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The Qalhât Project - Preliminary report on the seventh season (18/11 -16/12/2014)

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The Qalhât Project
Ministry of Heritage and Culture
General Directorate of Archaeology and Museums
Department of Excavations and Archaeological Studies
Sultanate of Oman

Preliminary report on the seventh season
(18/11 – 16/12/2014)



Dr Axelle Rougeulle (CNRS - UMR8167)
Dr Thomas Creissen (Eveha International)
Ms Juliette André, Mr Virgile Ferbourg
Dr Hervé Monchot (CNRS - UMR8167)



Sultanate of Oman
Ministry of Heritage & Culture



سُلْطَنَة عُومَان
وَدَارَةُ التَّرَاثِ وَاللِّبَاقَةِ



Introduction

The seventh season of the Qalhât Project took place from November 18th to December 16th 2014. The expedition was held under the authority of the Ministry of Heritage and Culture of the Sultanate of Oman, with the joint financial support of the MHC on the Omani side and of the National Centre for Scientific Research (CNRS – UMR8167 *Orient and the Mediterranean*) and the Archaeological Committee of the Ministry of Foreign Affairs on the French side.

Brief history of the Qalhât Project

The Qalhât Project started in 2008 when the Ministry of Heritage and Culture of Oman decided to launch a large project of archaeological study at the site of Qalhât, in collaboration with a team from the French National Centre for Scientific Research (CNRS), directed by Dr Axelle Rougeulle. During the first five year plan (2008-2012) many information were collected about the site. A GIS was established, preliminary maps of the medieval city were drawn, its spatial organization and evolution were studied. The defensive system and water supply system were analysed; the regional and international trade networks of the harbour were brought to light through the study of local and imported material; and main buildings of the town were discovered and tested, several domestic units, a store, a ceramic factory, small mosques, and especially the great Friday Mosque of the city, which had been described by Ibn Battuta in 1320, was eventually destroyed by the Portuguese in 1508, and was then left undiscovered for exactly 500 years, until 2008.

Based on these results, the MHC launched in 2013 a large development project at Qalhât, with the final aim to create an archaeological park at the site. Since 2013 the QP is therefore held in parallel with the Qalhât Development Project (QDP), which is working on the field about 6 months a year with a team of 6 archaeologists/topographers from Eveha International and several CNRS specialists, under the direction of Dr A. Rougeulle (CNRS - UMR8167). When the aim of the QDP is to excavate extensively the most important buildings of the city discovered since 2008 for conservation and display in the future Archaeological Park, the objective of the QP is to continue the study of the city as a whole, making surface survey and test excavations to discover and identify new elements for the understanding of its spatial organisation and evolution.

Now, as the 2014b season of the QDP had to be cancelled due to administrative problems in the MHC, the seventh season of the QP was held alone this year.

The team and partners

The members of the team of this season were:

Dr Axelle Rougeulle (CNRS - UMR8167, Paris), archaeologist, director of the Project

Dr Thomas Creissen (Eveha International, Paris), archaeologist

Ms Juliette André, archaeologist

Mr Virgile Ferbourg, assistant archaeologist

Dr Hervé Monchot (CNRS - UMR8167-Labex ResMed, Paris), archaeozoologist

Our deepest thanks are due to the Ministry of Heritage and Culture of the Sultanate of Oman and to H.E. Salim bin Mohammad Al Mahruqi, Undersecretary for Heritage Affairs, without whom the Qalhât Project would not exist. Our gratitude goes especially to Mr Hassan Mohammad Ali Al Lawati, Director General of Archaeology and Museums, and to Mr Sultan Saif Nasser al Bakri, Director of the Department of Excavations and Archaeological Studies, for their deep involvement in the Project. We also want to express our warmest appreciation to Mr Khamis Nasser Al 'Amri, representative of the Department in the Sur region, and to Mr Mohamed Al Waili, in charge of the Qalhât Project in the Department in Muscat, for their very efficient and friendly help and support. A visit of the staff of the Department of excavations and archaeological studies was made at the site on December 8th (**Fig. 1_Visit of the MHC authorities at the site**). This year Ms Nawal Abdullah Salim Al Arimi and Ms Fatma Hulies Sultan Al Bahlooli, members of the staff of the office of Heritage and Culture at Sur, came regularly at the site for training and reporting, under the direction of Mr Adel Abdullah Salem Al Athroshi Al Araimi, manager of the office. We also had the pleasure of a visit of schoolboys from the Qalhât school (**Fig. 2_Visit of a Qalhât school at the site**).



As in previous years, the mission could not have been so successful without the support of the French National Centre for Scientific Research (research lab UMR8167, *Orient & the Mediterranean*) and the Archaeological Committee of the French Ministry of Foreign Affairs which provide funds and specialists. The French archaeological consulting agency Eveha, which is part of the Qalhât Project since the first year and now realizes the QDP excavations, kindly put again at the disposal of the mission Dr Thomas Creissen, Head of Eveha International.

Objectives of the 2014 season of the QP

The main objects of the 2014 season were as follows (**Fig.3_ Aerial view showing location of studied areas**):

- A. Excavation and study of B39, a building located near the ceramic factory B41 which showed unusual interesting features on the surface
- B. Continuation of the surface survey of the ancient quartier of the city started during the 2013 season of the QP
- C. Archaeological consultancy for the conservation component of the QDP, vital before the starting of conservation works at the large building B21.
- D. Archaeozoological study of the bones from the excavations at the great mosque B12 and neighbouring buildings, the rooms in the courtyards B139, the large building B13, and the *suq* B140-141.



A. Excavations at B39

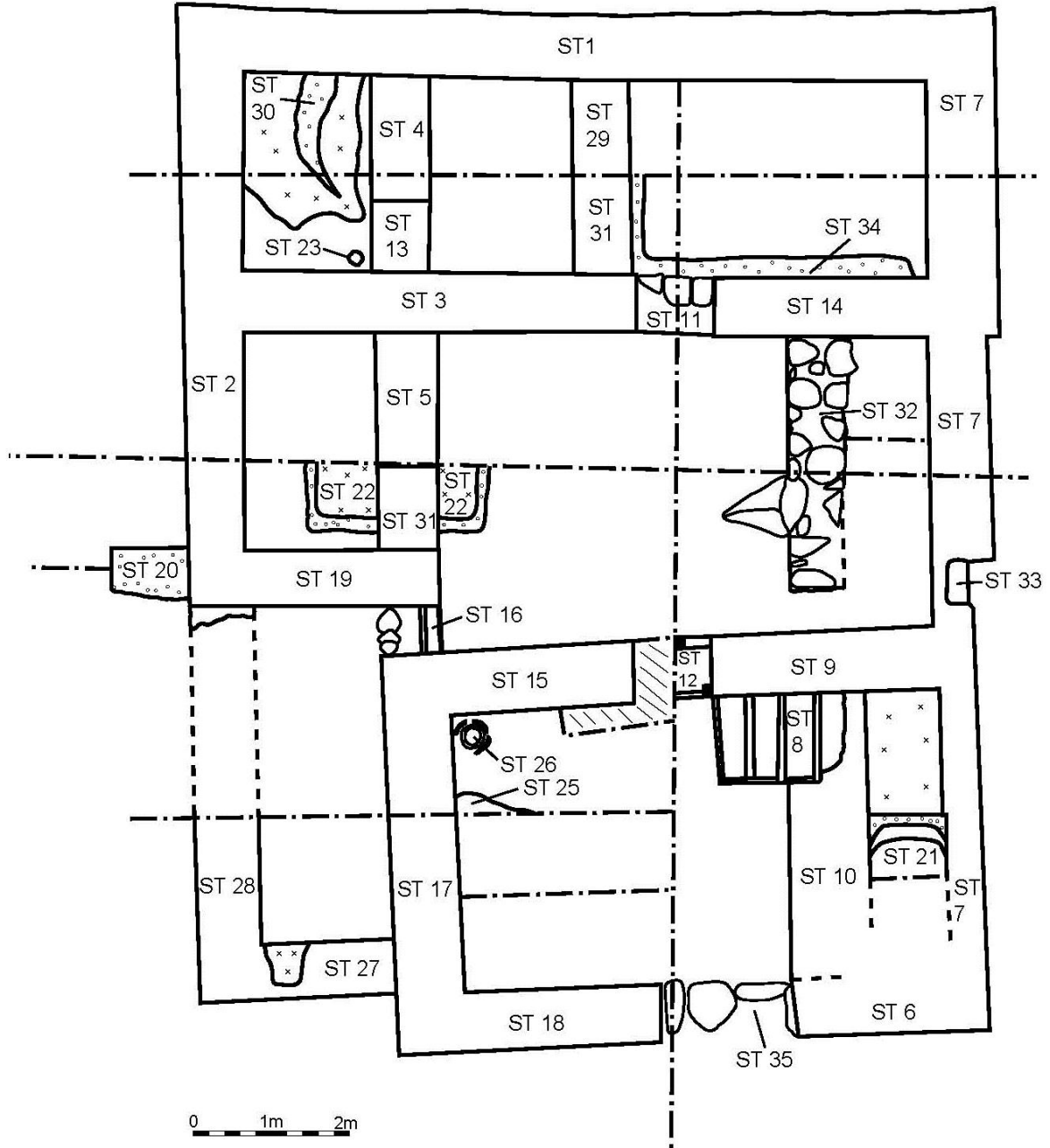
Dr Thomas CREISSEN
Eveha International
Juliette ANDRE, Virgile FERBOURG

Introduction



B39 is located in the western quarter of the city, just south of the kiln factory B41 (2511910N – 744085E). From surface survey it looked as a rectangular building, around 8 x 10m, made of two parallel rooms, with an extension on the eastern side. Its main characteristic was that the visible peripheral walls were made using a creamish plaster mortar as shown especially on two large elements of masonry collapsed to the north. As a matter of fact B39 was one of the few buildings in Qalhât which appeared white on the black-and-white aerial photos of the site, the other ones being small platform mosques, the Great Mosque B12, and the large complex B14 where Iranian excavations in 2008 discovered small rooms as in a *khân* and fragments of an inscription. It therefore seemed that B39 was an important building of the city. Moreover, the location of B39 makes it a perfect element for the Archaeological Park, being situated close to the ceramic factory B41, planned to be extensively during season 2015b, on the itinerary linking the north-west quarter currently under conservation work (twin houses B94, large building B21, small terrace mosque B19) to the great mosque B12 which will be the main focus of the Park.

