig. 7 – site 15, two halberds with patina, note to the right the carbonate coat.

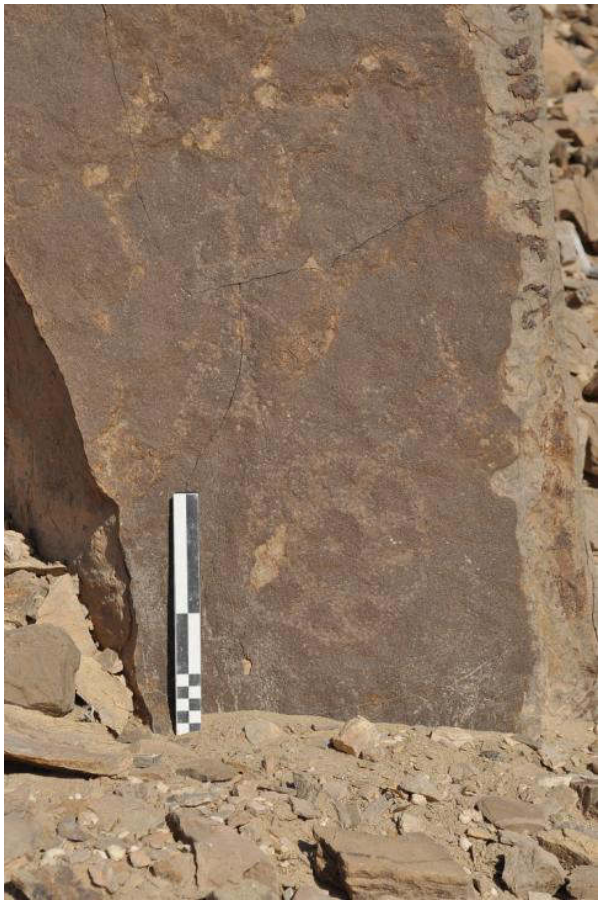


Fig. 8 - site 14, standing anthropomorphic figures and solar symbol; patinated.

Fig. 9 - Hasat Bin Salt site, notice the extreme state of corrosion of the petroglyphs, the cracked state of the rock surface and the red iron oxide coat.

AFLAJ IN THE AREA OF SALUT.
AGE, CONTEXT, STATE OF PRESERVATION, FURTHER RESEARCH

Mauro Cremaschi

In the frame of the activities of the IMTO I am studying the aflaj of the area of Salut with a multidisciplinary approach, including geoarchaeology, archaeology, isotope geoachemistry , absolute dating. The aflaj and related canals have been mapped and referred to on high resolution satellite imagery. The preliminary results were published on the preliminary report of the 2007, 2010 campaigns and now we are publishing a synthesis of our research on an international journal. The results obtained can be summarized as follows:

1 – The aflaj and their age

The irrigation system surrounding the citadel of Salut consists of c. 30 kilometres of aflaj and interconnected open-air canals, particularly Falaj Salut (total length 700 m), Falaj Shaww (total length about 4 k m), Falaj Farud (total length 5 km), and Falaj al Hayl (in total 3 km long) are located along the valley of Wadi Sayfam, while Falaj Bisyah and its eastern bifurcation (5 and 4 km long respectively) and Falaj Azabi (total length 8 km) come from the gravelly alluvial fans of Wadi Bahla. At the topographic surface, the occurrence of aflaj is suggested by regular alignments of spoil rings, which are about 8 m in diameter; moreover, they have a high ranging from about 0.6 to 1.2 m, which are aligned at a regular intervals of about 15 m . Likely, the sequence of spoil rings of each falaj is incomplete and in some cases the beginning of the falaj (the mother well) and its termination have been obliterated by colluviation, collapse, and recent erosion of the spoil heaps. Furthermore, in many cases the shafts of the aflaj are totally or in part collapsed and their pristine depth cannot be assessed exactly. Also, the underground tunnels were accessible in very few cases and do not preserve their original shape due to collapse of structures and sedimentary infilling.