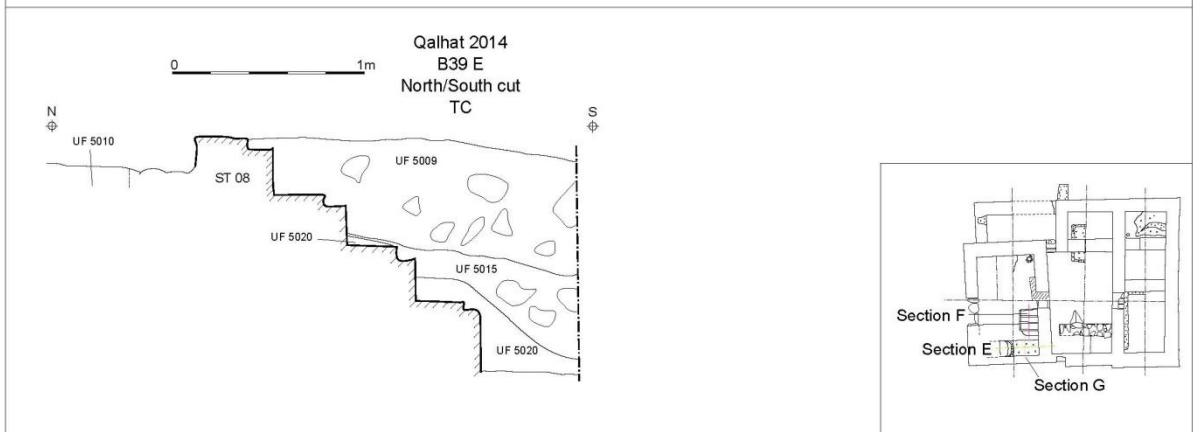
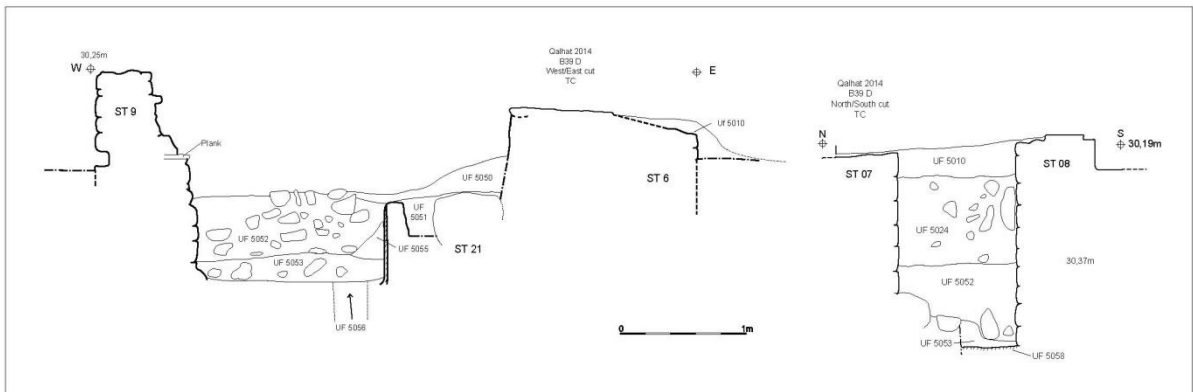
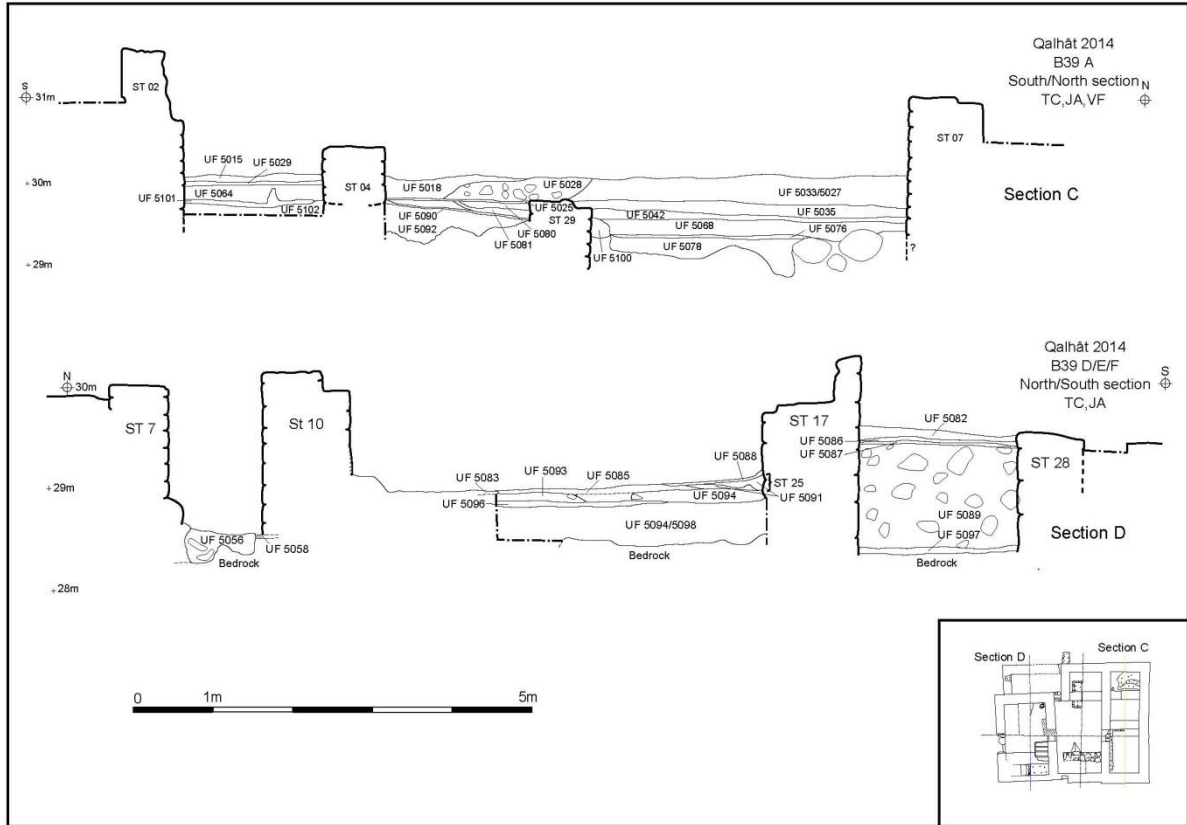
The general shape of the building is quadrangular, about ??? x ???m (???m²), with the entrance to the east. Once the collapse layer was removed, the building appeared to be quite complex, including different areas (A, B, D, E and F) that are in turn subdivided in multiple rooms: A1, A2 and A3, B1 and B2 (**Fig. 4_General plan of B39**). The presentation of the stratigraphy will therefore follow this spatial distribution (**Fig. 5-8_Sections and stratigraphical diagram**), and we will try to propose a synthetical analysis of the monument in a last chapter.

Qalhat 2014
B39
General plan
13/12/14
TC,VF



0 1m 2m

-  Cement floor
-  Mortar



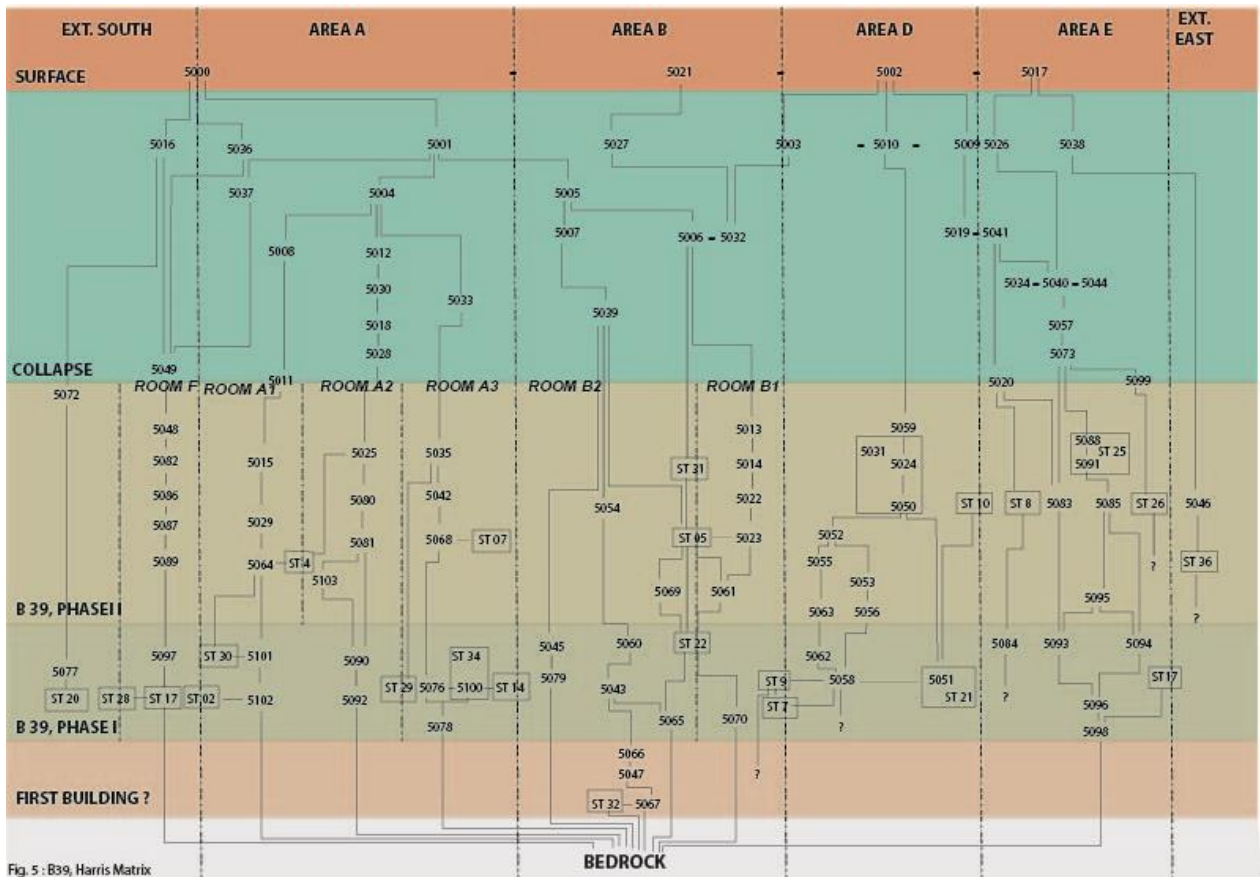


Fig. 5 : B39, Harris Matrix

B39 A (Fig.2. North-south section in area A).

Area A is the backroom of the building, located in its western extremity. It is approximately 8,80 m long and 2,50 m large and delineated by the peripheral walls ST 1 (west), ST 2 (south) and ST 7 (north). Two partition walls (ST 13 and St 14) constitute its eastern side. An access is set up between them (ST 11).

This area is divided in three singular rooms by partition walls (ST 4 and ST 29). Only the southern one as a threshold connected with it (ST 13). This wall and the access have been added in a second time

B39 A1

This room is approximately 2,50m x 1,50m.

Stratigraphy

- Just under the surface (UF 5000), many layers of collapse were removed: UF 5001, 5004, 5008 and 5011 (this later mixing with the latest occupation layer). They are *ca.* 1,50m thick in the higher parts (*ca.* Δ 31,50). They mostly consist of coral elements in the upper part, mixed with few stones in the lower ones. Many pieces of masonries made of coral elements bounded in a strong mortar are included in UF 5008.

- The first occupation layer, at *ca.* Δ 30,05, is very hard and contain many small pebbles (UF 5015). Few ceramics shards are included.
- Just below, UF 5029 is a beaten earth floor (*ca.* Δ 30,00). Some pottery shards were laying on the surface, as well as fish bones. Near the entrance, remains of purple sediment are located near a stone, also covered by the same sediment (like part of the sediment, it has been take for further analysis). Elements of grindstone and mortar are associated with this floor (**Fig.9_Grindstone and floor UF 5029**). Some of them top a stone structure whose shape is quite irregular (ST 24): it is probably a kind of base devoted to support this mortar/grindstone.
- In its southwest corner, a big piece of cement floor is included in this layer whereas a post hole seems to have been set up near the entrance (ST 23).
- This floor is built on top of a backfill consisting of sandy sediment mixed with many small gravels, pebbles, bones and ceramic shards (UF 5064, *ca.* Δ 29,95). This is clearly a preparation layer related with the above-mentioned floor. This backfill is also connected with the partition wall ST 4 and the threshold ST 13.



- During the construction of these masonries, a former floor was destroyed. It is made of beige and hard mortar (UF 5101, *ca.* Δ 29,75). An irregular masonry topped this floor (St 30). It is probably the remain of an edge, largely destroyed (**Fig.10_Edge**).

- This floor and the related structure were erected upon another backfill, also

including many pebbles, gravels and pottery shards (UF 5102, *ca.* Δ 29,65). It has to be noticed that this backfill is leaning on both wall ST 2 and ST 3.

B39 A2

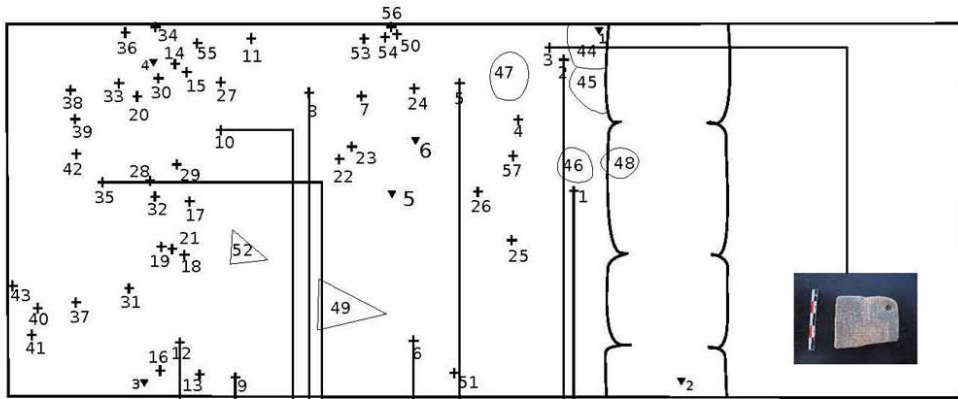
This room is approximately 2m x 2,50m. It is connected with room A1 through the threshold ST 13, whereas no specific fitting could be observe in the partition wall ST 29: it is not yet possible to ensure where the passage between A2 and A3 was located.

Stratigraphy (Fig.5-8 supra).

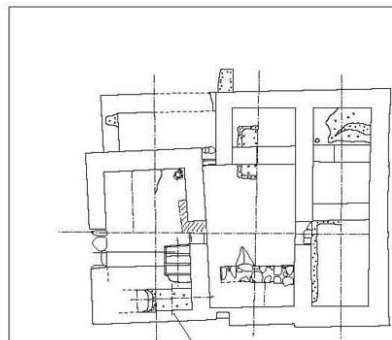
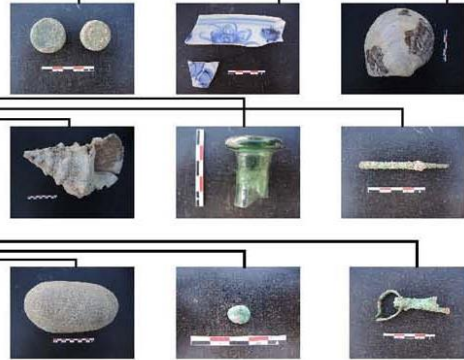
- This area is topped by a huge level of collapse (Uf 5001, 5004, 5012, 5030, 5018 and 5028). It contains a lot of coral blocks and few stones. In the lower collapse, few pieces of mortar are included among the collapse.
- Just below the collapse, UF 5025 is a beaten earth floor topped by ceramics shards, shells, fishbones and an almost complete and connected goat foot (*ca.* Δ 29,80). This floor, 5cm thick, partly covered the partition wall ST 29.
- Below, UF 5080 is located only in the northern part of the room. It consists of an ashy layer containing many charcoal, fishbones and part of a cuttle-fish bone. A sample has been taken for further analysis.
- What could be remains of an occupation layer lie just under (UF 5081). The soil is very hard and contains small gravels, some pottery shards, bones, as well as small pieces of glass. These two layers are leaning against the partition wall ST 29.
- Just below UF 5025 and 5081, UF 5103 is a backfill containing many small pebbles and gravels. It covers a thin mortar floor (UF 5090) connected with the partition wall ST 29, but that has no relation with ST 04. This floor is sloppy, the northern part of it about 10cm higher than the southern one (from *ca.* Δ 29,50 to 29,60m).
- This floor is set up above a huge backfill containing many ceramic shards, pebbles and gravels mixed with loose and brown sediment (UF 5092). This backfill is most certainly the same as the one observed in room A1 (UF 5102) and both belong to the same building phase.
- This backfill directly covered the bedrock, which is there very irregular (*ca.* Δ 29,20 min. and 29,50 max).