By the hydrological point of view, the observed aflaj appear to exploit water from a confined aquifer, consisting of weakly cemented gravel and sand included between two superposed aquicludes. The latter are composed of the deeply cemented sediments (calcrete) upon the aquifer and the deeply cemented shale at its bottom.

Two main types of falaj can be distinguished on the basis of their state of preservation: (i) very degraded aflaj, whose shaft is filled up and the spoil heaps are flat and smooth and their deposits are slightly compacted and homogenized with the surrounding ground (Falaj Hayl 1 and 2, upper reach of Falaj Azabi); (ii) better preserved aflaj, whose shafts are still open, while in part enlarged by collapse and reaching a minimum depth of 2 m and a maximum depth of 12.5 m (the mother well of the Falaj Bisyah; Avanzini et al. 2005). In this case, the spoil heaps are up to two m high, very

distinct from the surrounding plain, and consists of loose material (Falaj Salut, Falaj Shaww, Falaj Farud, Falaj Bisya).

The archaeological survey around the aflaj, carried out to check their relations with archaeological vestiges, indicates that clusters of late Islamic pottery, are generally in relation with the aflaj of the group B (the intermediate part of the Falaj Farud and the whole Falaj Bisyah), but more frequently archaeological material is lacking, as in the case of the deeply eroded aflaj of group A.

The canals have been observed at the lower reaches of the Falaj Farud, Falaj Shaww, and Falaj Bisyah. They are delimited by straight levees, from 1 to 1.8 m high above the ground surface and around 20 m large. They are in general c. 1 m deep, because partially filled by the material resulting after the dismantling of the levees. Along the Falaj Farud a bulldozer cut exposed a soil buried by the levee's sediment. A fragment of pottery included in it was dated by thermoluminescence to 3900±200 years BP giving a *post quem* dating for the excavation of the canals .

The Falaj Shaww, Falaj Farud, and Falaj Bisyah converge in the plain surrounding the Iron Age citadel of Salut; the same area is marked by abandoned settlements and evidence for former cultivated fields. The latter mostly consists of a net of irrigation ditches and stones or flat, earthen walls, built around formerly cultivated fields to retain the fertile soil and prevent it from erosion. These features are evident in the field and also in high resolution satellite imagery, and have to be interpreted as gardens and irrigated fields. The pottery collected during field survey dates from the VIII/IX to the XIV/XVI centuries AD permits to refer the exploitation of this region to the long period encompassing the early of the middle Islamic era.

An sample of the Islamic pottery collected in association with the aflaj

The traces of former cultivated fields surround more than 20 small mounds of soil, locally called *nadud* . These are composed of material from mixed provenance, accumulated in the frame of the management of the resources of the oasis in the late pre-Islamic and Islamic phases. The large occurrence of Iron Age indicated that that the building of mounds included the reworking of soil/sediments from Iron Age settlements and the area in use in that period was widely extended around the citadel.

Along the upper reaches of the Falaj Shaww and Falaj Farud on a length of about 500 metres several fragments of calcareous tufa were found in the spoils from shafts of the falaj; tufa are in form of lateral flowstones and stalactites . Flowstone and stalactites can develop only in an open underground space, and therefore the fragments collected in heaps where formed in cavities, which were intercepted during the last dig/cleaning of the shafts. The shape of the flowstones that are squared in their lower part is consistent with the shape of the wall of the falaj tunnels. It is therefore evident that the flowstones were originated within the tunnel of the falaj and on the wall of and thrown to the surface during a late phase of re excavation or cleaning of the falaj system.