Qalhat 2014
B39 A2
Objects location
VF

0 1m



- ▼1 : 29,53m
- ▼2 : 29,65m
- ▼3 : 29,55m
- ▼4 : 26,46m
- ▼5 : 29,51m
- ▼6 : 29,43m



B39 A3

This room is the largest of the area A. It is approximately 3,80m long and 2,50m large. It communicates with the B area through the raised threshold ST 11 (ca. Δ 29,80).

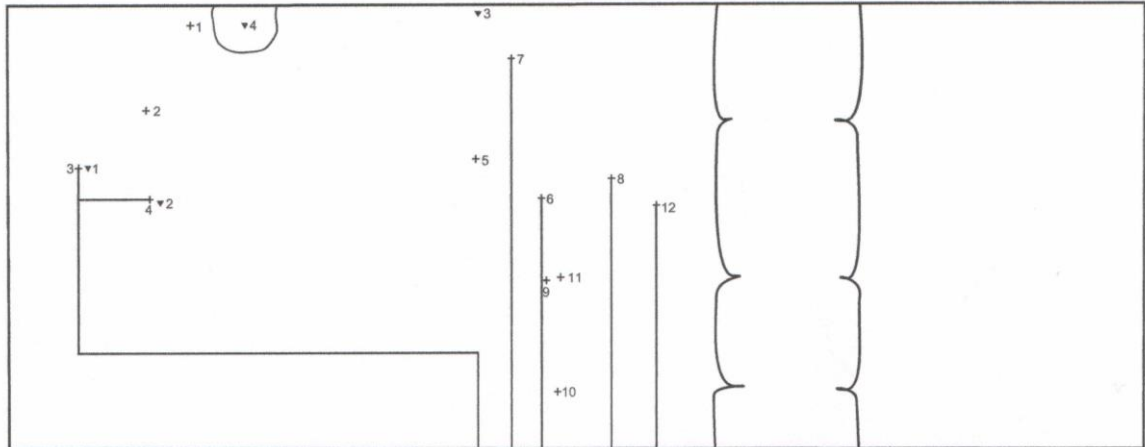
Stratigraphy (Fig.5-8).

- In this area, just under the surface (Uf 5027), most of the collapse has been gathered in a same huge layer, UF 5033. It consists of many corals blocks and few stones mixed with loose and beige sediment.
- The first occupation layer consists of a beige beaten earth floor (UF 5035, ca. Δ 29,55) which is approximately 10 to 15cm thick. It partly covered the partition wall ST 29. Many artefacts lay on its surface (**Fig.11supra** *Repartition plan of objects on the floor of the room A3*). Among the most spectacular are two metallic weights (**Fig.12** *Copper weights*), and also part of a broken stone mould, probably devoted to bronze object production (**Fig.13** *Stone mould and Chinese blue and white porcelain in situ*). But this layer also contains a big shell, some remains of rough semi-precious stones, bronze objects and many ceramics sherds as well as grindstones, mortar and stone pestles.
- Just under this layer, UF 5042 looks like another floor, harder, containing far less material than the previous one (**Fig.14** *infra* *Repartition plan of objects on UF 5042 of room A3*). Remains of a goat skeleton (the head and part of the body) are present (**Fig.15** *goat on the floor*).

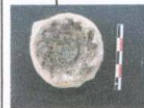
This floor is set up above a backfill including many pebbles, gravels as well as ceramic shards and bones (UF 5068).



Qalhat 2014
B39 A2
UF 5042
Objects location in A2
VF



- ▼1 : 26,39m
- ▼2 : 26,37m
- ▼3 : 29,64m
- ▼4 : 34,64m



This backfill is largely covering a small masonry (ST 34, UF 5100) leaning against both the eastern wall of the room (ST 14) and the partition wall ST 29. It is between 10 and 25 cm large. This “bench” is related to a very hard beaten earth floor (UF 5076, *ca.* Δ 29,25), *ca.* 5cm thick. In some parts, very big stones arise from this floor.

- Just under, UF 5078 is a huge backfill containing pebbles, gravels and many pieces of pottery. This backfill is clearly related to the above-mentioned floor and bench. It is located just above the bedrock, very irregular (*ca.* Δ 28,80 min. and 29,20 max.), and containing impressive boulders (**Fig. 16_Room A3 at the end of excavations**).



B39 B

Area B is the central area of building B39 known in its final phase of operation. In a previous state, this space formed one single room but a later partition delineated it into two smaller rooms, B1 in the south and B2 in the north.

This area was entirely recovered by different layers of collapse that all look alike (5000, 5002, 5003, 5005, 5006, 5007, and 5032). These collapses were made of a mix of powdery and greyish sediment in which were found numerous blocks of limestone and corals. However the collapse of the ceiling is a bit different (UF 5039). Many mortar blocks were discovered, at the back of which were palm trunks and mats impressions. Under these different layers of collapse were excavated the occupation levels whose description will follow.

B39 B1



Room B1 is a small area south of the building. Its dimensions are approximately 1,78 meters large by 2,80 meters long. (**Fig.17_General view of B1**).

Stratigraphy

- The most recent occupation level is represented by a mortar floor level (UF 5013) which

was only preserved in the western part of the room. The level was rather compact and homogeneous, but also brittle, which may explain its poor state of preservation.

- It was built directly over a level of ashy sediment mixed with charcoal (UF 5014). A sample was taken for further analysis that could provide information on what was burnt in that room.
- This thin ashy layer relies on a backfill level (UF 5022) which obviously belongs to the same phase of construction as the mortar floor level. The backfill layer should then have been used to raise the level of the room before the new floor was built. It consists in sandy sediment mixed with many small pebbles and gravels. A lot of material was found in it, mostly ceramic shards, which are interesting indicators of the construction period of the floor level built above the backfill.
- Under this construction layer was found another mortar floor level in a much better state of conservation though deficient mostly in the centre of the room (UF 5023).
- This most ancient floor seals another phase of occupation of the building in which a basin was functioning. During this previous phase, no separation between rooms B1 and B2 existed. The chronology of the basin (ST 22) will be described later.

B39 B2

Room B2 is located directly north of B1. Its shape is not quite regular, the northern width is about 3,70m, whereas the southern width is closer to 4m. The southern wall itself is approximatively 3,50 meters long and directly to its east is built a passage with two steps (ST 16), thus creating a misalignment of the wall with the other walls oriented north-south, giving this section its trapezoidal shape.

Stratigraphy

- The most recent occupation layer consists in a thin powdery level with traces of ashes and charcoal along the eastern wall (UF 5054). This layer is not uniformly represented, either it was destroyed through time, or not recognize during excavations. It could represent the interface between the final occupation phase and the abandonment of the building.
- It relied on a fine mortar floor level which was only preserved in the southern part of the room (UF 5060). It seems to form a trough at the foot of the stairs, but it could also come from a weakness of the mortar that ended up destroyed at that place.
- This floor level functioned with the basin mentioned above, when room B was one single room. This basin (ST 22) was dug into a backfill layer consisting in a aggregate of pebbles of all sizes and gravels (UF 5070 and 5065). Many ceramic shards should provide an accurate phasing of the room's different occupations phases. The basin inner surface



was coated with a fine hydraulic mortar. It is only partly excavated, so its final dimensions remain unknown. So far it is 30cm deep and 2,30m long. The basin was then itself backfilled with a sediment whose matrix is earthy and brownish, mixed with many small pebbles, and small to medium sized corals (UF 5061 and 5069). Another sample was made; the analysis could provide information about its function. (**Fig.18** *Photo of the basin ST 22*). The foundations of the wall that partitions room B into B1 and B2 are erected over the backfill of the basin and are therefore posterior to this structure.

- Under the mortar floor level was found a succession of two occupation and two backfill layers that were all destroyed when the basin was constructed. The most recent backfill layer (UF 5043) is made of a mix of small pebbles and gravels. Under it was discovered a thin layer that was trampled on. The section shows an organised succession of small compacted gravels forming another floor level, itself built over a backfill layer similar to the previous one (UF 5047). The first occupation layer relies directly above the bedrock since chalky white and smoky black nodules, as well as a few ceramic shards were discovered lying above it (UF 5067). The bedrock level is irregular, so in some places the top of huge limestone blocks is levelled with a backfill, more or less thick depending on the difference of elevation.
- There is one last structure in this room which is linked to a much earlier phase of occupation, even before the construction of the building (ST 32). It is a masonry made of limestone blocs (some of which are huge and probably belong to the bedrock). It may have been a wall in a previous building that is now destroyed. (**Fig.19** *Photo showing the earlier wall ST 32*).



B39 E

This room is located in the south-east corner of the building. It is connected with the outside through what is probably the main access to the building, ST 35, about 1,80 m large (*ca.* Δ 28,95). In this area, the building was lined by a street (*ca.* Δ 28,30) and its associated sidewalk (*ca.* Δ 28,50 m), about 1m large (ST 36). Room E itself is about 4,20m long and 3,50m large, but a staircase is located on its north-west corner (**Fig.20** *The staircase before its complete excavation*). It consist of five stairs leading to a raised platform (room D) *ca.* 1,20m above (*ca.* Δ 30,30).

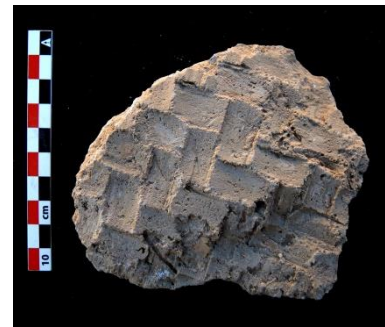
Room E is connected to the B section through the



access ST 12 (ca. Δ 29,35 m). Its peripheral walls are ST 10 on its north side, ST 18 on the east, ST 17 for the south, and ST 15 and 9 for the west.

Stratigraphy

- Under the surface (UF 5017/5002), all this area is covered by a huge level of collapse containing many coral blocks as well as some stones : Uf 5010, 5009, 5034, 5040 and 5040. Many pieces of hard mortar are present in the lower level of the collapse, some of them showing different kind of prints: wood beams, stones, and also palm (?) mat (**Fig.21-22_Mat prints from the roofing**). Around the staircase, two layers have been identified. The first one is made of hard brown sediment including many small fragments of mortar/coating. It was leaning on both the threshold ST 12, the collapse layers including the above-mentioned mortar elements, and UF 5020, which is partly covering the upper stairs and is therefore very sloppy. UF 5020 consists of loose and quite homogeneous brown sediment.



- Below this level and the collapse layers, different UF are present (**Fig.23_General view of room E**)

- Along the wall ST 10 and almost parallel to it, UF 5083 is a hard concrete floor ca. 1,50 m large including some small stones (ca. Δ 28,95). Bigger ones arise in some parts. Their surface is completely polished.

- The rest of the room was covered by an heterogeneous and soft

layer containing many ashes and charcoal (UF 5085, ca. Δ 28,95/29). Some samples have been collected for further analysis. Among the artefact included are pottery shards, fishbones, bones and few shells. The relation between UF 5083 and UF 5085 is not clear, but they seem to be contemporaneous.

- In the South-West corner of the room, this layer (?) surrounds an almost complete jar largely buried in the ground (ST 26). Its diameter is around 20cm for the upper part (**Fig.24**). Around this pottery emerge elements of a larger ceramic, maybe the lower part of the same jar or a bigger one whose fragments have been used as wedges. All this area has been fired as clearly indicated by the soil color.



- On top of UF 5085, a hearth (ST 25) is leaning against the southern wall. It consists of two UF, 5088 and 5091, the later almost only consisting of ashes for its upper part, and burnt earth for the lower one. All the sediment from the excavated part have been kept for analysis.
- Under 5083, remains of a structure including a huge polished stone and some mortar emerge (UF 5084, *ca.* Δ 29.00). This structure has clearly been cut when the staircase has been built.
- Under UF 5085, UF 5095 is another layer of occupation, very soft and dark brown, including some ashes. Few ceramic shards, shell and bones are included, but only a very reduced part of it have been excavated. This layer is only located in a small depression located between two floors (UF 5093 and 5094, *ca.* Δ 28,90) which might be equivalent. Both are very hard, including small gravels, bones, shells and few pottery (actually, UF 5094 includes both the floor and part of the huge backfill located under it, so a lot of ceramic have been recorded with this UF number).
- In some part, these floor are covering what could be an occupation layer (UF 5096). It is made of a soft brown-grey sediment and many ceramic shards are leaning on its surface. This layer, *ca.* 5cm thick, also includes few bones and shells.
- Under both 5096 and 5084, UF 5098 is a backfill *ca.* 40/50cm thick, including many pebbles and gravels, bones, glass, metal and an impressive quantity of pottery shards (**Fig.25_Section inside room E**). Among them are Indian painted ware, Yemeni mustard and few pieces of Chinese Lungquan celadon, all probably belonging to the early fourteenth century. In the northern part, a huge boulder is included in the backfill, which surface, arising of the latest floor, is completely polished. UF 5098 is located directly above the bedrock, which here again is very irregular (*ca.* Δ 28,40, but a huge depression as not been excavated). It has to be noticed that the southern wall ST 17 have been built on top of this backfill.



B39 D

This room mostly consisted of a raised platform *ca.* 3,50m long and 2m large, reachable though the stairway. Nonetheless, in a previous stage, this area was apparently not raised as revealed by the sounding in room D1.

Stratigraphy

- In this area, the collapse layer (Uf 5010) was not very thick (*ca.* 30 cm maximum).
- In the north-east corner, remains of a mortar floor (?) are preserved at *ca.* Δ 29, 95 (UF 5059): this is *ca.* 25 below the level of the last step of the stairway. This floor was not preserved everywhere and its original extension remains unclear.

- According to the results of the excavation of Room D1, this floor is built upon a very loose grey sediment including few gravels, many coral blocks and fragments of mortar (UF 5024, *ca.* Δ 28, 90). This layer, *ca.* 70 cm thick, includes few pieces of ceramics and some glass fragments. No remains of the above-mentioned floor has been found, and it is therefore neither possible to ensure that it was actually present in this area, nor that UF 5024 is surely anterior to the floor.
- Under Uf 5024, Uf 5050 is a sloppy layer (*ca.* Δ 29,55 in the east, 29,25 in the west), very loose, grey and including some pottery shards.
- It covers a layer including a soft brown soil mixed with a lot of stones and few coral blocks (Uf 5052). It also contains ceramics, bones and shells. This layer is 50cm thick. Below, Uf 5055 is a small bank leaning against the face of a wall (ST 21). It is very soft, including a grey soil and very thin sand.
- Located under both UF 5052 and 5055, UF 5053 includes many fragments of mortar, coral blocks and a soft brown soil (*ca.* Δ 28,55). Few material was found in it, mostly ceramics, bones and shells.



- UF 5056 is a concrete floor located at the bottom of the room (*ca.* Δ28,50) (**Fig.26**). In some part, it is covered by what could be another floor (UF 5062) It is very hard and it is connected with both the masonry ST 21 and the surrounding walls ST 17 and ST 9,

whereas the wall ST 10 is clearly built upon this floor. Two small pits were dug in this floor, that are filled by heterogeneous layers containing stones, earthy sediment and many small pebbles/gravels (UF 5063 and 5064) probably coming from the preparation layer of the floor. These pits reach the bedrock, at *ca.* Δ 28,40.

B39 F

On the south side of B39, once the collapse layer was removed, a new room connected with the building has been partly identified. As some parts are not yet excavated, the location of the entrance cannot be ensured. This room was probably 4,20 m long and 1,70m large. It is delineated by the walls ST 17 (north), ST 19 (west), ST 28 (south) and ST 27 (east). A small bay is opened in this later wall. This room communicates with area B through a narrow stairway (ST 16). Near its southwest corner, a largely destroyed masonry could belong to a stairway leading to the upper part of room F (ST 20).

Stratigraphy

- The walls of this room were covered by thick layer of collapse (5016 and 5042) including many coral blocks.
- Below these layers, UF 5049 (*ca.* Δ 29,60) consist of remains of the collapse mixing with an earthy sediment including small gravels and whitish unidentified elements. Traces of rotten wood could be observed. It tops a layer including many ceramics shards resting on its surface (UF 5048). This layer is very ashy and some samples have been taken for further analysis (**Fig.27**).
- Just below, three other layers of occupation have been identified (UF 5082, 5086 and 5087), all of them containing few pottery shards as well as many fish bones, ashes and charcoal: once again, samples have been take for each of them.
- Further down, UF 5089 is a huge backfill containing many big stones, coral blocks, few ceramic shards and earthy brown sediment. It is about one meter thick, culminating at *ca.* Δ 29,40.
- At the bottom of room F, UF 5097 is an earthy layer, brown and including small pebbles (*ca.* Δ 28,35). One ceramic almost complete was found in it.
- West from the supposed stairway remains (ST 20), just below the collapse layer, UF 5072 is a hard brown sediment including many small gravels and pebbles, as well as a lot of pottery (*ca.* Δ 29, 90m). This UF is leaning on the coating of both ST 20 and wall ST 2.
- Below, UF 5077 is a layer of pebbles and gravels including many ceramics shards. Its upper part (*ca.* Δ 29,70) fits with the interruption of the coating of ST 20, whereas this layer covers the coating of ST 2, which is slightly recessing at its bottom (*ca.* Δ 28,40 / 29,35).



General analysis (Fig.28-29_ General views of the building)

Due to the lack of time for an accurate observation of the walls and whereas no precise study of the material found – especially the ceramic – could have been done, the results, the dating and the hypothesis are naturally largely tentative. It seems that three mains phase should be isolated: before the erection of B39, during the use of this building, and the collapse and abandonment of the building. Inside the second phase, different transformations occurred and it will therefore be divided into two different stages.

PHASE I

In this area, the bedrock is quite irregular: culminating at *ca.* Δ 29, 20 in the western part, it is only at Δ 28,40 in the room E, and below Δ 28,20 outside eastern face of the building, where the bedrock has not been reached. Moreover, many huge boulders are included in this natural layer, so the area was first strongly irregular.



The first phase is connected with the rough wall ST 32, unearthed in the northern part of B39-B2. It has been directly built upon the bedrock, sometimes using some of the boulders included in it. The southern face is quite regular, whereas the northern one is less regular. This wall is 70cm large, and only one course is preserved. Outside this room, no other masonry could be connected with that wall, so it is impossible to precise the plan of the building (?) it belongs to.

South of that wall, UF 5067, 5047 and 5066 could be interpreted as circulation/occupation layers connected with the same phase. They could be both external or internal layers. As they have been only excavated in a restricted area, the material found could hardly help any dating of this phase.

This wall has been later cut by a foundation trench when wall ST 9 was erected.

PHASE II

Most of the walls of building B39 have clearly been restored or rebuilt in many places, some bays or doors were blocked, new ones were opened... Unfortunately, due to a lack of time, it was not possible to observe and describe all these masonries as neatly as would have been necessary. This work will be made during the next season and the present analysis is therefore schematic and tentative.

For instance, we will consider that all the building was built in a same architectural phase (PHASE II, stage I), whereas it is first obvious that the western part (section A and B) is clearly not in the same line than the eastern one (rooms D and E) : this could indicate that they were erected during two distinguished building campaigns (it also has to be noticed that the partition wall ST 9 is leaning against the inner face of ST 7, which could also indicate that part of the eastern section of the building belongs to a later addition). Regarding the northern wall, recorded as ST 7, it is clearly made of distinguished sections : the western extremity is the largest (ca 90cm), whereas it is only 75 cm large in most of B2. In this room, this wall shows clear testimony of partial rebuilding, probably related to the set up of the access/bay ST 33. And East from this specific feature, the same wall narrows once again (only 46cm !) and its orientation differs from the one used for the western parts. And another recess can be observed where wall ST 7 and masonry ST 21 are connected. Moreover, the wall ST 7 clearly coats the partition wall ST 14 and cuts the small bench – ST 34 – connected

with both this wall and the partition wall ST 29... All these masonries are clearly not strictly contemporaneous.

Stage 1

During the building phase, many backfills mostly make of gravels, pebbles and a lot of ceramics shards have been carried here to level the surface : UF 5102, 5092, 5078, 5079, 5065, 5071, 5096 and the layer observed below the cement floor in room D1. Most the time, these backfill lean against the inner face of the walls, which were therefore used as retaining walls for this backfill. Nonetheless, the southern wall of room B has been built on top of this backfill (ST 17). In fact, its northern part is built upon this backfill, but it is not the case for its southern one : here, the face of wall – which is also part of room F – go down until it reaches the bedrock...

The ceramics coming from this backfill seems to belong to the fourteenth century, so one might assume that at least part of the building was erected at that time.

In this stage, the platform of room D did not exist : a cement floor was there built at *ca.* Δ 8,50 m, almost the altitude of the bedrock in room E. As no traces of such floor have been found in this room, a partition surely already exists between rooms E and D, maybe not exactly at the same place. Altogether, rooms E and D belong to a space of approximately 21 m².

To the same stage, we could associate a first access documented by the big polished stone and the associated mortar (UF 5084) later covered by a new threshold (ST 12). A bay or a niche was probably set up in the south-west corner of the room, as wall ST 17 have clearly been partly rebuilt later.

The section B was not yet divided in two rooms. It is about 35 m². Inside this section, a small basin (ST 22) has been set up in the layer of backfill bring for the construction work. It is not possible to ascertain its function. In this room, if part of the earlier wall ST 32 have been covered by backfill, some of its stones still arise from the floor, which was therefore quite irregular (in fact, these stones were directly covered by the level of collapse). Further west, section A – *ca.* 22 m² - was already divided in two rooms by the partition wall ST 29. Nonetheless, another wall might have already existed in the location where partition wall ST 4 was later build, as the cement floor found in room A1 (UF 5101) has no equivalent in room A 2 (here, the floor is make of beaten earth : UF 5090). In the room A1, a specific structure was related to the floor, but its original shape like its function remain totally unknown (ST 30).

In room A3, a small masonry bench was running along some of the wall. Once again, its function is not clear.

Outside the building, the room F might be associated to the same stage (but the staircase ST 20 seems to be a latter addition, as it is covering the coating of wall ST 2).

In sum, at that time, the building might have already the same general layout as in its later phase, even if some transformation might have occurred.

Stage 2

In this stage, the eastern part have been transformed : a stairway connected with a dividing room (ST 10) has been built, and all the northern part was no raised. The function of this platform as that of the stairway are not cleared : the upper step is higher than the circulation layer of the platform, and one can assume that this stairway was originally going higher, maybe devoted to reach the roof of both room D, E and B ? Inside room E, the floor was mostly made of ashy layers containing many remains of food (but nothing that could be interpreted as clue for restituting an hand-craft activity) related to a least one fire place (ST 25) and maybe a cooking pot used as an oven (ST 26). A “paved” path was running along the northern wall of the room and the stairway, and a new threshold was set up for the access of section B.

Inside section B, a partition wall was erected (ST 5), and the small basin now abandoned. Different floors were later set up inside this room : first UF 5023, later UF 5013/5014 related to the backfill UF 5022. Inside B2, the floor was the UF 5054, which is related with the stairway ST 16. This clearly indicate that the room F was now almost completely filled by Uf 5089. On top of this, different layers documented the latest occupation of this room (UF 5087, 5986, 5082 and 5048).

In section A, a new partition wall was erected between room A1 and A 2. Inside room A1, many specific features have been found : a stone base apparently devoted to support a mortar or a grindstone, and also a stone covered with a purple sediment. All around, an important quantity of the same sediment was scattered. In the collapse layer, many pieces of an undefined masonry were also found inside this room. Inside room A2, different floor have been fitted out until the last one, UF 5025. No specific items could be related to this.

In the room A 3, a first floor and an occupation layer was built upon the “bench” belonging to the previous stage. Part of the body of a goat has apparently rotten here... Later, this layer was covered by UF 5035, the occupation layer that has delivered the richest material. Apart from the mortars, grindstones and pestles, specific items as a huge shell, bronze objects and a small mould were found. In the same layer, two small weights and semi-precious stones, some of them rough, the other ones partly carved have also been collected. All these elements could be clues to interpret this area as one devoted to craftsman activities, maybe manufacturing small objects or jewels. Unfortunately, no fireplace connected with this activity have been found.

In sum, before its collapse, this building was at least partly used for handicraft, and it could also have been used as a shop. In fact, the general layout of the building does not match the one of the houses already excavated in Qalhât, even if the room E seems to have been mostly devoted to culinary activities. The study of the numerous samples will probably help to precise the function of the different rooms.

Among the collapse or even in the walls, many specific features are very interesting testimonies of the general layout of the building. It is first clear that the wood as an important place inside the building : wood beams or planks are included in the masonry : most of the time, only their prints remain, but a plank is still preserved in room D. Wood

elements are also associated with the access or the stairways. Moreover, inside the collapse, the different prints found in some of the mortars elements clearly indicate that the roof of both rooms B2 and E, at least, were made of wood beam associated with smaller perpendicular branches, but also probably palm mat. The beams were most probably visible from the rooms, and pigment traces observed in the same mortar seems to indicate that they were partly covered with red painting. On top of this, corals blocks were also used for the roofing.

The ceramic found in the latest occupation layer will probably help dating this phase (many Chinese shards have been collected). The ceramic study has not yet been done, but we could already notice the complete lack of Bahla ware, quite common in the late occupancies layers of Qalhât (first half or middle of the sixteenth century).

PHASE III : The collapse.

The walls of the building are completely grey in some parts, and many pieces of burnt wood have been found inside the collapse, especially in room B and E. This probably indicates that the building was burnt. After this destruction, no clear traces of reoccupation could be observed, and this area was probably almost completely abandoned until the building completely collapse.

This building is the first one excavated in Qalhât that seems to have been almost completely destroyed by a fire. Moreover, after this disaster, the building was completely abandoned, and the material present in the room was not recovered. No material belonging to the latest phase of occupation of Qalhât could be related to this building.