The samples of stalactites were dated through U/Th methods and seven dates were obtained as indicate in the following table:

Campione	Anni (ka)	±	Anni (ka) corretti	±	Anno
1-SL24B	1,820	0,034	1,753	0,047	247 AD
3-SL24A	2,424	0,062	2,409	0,059	409 BC
4-SL24A	1,650	0,032	1,645	0,031	355 AD
5-SL24A	1,686	0,040	1,681	0,038	319 AD
6-SL24A	2,074	0,035	2,062	0,037	62 AD
7-SL27	1,373	0,041	1,156	0,119	844 AD
8-SL27	0,936	0,037	0,854	0,056	1146 AD

These results are rather interesting and deserve further comments. However, in short, they incontrovertibly indicate that the falaj existed during the Iron Age (409 y BC) , certainly during the last phase of the Salut citadel (but probably also before) , that they were in use during the early Islamic period up to 1146 AD (622 H) and re- excavated and re- used after that period to supply water to a flourishing oasis during the Islamic periods , probably up to the XIV century AD (VIII century H).

2 - Further research

The potential of knowledge of the aflaj surrounding Salut is high and the research about it is just at the beginning. The data obtained up to now need further deeper research on the spot, some goals may be envisaged:

a- the shaft of the falaj still opened cannot be directly accessed, because the wall are at risk of collapse. However they may be explored through fiber-optic probe, in order to investigate the shape of the underground canal.

b – a systematic archaeological excavation of the falaj shafts sealed of sediments has never been undertaken; a selection of the best preserved evidence may be stratigraphically excavated in the course of specific campaigns; the results may be of great interest to understand the technique used, the ages of the system related to the period of use and of abandonment.

3 – Preservation

The Aflaj in Salut represent an important evidence of archaeological irrigation techniques in the Sultanate of Oman and are one of the oldest aflaj system preserved in the country, and therefore they deserve conservation, to be used for further research and tourism.

According to local people, the aflaj ceased definitively to carry any water during the 1970s. Some wells shafts were re-excavated and refined with concrete during the 1990s, with the purpose to reach the water table; but also these wells are now desiccated. Perfectly preserved up to few years ago, the aflaj system is today badly endangered by the construction of the pipeline in the area; at least two kilometres of the Falaj Farud have been recently destroyed (we sent to the Office a report about this threat two years ago), and also to day some shafts of the Falaj Bisyah, few kilometres north of Salut have been reconstructed with concrete, completely erasing the evidence of the former artefacts. In the perspective to insert the alflaj system in the archaeological park of Salut, it is to be stressed out that in this area its is particularly poorly preserved. However the Bisyah Falaj, just immediately to the South East of the Park area display interesting features. In this area there is the connection between the shaft line and the open air canal: the complexity of this part of the system makes it particularly significant and impressive. However restoration is needed, removing heap of garbage , closing occasional digs, and repairing damaged falaj structures, but it is not impossible and it will give the opportunity to include in the park , and to protect it, a meaningful part of the cultural heritage of the area.

Prof. Mauro Cremaschi – University of Milan

Nizwa, April 7th, 2016

AN ARCHAEOZOOLOGICAL STUDY OF THE REMAINS FORM HUSN SALUT: PRELIMINARY REPORT OF ACTIVITIES (3RD-19TH OF APRIL 2016)

Laura Strolin

During this first archaeological campaign of 2016 at the site of Salut an archaeozoological study has been started on part of the evidence recovered during the previous archaeological campaigns at Husn Salut. This brief report relates the activity carried out during the campaign and some immediate results of the work. A more punctual and deeper analysis of the evidence will be prepared in the next months, to be integrated with the results of the upcoming campaigns.

The focus of the work was on a series of layers pertaining to the same context, part of a sound stratigraphic sequence for which numerous radiocarbon dates are also available.

As a first contact to the assemblage, a diachronical perspective has been preferred to other kind of approaches in order to have a general overview on ancient fauna present at the site over time.

In particular, material from the so-called Basement has been studied, belonging to the following layers: US20, US10 and US6 for the earliest phase; US274, US269, US18, US472 and US 473; US16, US35, US53 and US276-242; US14, US13, US12 and US9; US3 for the latests phase.