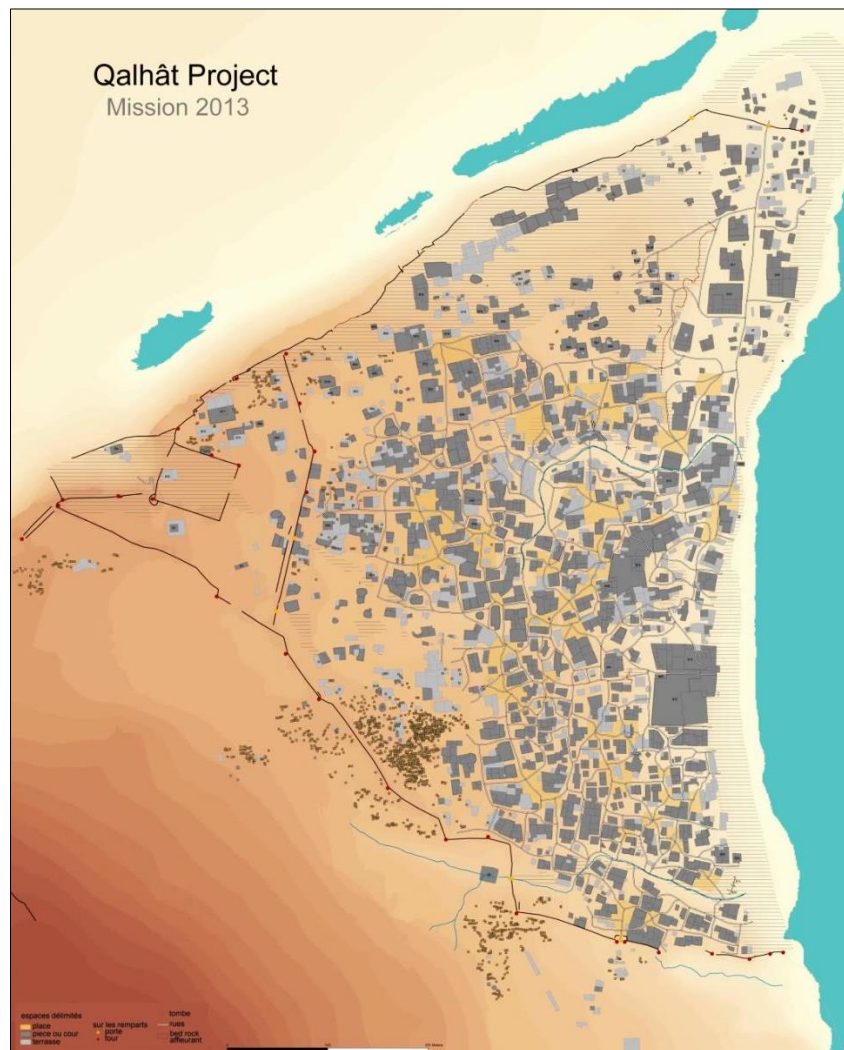
According to these elements, it is not impossible that this building was destroyed during the attack of the Portuguese, and never reinvested after that. If it is the case, it would be the first clear testimony of this tragedy ever identified in Qalhât.

B. Surface survey of the ancient quarter

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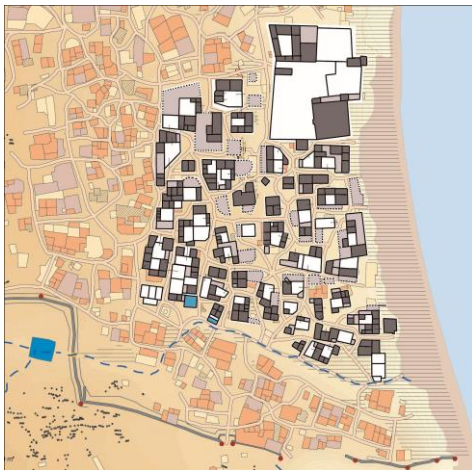
Introduction

In 2008-2010, the Qalhât Cartographical Project lead by geographers from the CNRS *Archéorient* lab in Lyon succeeded to draw a preliminary map of the medieval city, thanks to a fund of the Total Company (**Fig.30_Preliminary map of the medieval city, from the 2008-2010 Cartographical Project**). The plan was based on a GIS built on a surface mapping of the ruins by differential GPS and the study of kite photographs. Although the Cartographical Project succeeded to map the entire surface of the site in the limited time allowed, three two-week missions, the ruins are extremely difficult to interpret in some areas and the plan was more or less accurate. Furthermore it had to be interpreted by an archaeologist.



One of the objectives of the second QP five-year session is therefore to achieve a comprehensive and precise survey of the entire surface of the site, to verify and detail the map of the Cartographical Project. It will provide detailed information on the spatial organization of the city, the different quarters, the various street networks, the boundaries and inside plan of each building. It will thus provide an accurate documentation for the publication and the development of the site, especially for 3D digital restitutions.

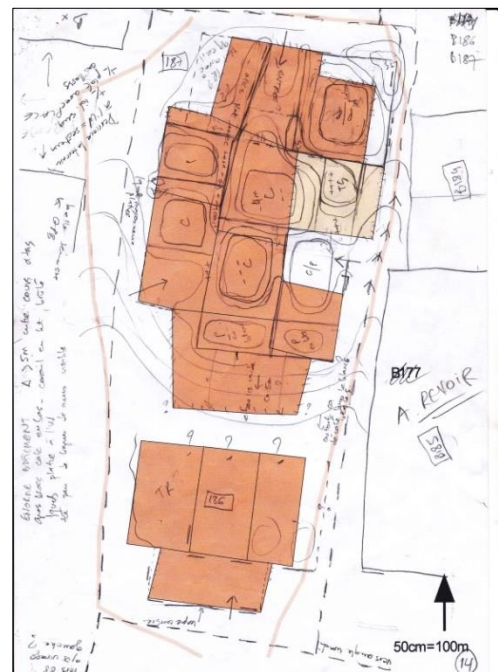
Last season, the survey had concentrated on the south part of the ancient quarter of

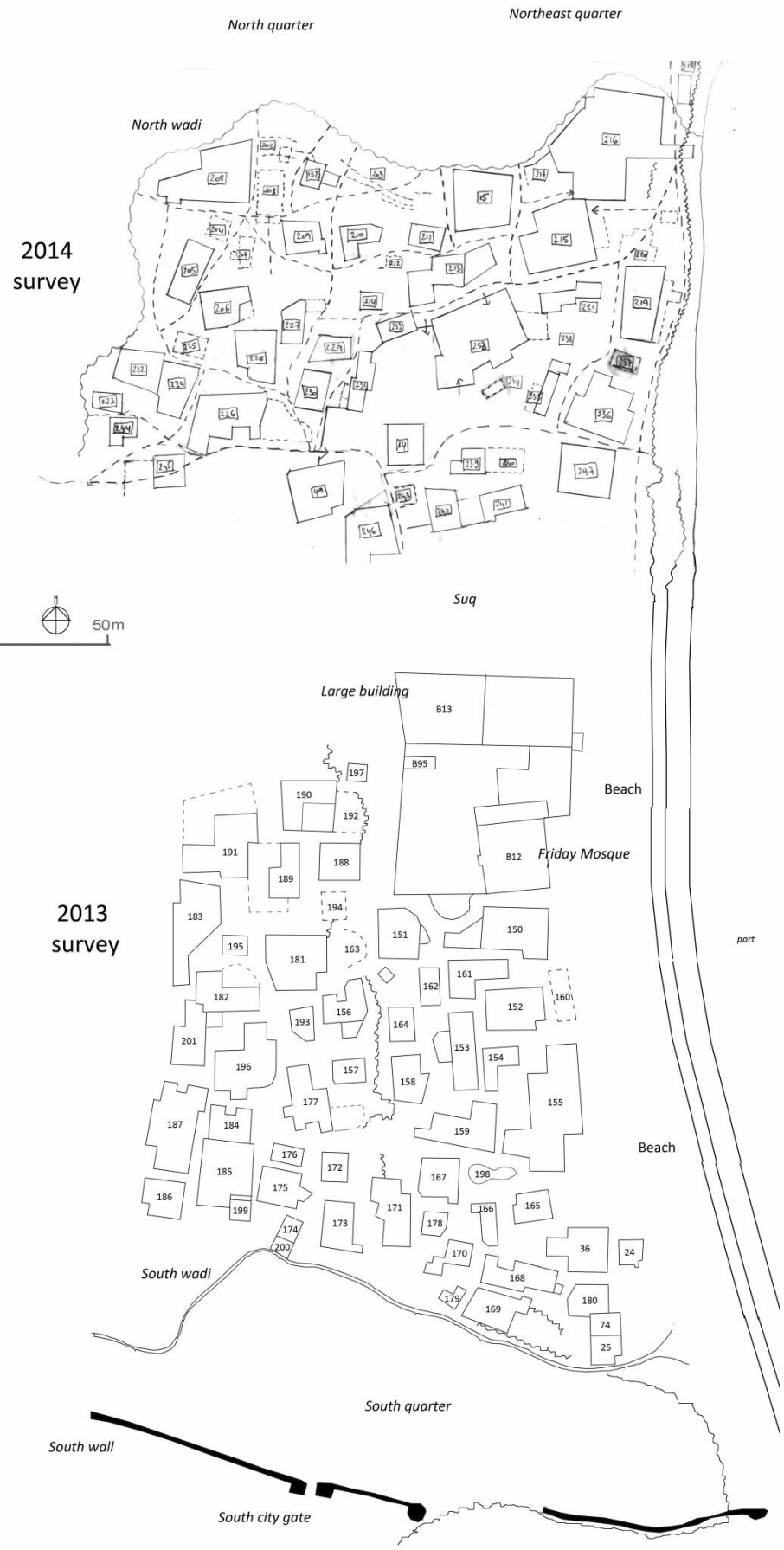


Qalhât, around the Friday mosque which was then under excavation by the QDP (**Fig.31_Map of the 2013 survey**). The complete area between the main west-east street leading to the mosque and the southern inside wadi, a distance north-south of 200m, and between the sea and the main north-south street of the city, about 150m east-west, was at that time surveyed. Altogether it represented a surface of c.3ha, the most densely built of the city and therefore the most complex to interpret. Fifty buildings mapped in this area by the Cartographical Project were checked during this 2013 season.

Results of the 2014 season

This year the survey concentrated on the northern part of the ancient quarter, not too far from the current excavations in B39. It covered an area approximately 190m east-west and 130m north-south (about 2.5ha) which is well defined between the cliff above the sea to the east, the deep northern *intra-muros* wadi to the north and west, the modern track and the high natural ridge overlooking the great mosque to the south. About 40 buildings had been registered in this area on the map of the Cartographical Project, which were checked and analyzed this year. Extracts of the map scale 1/200 were printed on A4 sheets and then redrawn and noted on the field following the detailed study of the surface (**Fig.32_Example of survey field sheet**). The contour lines were roughly indicated, all discernable lines of walls were excavated, the circulation network, limits of buildings and inside spaces were defined, the identification was given when possible (courtyards, rooms, terraces...) (**Fig.33_Sketch map of the areas surveyed in 2013 and 2014**).





The wadi

The area is mainly defined by its position on the right bank of the northern *intra-muros* wadi which makes a rather deep depression in the ground, furthermore dominated on the other bank by the natural ridge and high buildings of the north quarter (**Fig.34_The mouth of the wadi, between the central, right, and the northern, left, quarters**). It is clear that this wadi played an important part in the life of the city. Supply water structures were built inside, as walls, small dams and cisterns for the collect and conservation of rain water (**Fig35_Dam wall in the wadi**). The flow was probably rather forceful at time as shown by the fact that the banks were strongly reinforced and nearly entirely masoned with facing walls. As a matter of fact the buildings on top of the bank were seemingly erected on terraces, the facing wall against the bank of the wadi reinforced at the back by perpendicular walls making coffered which were probably backfilled to produce terraces in front of the building (**Figs. 36-37_Facing and reinforcing walls in the wadi bank**). Several streets of the city were also crossing the wadi, connecting the north and central quarters, and the slopes between the buildings were landscaped by carving the bedrock and/or building walls to create stairs and terraces. Buildings along the shore, on top of the cliff, had also impressive walls on that side, based on large blocks, seemingly making a continuous line only interrupted by the opening of streets, as a fortification wall described by Ibn al-Mujâwir.



The quarter

Up the south bank of the wadi, the general layout of the quarter is very different from what it is in the south part of the quarter surveyed in 2013. The buildings are more widely scattered, with wide empty spaces and no really planned street network. As a matter of fact, two main sectors may be recorded in the area surveyed this season.

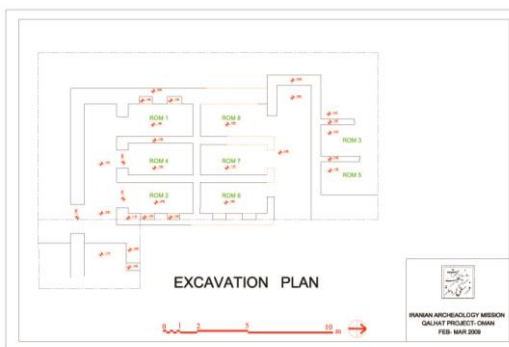


To the west, on the city side, are rather small constructions up to 200m², with rooms and often a courtyard, which are probably houses. Among them is a platform mosque (B132) with a prayer hall about 7 x 9m and a small courtyard probably 6 x 6m, which was dominating the wadi bed for about 10m; several parallel walls are visible on its northern side and it is possible that it was built on top of a stepped basement, in any case a very impressive construction when seen from the wadi (**Fig.38_Platform mosque B132 overlooking the wadi**).

wadi level to the north, about 8m below (**Fig.39_Building B15 with retaining wall along the wadi, and cistern B217**). B216, at the junction of the wadi and the shore, is a huge complex quite eroded on the wadi side, with several large spaces as courtyards, rooms and terraces, which could be an administrative building rather than a cluster of several domestic units. Traces of two west-east parallel walls, 4m apart, are protruding from its eastern seaside façade until the edge of the cliff, and fragments of bedrock with traces of masonry have collapsed down to the seashore (B26). It therefore seems that the north-south street alongside the cliff, which was connecting the area of the Great Mosque to the north-east quarter, was interrupted in this area, maybe by a gate (**Fig.40_Walls B26 closing the coastal street between B216 and the cliff up the shore**).



The B14 complex

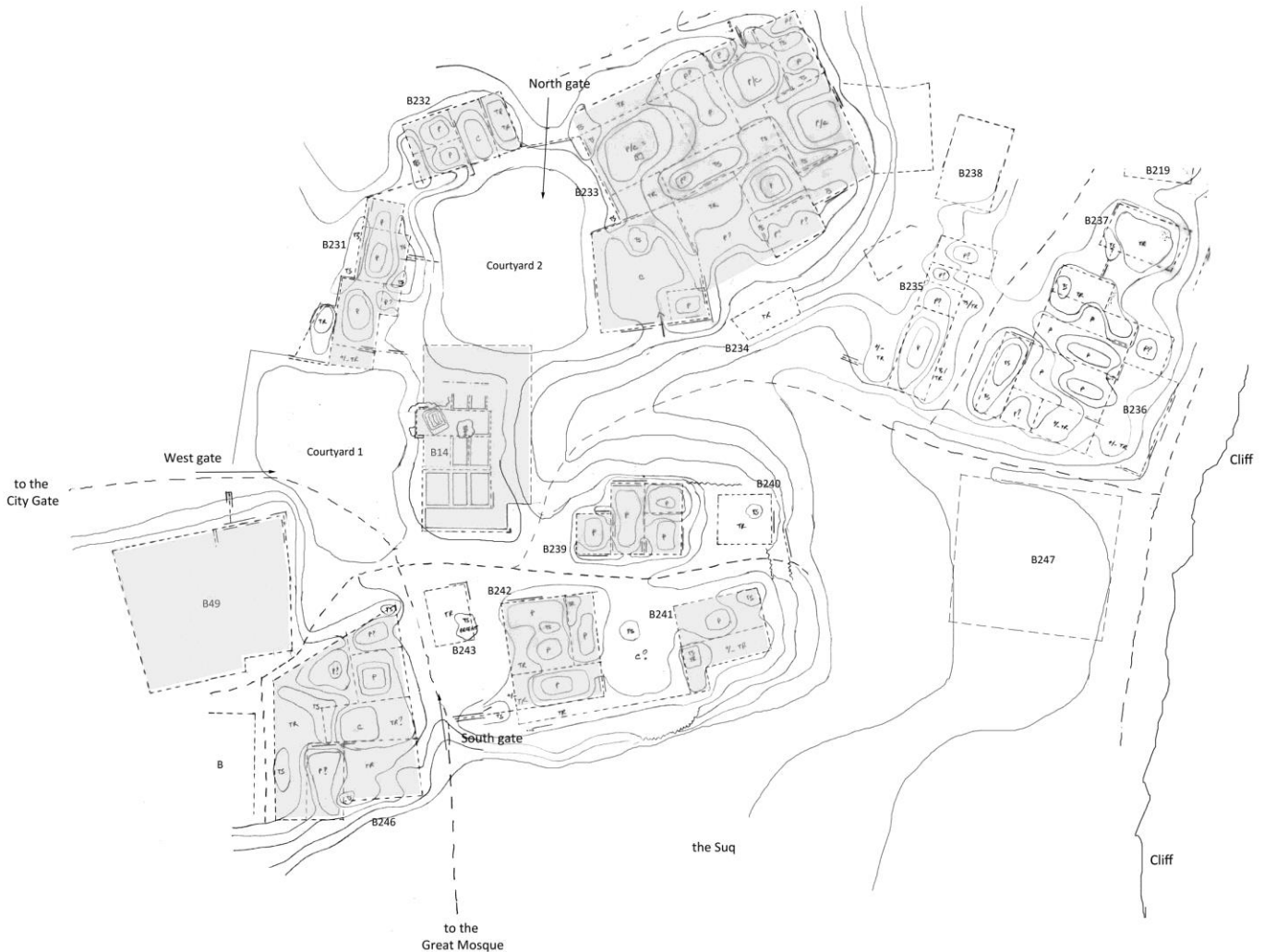


But the main edifice of this area was the B14 complex. The building B14 proper is located south of the area surveyed, near the crest of the rocky ridge which overlooks southwards the ancient part of the city in the natural depression along the beach, mainly the *suq*, the large building B13 and the great mosque B12. It stands at the extremity of a marked hollow of the ground, as a short wadi, leading eastwards to the shore, some 20m down (**Fig.41_View of the sea from building B14**). The ruins of B14 are crowned by a huge fragment of massive fallen masonry entirely plastered on nearly all sides, whose original position and function is difficult to ascertain.

Excavations held there by an Iranian team in 2009 revealed the presence of small rooms as cells, with a corridor and possibly traces of a cupola (**Fig.42_Iranian plan of B14**), together with walled arch but no notes nor any report were made and it is impossible now to understand this building, at least without further excavation (**Figs.43-44_West side and cells of B14 after Iranian excavation**). Fragments of an inscription were found, and also possibly Kashan glazed tiles of the turquoise and lajvardina styles, which are now stored in the MHC as issued from the Iranian mission but whose exact provenance is unknown (**Fig.45_Inscription and Kashan glazed tiles from the Iranian mission**). It is therefore clear that B14 was a very important edifice of the medieval city of Qalhât.



B14 is in fact part of a wide complex which includes two wide courtyards about 400m² each on the southwest and northwest sides and several associated buildings which are mainly erected on top of the ridges on both sides of the hollow (**Fig.46_Plan of the area of the B14 complex, showing the buildings which are, probably (in grey) or possibly (in white), part of the complex**).



Courtyard 1 is located west and south of B14 and courtyard 2 north of it, both possibly separated by a wall. Courtyard 1 was closed on its west side by a wall 1.40m thick, with a gate opening just in front of B14, at the extremity of a city street, now crossed by the modern track (**Fig.47_West gate of the B14 complex, leading to courtyard 1 in front of B14**). To the north the wall is joining B231 B232 and B233, three nearly contiguous buildings on the west, north and east sides of Courtyard 2. A north gate to the complex seems to be located



between B232 and B233, this building being a very large construction, approximately 30m x 26m (c.780m²) standing on top of the corner of the steep slopes of the hollow, south, and the shore, east. To the south, the south jamb of the west gate is abutting B49, a building which is located at the corner of the street and courtyard 1 and could either be part of the complex or an outside structure. At the back of B49 is B246, another large construction on top of the ridge overlooking the depression south, followed to the east by B242 and B241, also located on top of the ridge. B246 and B241 are linked by a wall 1m large and it is probable that a south gate was located there, leading down to the ancient part of the city and the great mosque, although the modern track destroyed all trace of it. North of B241 and B242 is B239, a rather small construction standing on top of the south slope of the hollow, opposite B233. The top of the hollow was therefore entirely crowned by buildings, B233 to the north, B239 to the south, and B14 to the west. This central building of the complex was standing up just in front of the street climbing up the hollow, certainly a most impressive view for people coming from the shore. As a matter of fact it seems that the lower part of the hollow, buildings B235, B236 and B237 to the north, and building B247 to the south, were possibly also part of the complex. At least it appears on the ground that the eastern massive sea-walls of B236 and B247 are interconnected, with a narrow entrance leading to the hollow in-between, which was probably closed by a gate.

The function of the B14 complex is not very clear yet. It could be the palace of the governors of the city, as B13, close to the great mosque, seems definitely too small. But the cells uncovered by the Iranian team suggest that it could also be an official compound, including a *khan*, a hospital and several other public facilities of that kind, as the one which is described in Hormuz by contemporary travelers and geographers.

Conclusions to the survey

The study of the central quarter of the medieval city of Qalhât is planned to be completed during the next season of the Qalhât Project, in fall 2015. The cartographers of the Cartographical Project will then come back to the site in spring 2016 to refix precisely in the GIS all the architectural features brought to light, especially the lines of walls. The exact location and dimensions of all the identified structures (buildings, rooms, courtyards, terraces) will therefore be acknowledged, allowing the production of precise maps and 3D restitutions of this quarter in collaboration with the Iconem Agency.

The final objective is to continue this work on the entire site to be eventually able to produce a plausible reconstruction of the whole city. Although the peripheral quarters are rather wide, they are much less densely built than the central quarter and this work could be completed before the end of the current five-year plan of the QP and QDP.

C. Architectural study of B21

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The main objective of the Conservation Component of the QDP this year is to achieve the conservation work at B21 for future display in the Archaeological Park. B21 is a huge edifice which was tested in 2008 and extensively cleared during the first season of the Qalhât Development Project, in February and March 2013. Several architectural phases were then identified but the masonry is very heavy and the mortar very strong and the joints were not completely cleared for fear of weakening the structure. Its chronological evolution was therefore not precisely understood then.

This season, B21 was the main focus of the conservation component of the QDP and the joints between stones were consequently entirely cleaned by workers to prepare the repointing for conservation work (see conservation report, **Fig.48** *General view of B21*). The necessary architectural study preliminary to this work was then made possible and realized during the QP mission.



Architectural description of B21

B21 is located in the north-west quarter of the city between the twin houses B94 and the small terrace mosque B19. North is the city square opposite B19, west east and south are streets. It is a large construction ca 27 x 28.50m, i.e. about 770m². It shows a nearly square shape, except for an irregularity in the northeast corner which is most probably due to the desire of leaving a wide passage between B21 and the southwest angle of nearby building B20.

The walls are mainly built in medium or rather large blocks of limestone which are roughly squared and embedded in a heavy red mortar with a wedging of small stones in the joints, a very specific building technic which is rather rare at Qalhât where most edifices are built in coral blocks in brown hearth mortar (*Fig.49-51_Walls of B21*). The B21 mortar includes hydrated lime. One of the main characteristics of this lime is that it strengthened when in contact with the air, and this means that the layers of collapse are sometime more compact and strong than the walls themselves. Excavation was therefore laborious and difficult at B21.



The walls are of different width according to their location in the building and are therefore of different masonry. The peripheral walls are 90 to 100cm in width and are made of two facings in cut blocks with an inside filling of medium round stones as pebbles. The main inside walls are with two similar facing but an inside filling of smaller blocks. Some secondary or later walls are 60cm wide and made of smaller cut blocks or in round blocks as boulders.

The careful study of the architectural features of B21 in collaboration with Mr Vincent Bernard, field manager of the Conservation Component of the QDP and a stonemason, brought very interesting information about the building technics in use at Qalhât during the Middle Ages. They will be published in detail later but some key aspects for the understanding of the chronological evolution of B21 may nevertheless be given here.



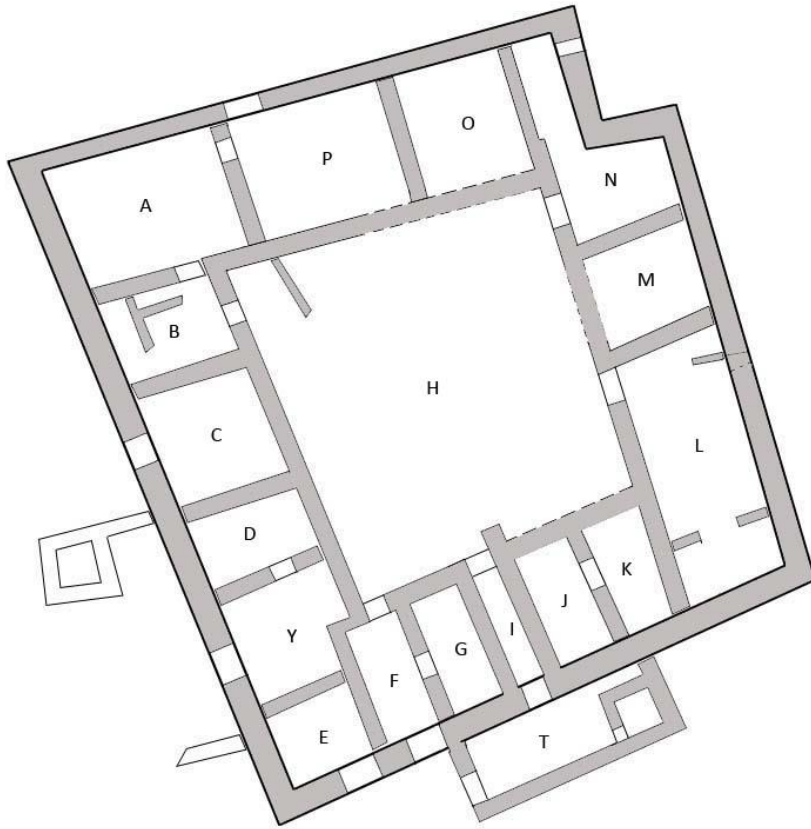
For example, the walls were erected in three stages as shown on the south peripheral wall (ST 30) which is preserved up to nearly 2.5m (*Fig.52_South wall ST 30*). The lower parts of the contemporary walls were built in one stage, with no clear courses visible, up to 1.10m in height, which seems to be the maximum height of work possible for the mason standing on the ground. The summit was then levelled by a row of flat small fragments of stone. On this level the mason continued building the wall but as he was now standing on a scaffolding, which was seemingly rather small, the wall was built in sections, the mason being obliged to regularly shift the scaffolding before continuing the construction. This explains why vertical lines are visible in the masonry of the upper part of the wall. It is interesting to note that in this wall the second part of the masonry is made of stone which are much bigger than in the lower part, which proves that the work schedule

was not perfectly organized. A second levelling line is visible 0.90m higher and this indicates that the scaffolding was about 0.90m high, reaching about 20cm below the first levelling row, which makes again a constructing height of 1.10m. It can therefore be supposed that the building or at least the ground floor was 2.90m high, with three stages of construction. Although the other walls are much less preserved, the first levelling line is still visible on some of them at the same altitude, which indicates that they are contemporary.