The main abundance of remains has been recorded from layers US16 and US35, a pit in US16. The quantitative disproportion between these layers and the others may hint to an intense use of the building at that time or to a specific function, questions that will be discussed during further work.

Material from the square between wall M117 and M42 has also been taken into account, in particular from layers US510, US509, US508 and US337.

All fragments were dry brushed than observed for identification. A database has been created providing information about species, anatomy, age and fusion data, taphonomical observations, sex, weight information (per species) and standard measurements (following VON DEN DRIESCH 1976).

The methods of collection of faunal material must be considered when interpreting results. Remains were indeed hand collected, a heavy bias on species representation penalising small species, small fragments and fragile bones. Moreover, the assemblage presented a high amount of recent fractures which could be sometimes recomposed, since they likely occurred after the collection. Concerning other fractured fragments, no correspondences were found, which suggests a breakage during excavation and a lack of complete recollection of the pieces (the impact of instruments has been often recognized).

The preservation of material is not as bad as encountered at other sites in Oman, this may be due to different climatic conditions of temperature and humidity and to the chemical components of the soil. Unfortunately bones were better preserved than teeth, that were completely splitted into many splinters. A relevant amount of time has been devoted to the recontruction of the occlusal face of teeth in order to provide evidence

sufficient for the estimation of the age profile of the living stock. The description of wear stages follows the protocol proposed in GRANT 1982.
Regarding taphonomy, it must be stressed that a detailed recording of taphonomical evidence has been carried out, which will allow specific considerations about butchery practices at the site at the different chronological stages.
Furthermore, a small comparison collection was set up with the best preserved *specimen* and will be available for future work.
At the end of the campaign a reorganisation of the material has also been carried out for what concerns its location: a new list of boxes has been drawn up. The majority of the material is still stored in Muscat Office, except from a series of samples for whose identification a comparing collection was required, or samples that may be part of a more accurate analysis through specific techniques in the upcoming research. These remains, after proper authorization from the Office of HE the Advisor to HM the Sultan for Cultural Affairs – Muscat, are now deposited and listed at the Natural History Museum of Geneva (Switzerland), in the Department of Archaeozoology directed by Dr. J. Studer.
During this campaign 4472 fragments were sutdied, the largest part of which have been positively identified for the species, the *genus* or the family. Unidentified fragments reach the number of 1546 and are mostly fragments smaller than 3 cm, shaft, cranium or rib fragments without any specific distinctive feature, or also result of recent fragmentation. Weight data will help evaluating the importance of unidentified fragments.
Species representation is coherent with the environmental situation of the site in antiquity: availability of water, the presence of mountains and reasonable distance from the sea. Such a situation is compatible with the evidence identified. The majority of fragments indeed belonged to ovicaprids, which constituted the main dietary resouce at the site in all chronological phases considering the amount of butchery marks observed.
Wild fauna is also present, gazelles in particular were relatively abundant and bore marks of human activity.
Camelid bones were also identified, in a small percentage as could be expected for this kind of habitat, since camelids are more attested in dry desertic areas. The evidence shows butchery marks.
Two fragments pertaining to equids have been recorded and have been transported to Geneva's laboratory to attempt a specific determination.
Three fragments belonging to avifauna were present, without any mark of human interference. Rodents too are present in the faunal remains, in particular two size ranges were recognised.
More detailed analysis of faunal remains will be carried out in the following months in order to provide a sound starting point for the future archaeozoological study to be held next autumn.

Cited bibliography:

Grant A. 1982, The use of tooth wear as a guide to the age of domestic ungulates, in Wilson B. / Grigson C. / Payne S. (eds), *Ageing and sexing animal bones from archaeological sites, BAR British Series*, British Archaeological Reports, Oxford, 109, p. 91-108.

von den Driesch A. 1976, *A guide to the measurement of animal bones from archaeological sites*, Peabody Museum, Harvard University.

Nizwa, April 20th, 2016