Chronological evolution of B21

The main clue for the relative dating of walls in a construction is the fact that they are bounded, or leaning on, or leaned by, other walls. Unfortunately it seems that the masons of B21 were not very acute in their job, contemporary walls never being tightly bounded in the corners. Sometimes only one stone of the façade proves the contemporaneity of two walls, sometimes even it is only in the filling of walls that the bounding appears. This clue is therefore often missing but the associated study of the masonry, the wall connections, and the stratigraphy allow us now to identify four phases in the evolution of B21, whose plan underwent important changes (**Fig.53_Zenital view of B21 by Iconem**).





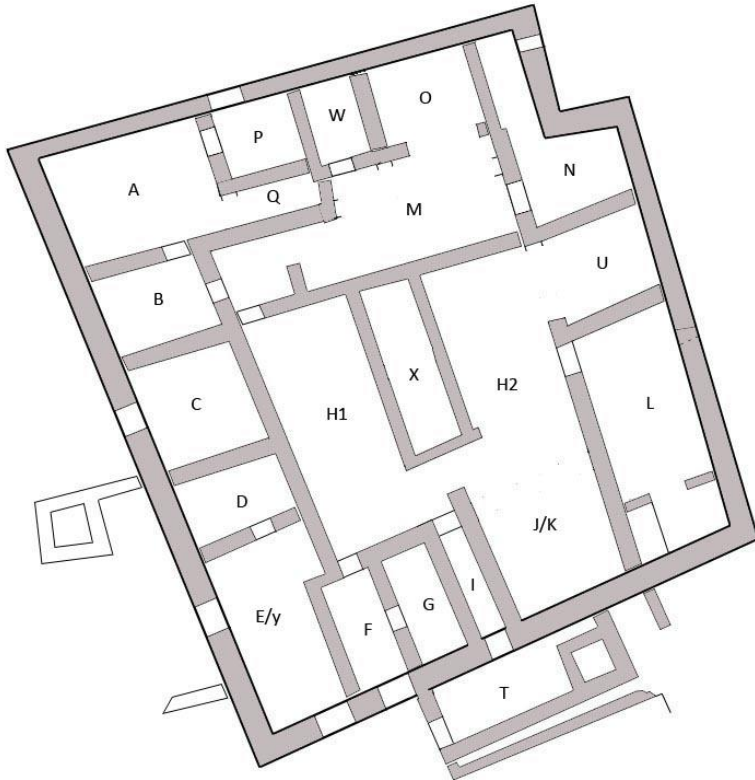
Phase I

This phase (Fig.54_Plan of B21 in phase I) was built on the bedrock after the main irregularities of the ground were levelled with a thin backfill of small fragments of stone, which delivered material dated to around the beginning or the first half of the 14th century. The first walls built are the peripheral walls which are all bonded together and measures 90 to 100cm in width. Then four aisles were created around a central square courtyard (H) by building the walls on the courtyard bonded to partition walls

which are leaning against the peripheral walls, all about 70cm large. The building possibly started from the northeast wall, between rooms O and N, which measures 50cm against the north wall and then becomes 70cm wide, maybe a mason remorse. The floors of the building were then of a red clayey layer.

The main general access seems to have been in the middle of the south wall, through the entrance room T leading to the corridor I whose both shear walls are the only ones to be bounded with the peripheral wall. Turning counter clockwise ten units, made of one or several connected rooms, may be registered in the aisles:

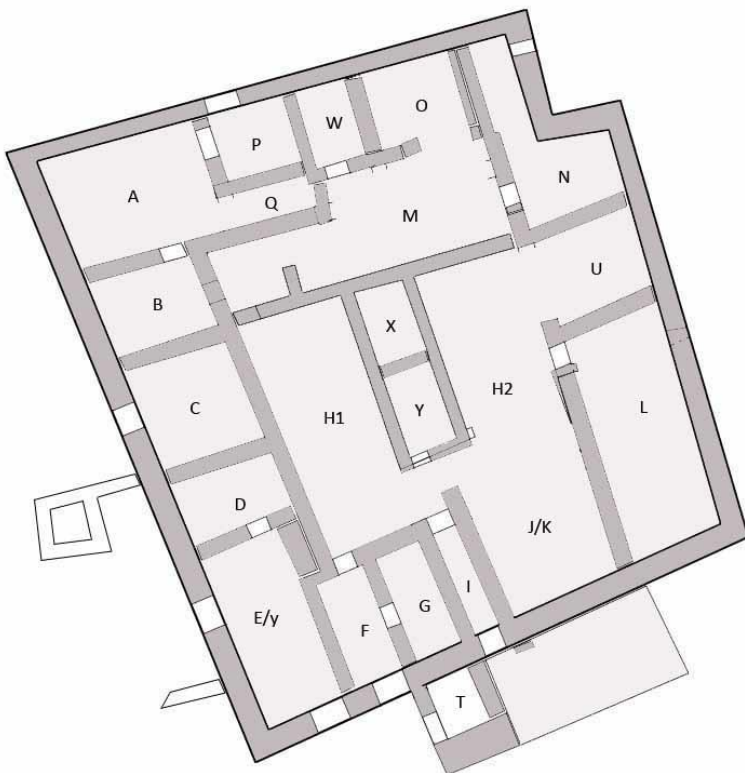
- J/K, opening to the courtyard
- L, opening to the courtyard, with a small opening in the east wall which was later closed
- M, opening to the courtyard
- N, opening to the courtyard
- O, opening to the courtyard
- P/A/B, opening both to the outside north and to the courtyard
- C, opening to the outside west
- D/Y, opening to the outside west
- E, opening to the outside south
- F/G, opening both to the courtyard and the outside south



Phase II

In the following phase the entire inside organisation of the building was revised (**Fig.55_Plan of B21 in phase II**). A structure with walls in boulders was built inside the courtyard, still on the bedrock, dividing this wide open space in three small areas, H1, H2 and M and creating a central elongated room X. To enlarge the small new courtyard H2, the rooms J/K and U were then widely opened, their façade wall on the courtyard entirely destroyed. The north aisle was also entirely reworked to enlarge courtyard M, the ancient façade partly destroyed on its eastern half and rebuilt

two meters further north, with the creation of a new room (W). The south wall of the south entrance room was doubled by a parallel wall, the space in-between filled with stones, maybe to support a high structure there.



Phase III

Later the entire building was filled with a backfill of small fragments of stone, between 15cm and 45cm thick depending on the room, a huge work for an unclear function (**Fig.56_Plan of B21 in phase III**). Some other changes were also made, as the closing the doors between M and B to the west, H1 to the south, therefore separating entirely the northern part of the building from the rest of it. Several other doors were also narrowed and two stone massifs were built in rooms E/Y and O. It must also be noted that room X in the central structure of phase II was partitioned in two smaller

rooms X and Y and the south wall of this structure was entirely rebuilt. But the main architectural change occurs in the south entrance area. A shear wall in boulders was built in room T. All constructions east of it were erased up to 50cm in height and filled with a thick backfill creating a rectangular terrace against the south peripheral wall. The western part of room T was not backfilled and it was probably still used as a guard room for the main entrance to the building, now through room F. As for the outside western structures their dating is unknown.

Phase IV

Much later, when B21 was mostly collapsed, some people squattered the area. They rebuilt some walls on top of the ruins, mainly in the southeast corner which was the best preserved, together with a circular cattle shelter attached to the southwest corner. They are built in dry stone and with curving layout and some material was found in these levels which indicates that this phase could be rather recent, dated to the first half of the 19th century.

Conclusion to the study of B21

As indicated by the material in the bedrock backfill, B21 was built in the first half of the 14th century, a huge and massive squarish construction with four aisles around a central square courtyard, significant of the then blooming expansion of the city. The material brought to light does not give any clue about its function but it is more than probable that it was some kind of a store or a *funduq* owned, or at least used, by several customers/merchants of Qalhât, each one having the use of one room, sometimes connected to a back room. The fact that these units were opening onto the inside courtyard or to the exterior is certainly significant of their precise function but the details are still difficult to understand.

The reorganisation of the courtyard and northern wing in the second phase is significant of an important change in the history of the building, maybe a change in its ownership as its function seems to have been kept the same. The fact that wall of this phase were also built on the bedrock, with nearly no traces of the occupation layers of phase I seems to indicate that this change appeared rather quickly, certainly in the 14th century. The occupation layers of this second phase are also very thin and did not delivered much diagnostic material.

The third phase is characterized by the dumping of the entire building with the thick backfill, which delivered quite a lot of material, dated to the 14th-15th centuries. This phase may therefore be dated to the 15th century. The building seems to have been in use until the beginning of the 16th century, maybe abandoned after the Portuguese attack. The collapse layers delivered material of the 16th.

D. Zooarchaeological study of the mammals and birds

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After a first campaign in March 2013 (see 2013 report), the second campaign of the study of the zooarchaeological material of Qalhât took place from 1st to 17th September 2014. Its purpose is the study of the material of vertebrates, mammals and birds, from the various buildings of Qalhat. Fish and shellfish will be reviewed shortly. So it is good to remind that the zooarchaeological study is important not only for understanding the environment of Qalhat but also to better understand the subsistence strategies of the inhabitants of the site and the sources of this diet.

Thus the study of B94 (a domestic building) and B12 (the mosque) buildings, initiated in 2013, were completed and new buildings were studied as B13, B139, B140 and the cistern B2. This work is in progress. So it is not possible to provide quantified data for each of the buildings. These will be provided soon.

However the first results confirm the results of the first study (see 2013 report):

- If the subsistence of the Qalhat inhabitants during the Middle Age is resolutely turned towards the sea with an over-abundance of fish remains, caprines and especially goat (*Capra hircus*) represented an important part of the staple food. It is not surprising to find many sheep/goat individuals given the important role played by these animals in the diet of the inhabitants of Qalhat: they are the main source of food in meat, but also in milk.

The milk consumption is confirmed by the age profile according to the different age stages defined by Payne¹. This age profile for the building B94 shows an exploitation of caprine for meat or for secondary products such as milk or wool. Indeed, for the exploitation of the meat, we can distinguish a majority of lambs slaughtered between 6 months and 1 year for tender meat and adults slaughter between 1 and 2 years at maximum meat yield. Normally the milk production results in a strong slaughter of young before weaning between 0 and 2 months and its operation by the reformed females (stages EF). The exploitation of fleeces do not require to slaughter the animal, it is only seen when intensive, but results generally by the strong presence of adults. It is important to remember that it is only a management trends and that these operations can overlap².

¹ Payne, S 1973. Kill-off patterns in sheep and goats: the mandible s from Asvan kale. *Anatolian Studies* 23, 281-303.

² Blaise. É. 2005. L'élevage au Néolithique final dans le sud-est de la France : éléments de réflexion sur la gestion des troupeaux, *Anthropozoologica* 40, 191-216.

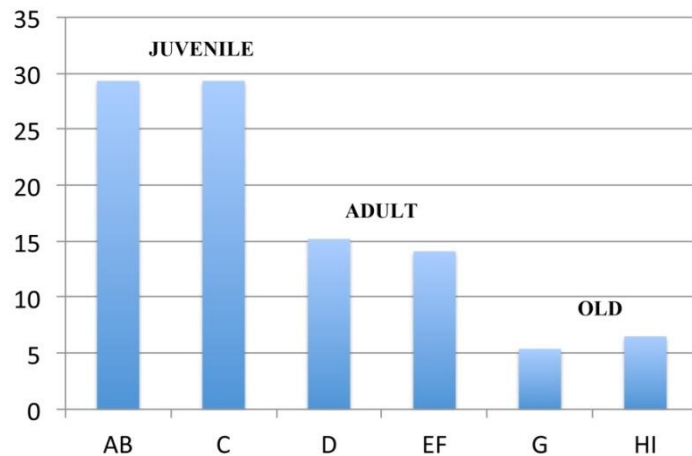


Fig.57 Caprine age profile in % according to Payne stage (1973) for the building B94 (Stage AB = 0-6 months; Stage C = 6-12 months; Stage D = 1-2 years; Stage EF = 2-4 years; Stage G = 4-6 years; Stage HI = 6 years)

The exploitation of very young animals can also be a sign of wealth. The meat consumption is confirmed by the presence of butchery marks (cut and chop marks) or burning traces on bones.



Fig.58 Cut marks on the goat atlas vertebra (first cervical) found in B12-3116 produced when severing the head from the neck (primary butchering)

Helmer, D., Vigne, J.-D. 2004. La gestion des caprinés domestiques dans le midi de la France. In, *Approches fonctionnelles en Préhistoire. Actes de XXVème colloque du Congrès Préhistorique de France* (Nanterre Novembre 2000). Mémoire de la Société Préhistorique Française, numéro spécial : 397-407

Vigne, J.-D., Helmer, D. 1999. Nouvelles analyses sur les débuts de l'élevage dans le centre et l'ouest méditerranéen. *Le Néolithique du Nord-Ouest méditerranéen, XXIV Congrès Préhistorique de France, Carcassonne, 26-30 Septembre 1994* : 126-146.



3 cm



Fig.59_Cut marks on a goat proximal metaphysis of a femur (young caprine) produced for meat processing (filleting)

- Behind the caprines we found the domestic fowl as chicken (*Gallus gallus domesticus*) as the second domestic species well represented and consumed.
- The cattle bone assemblage is relatively small. It seems likely that the bones are from the domestic humpless cattle (*Bos taurus*) but the presence of humped cattle (*Bos indicus*) has not been excluded. Differentiation between these two species depends on the recovery of cranial/jugal parts³ or of thoracic vertebrae. There is some evidence for *B. indicus* from Qala'at al-Bahrein⁴.

³ Grigson, C. 1980. The craniology and the relationship of four species of *Bos*: 5. *Bos indicus* L. *Journal of Archaeological Science* 7, 3-32.

⁴ Uerpmann, M., Uerpmann H. 1997. Animal bones from excavation 519. In: Højlund, F., Hellmuth Andersen, H. (Eds), *Qala'at al-Bahrein; The Central Monumental Buildings*. Moesgaard: Jutland Archaeological Society, pp. 235-264.

- We can note the presence of few specimens of equids (horse, donkey, mule) and dogs. These animals are not consumed, the former are used for the transport of goods or people, or even for farm activities; the second, the dogs, are pets, animal commensal of human activities. It is worth noting the very low marks (i.e., pits, furrows...) on bones made by dogs or other small carnivores (fox), which are generally rummage through the garbage or scavenge some abandoned herbivores carcasses.
- Cats are well represented on the site and were found in almost all buildings. But we'll come back.
- No pig (*Sus scrofa domesticus*) and camel (*Camelus dromedarius*) bones were identified on the site. From antiquity onwards, the dromedary has played an important role in human exploitation of desert region; it is surprising to find no camel bones on the site.
- Some vertebrae of marine mammals (whale and dolphin) were identified on the site. It is difficult to know if these mammals were consumed in the past or if the bones were just picked up on the beach.
- Some new species were identified on the site: (1) two coracoids indicate the presence of cormorants and (2) the ostrich (*Struthio camelus syriacus*) is attested by two fragments of eggshells.

The Socotra cormorant (Phalacrocorax nigrogularis)

The Socotra cormorant is a threatened species that is endemic to the Persian Gulf and the southeast coast of the Arabian Peninsula⁵. It is also sometimes known as the Socotran cormorant or, more rarely, as the Socotra shag. Individuals occasionally migrate as far west as the Red Sea coast. This species is distinguished from the great cormorant (*Phalacrocorax carbo*) by the size⁶.

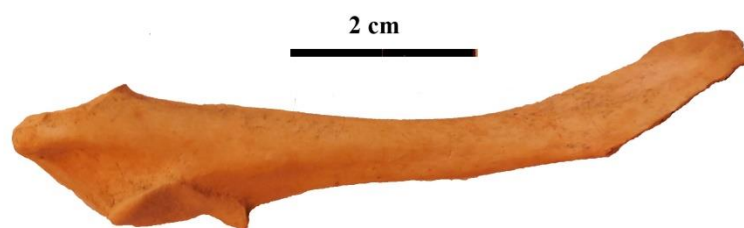


Fig.60_ Coracoid of cormorant (B141-4036)

⁵ Mughal, Muhammad Aurang Zeb. 2013. "Persian Gulf Desert and Semi-desert." Robert Warren Howarth (ed.), *Biomes & Ecosystems* vol. 3. Ipswich, MA: Salem Press, pp. 1000-1002.

⁶ Tomé C. 2003. *Les mammifères et les oiseaux dans l'économie des sociétés protohistoriques et historiques du golfe Arabo-persique (IIIe millénaire avant J.-C.-Ville siècle après J.-C.)*. Thèse Doctorat Université Aix-Marseille 1.



Fig.61_ *The Socotra cormorant (Phalacrocorax nigrogularis)*

Eggshell of ostrich (Struthio camelus syriacus)

If the ostrich bones are quasi-absent in archaeological sites, the eggshell fragments are more or less frequent on archaeological site⁷. The Middle Eastern Ostrich or Arabian Ostrich (*Struthio camelus syriacus*) is an extinct subspecies of the ostrich, which once lived on the Arabian peninsula and in the Near East. Ostriches also appear frequently on petroglyphs from prehistoric time and then in Islamic verse, especially in the poetry from Arabia itself, where the birds were common. The pleasures of ostrich hunting, for example, were extolled, and large numbers of ostriches and eggs were considered an indication of prosperity⁸. Although the wide distribution of ostrich in Arabia can be demonstrated by the ethnohistoric evidence or representational and eggshell evidence just reviewed, the universal absence of ostrich bones in faunal inventories from excavations in the Arabian peninsula nevertheless suggests that ostriches were not killed for their meat, in ancient Arabia, as was the case in Mesopotamia⁹.

⁷ Potts, D.T. 2001. Ostrich distribution and exploitation in the Arabian peninsula. *Antiquity* 75, 182-190.

Studer J. 2010. Preliminary Report on Faunal Remains. In: L. Nehmé, D. al-Talhi and F. Villeneuve (ed.). *Unpublished report. Report on the Third Excavation Season (2010) of the Madâ'in Sâlih Archaeological Project*: 285-293. Unpublished report. <http://halshs.archives-ouvertes.fr/halshs-00542793>

Monchot, H. In press The faunal remains: preliminary results. In, Charloux G., Loreto R. (Eds.) *Dûma II. Report of the Saudi-Italian-French Archaeological Project at Dûmat al-Jandal (Saudi Arabia)*. Saudi Commission for Tourism and antiquities.

⁸ Stone, C. 1982. The camel bird of Arabia. 1982. Saudi Aramco World. Ed., pp. 10-11 (March/April).

⁹ Potts 2001 :186.



1 cm

Fig.62_ *Ostrich eggshell fragment found in the mosque (B12)*

An indirect presence: the Indian crested porcupine (Hystrix indica)

Numerous bone remains of caprine but also chicken found in the courtyard, especially between the building B95 and B13, of the Mosque exhibit characteristics gnawing marks of porcupine. The surface bone modification is a similar fashion to that described in the literature. They include different type of gnawing damage, such as the broad, chisel-shaped upper and lower incisors, and scooping or hollowing out of cancellous bone, usually accompanied by damage around the bone shaft margins¹⁰.



3 cm

Fig.63_ *Shaft tube of caprine tibia showing gnawing porcupine marks (B95/B13-3520).*

¹⁰ See numerous references in Monchot et al., 2012. Palaeodemographic analysis of a fossil porcupine (*Hystrix refossa* Gervais, 1852) population from the Upper Pleistocene site of Geula Cave (Mount Carmel, Israel). *Journal of Archaeological Science* 39(9), 3027-3038.



Fig.64_Shaft tube of a young caprine radius showing porcupine action (B95-3509).

Porcupine commonly chews on bones for calcium and to sharpen its incisors¹¹. In Qalhat the action of the porcupine is definitely occurred on the bones after the abandonment of the place by the inhabitants.



Fig.65_The Indian crested porcupine (*Hystrix indica*)

Cats in the Mosque, cats in the city

But the most interesting animal found on the site is undoubtedly the cat (*Felis domesticus*). More than 360 remains have been found everywhere on the site as fifty bones founded in the building B94 belonging to nine individuals, 3 immatures and 6 adults¹². According to the diagnostic criteria of Kratochvil¹³ these would appear to be from domestic rather than wild cats.

¹¹ Nowak R.M. 1999. Walker's Mammals of the world, sixth ed. The Johns Hopkins University Press, Baltimore.

¹² see Qalhat 2013 excavations report

¹³ Kratochvil, Z 1973. Schadelkriterien der Wild- und Hauskatze (*Felis silvestris silvestris*) Schreb. 1777 und *F.s.f. catus* L. 1758). *Acta Scientiarum Naturalium Academiae Scientiarum Bohemoslavacae* VII, 10, 1-50
 Kratochvil, Z 1976. Postkranialskelett der Wild- und Hauskatze (*Felis silvestris* und *F. lybica f.catus*). *Acta Scientiarum Naturalium Academiae Scientiarum Bohemoslavacae* X(6), 1-43

The case of the Great mosque building

The building B12 and its surrounding delivered numerous remains of cats. Without going into details (the work is in progress), we observed:

- Forty-two bones were identified in many sounding along an external wall in the north B12 building, the great Friday Mosque. If the majority bones were single finds, the UF 1300 and 1309, presents many remains belonging to immature skeleton. The size of the long bones show that immature juveniles belong to different age ranges¹⁴.
- The presence of two older cats that were not in good health, founded more or less completely within the room J (n = 58 in UF 313). Indeed on one pelvis bone we observe an important coxarthrosis with an important periarticular alterations over the entire periphery of the acetabulum, and including in the acetabular cavity. This bony pathology of arthrosic type is most often associated with dysplasia of the hip. Common in dogs, this disease was nevertheless described in modern cats¹⁵.



Fig.66 *Pathological pelvis of cat showing an important coxarthrosis*

¹⁴ Smith R.N. 1969. Fusion of ossification centres in the cat. *Journal of Small Animal Practices* 10:523-530.

Luff, R.M., Moreno-Garcia, M. 1995. Killing Cats in the Medieval Period: An Unusual episode in the history of Cambridge, England. *Archaeofauna* 4, 93-114.

¹⁵ Patsikas et al. 1998. Hip dysplasia in the cat: a report of three cases. *Journal of small animal Practice*, 39 (2), 290-294.
Clarke S.P., Bennett, D. 2006. Feline osteoarthritis: a prospective study of 28 cases. *Journal of small animal Practice*, 47, 439-445.

One femur from the same individual shows a fracture with an important consolidation callus, following a mid-diaphyseal fracture resulting a latero-medial displacement of the bone ends and a shortening of the total length of the bone.



Fig.67_Deformed after fracture femur of cat (B12-J-3113)

Finally the mandibles clearly reflect an old individual: the canine and incisors alveolus appear to have been filled after the disappearance of the teeth.

These two old cats are certainly died naturally in the basement of the mosque. A kitten was discovered too in the same room (three bones B12-J-3093)

- Some cat remains were found in rooms B (n = 2), G, (n = 1), H (n= 8), I (n = 6) or P (n = 3).
- Finally 6 cat bones were discovered in some stratigraphic levels in the external qibla.

Other cat remains were discovered in buildings B13 (n = 3), B141 (n = 5) and B140 (n = 4).

The case of the inside cistern B2

A small sounding¹⁶ was made in 2010 in this cistern which is located in the western corner of the city near the Bibi Maryam mausoleum. The pottery material in the excavated layers is dated to the 15th century and no doubt that older wares could be found in lower layers and that the building of the cistern goes back to the period of major power and extension of the city in the end of 13th or in the 14th century.

So in this small test pit a very interesting bones assemblage were found: caprines, large mammals (whale and dolphin), 35 bones of dog (belonging to two individuals, one young and one adult) and mainly 63 bones of cats belonging to 10 individuals (based age-combination of the humerus), three young and seven adults.

The skeletal profile is incomplete, but this is certainly correlated with the small size of the sounding, and we can imagine found the rest of the skeletal or more individuals with further excavations.

If we can imagine an individual being trapped by falling into the cistern and can no longer go up, the number of cats does not think of chance. The inhabitants are thus able to stack corpses of cats, but also dogs, into this pit that was inoperable. These animals have been recovered and died on the site or be deliberately killed due to excessive proliferation. The question is when? Only further excavation of this cistern will allow us to say.



Fig.68 *Collection of cat humerus bones from the inside cistern B2*

¹⁶ See Qalhat 2010 excavations report.

Discussion

Rarely abundant amongst the archaeological faunal list from the Near and Middle east, the cat was nevertheless identified in many Mosque areas like in Bilad al-Qadim (Bahrain)¹⁷, in the medieval levels in Siraf (Iran)¹⁸ or in the Islamic site of Al-Yamâma in Saudi-Arabia¹⁹. No traces of cut marks were found on any cat bones so it seems likely that the animals were not skinned. Probably, cats were popular pets and would also have fulfilled an important role in controlling rats and other small rodents²⁰. The abundance of cats can be explained by the abundance of rats on the site, which is the main predator (the building B94 presents many gnawing rat traces on bones). In Egypt in a Roman building of Tell el-Maskhuta a burial of a cat was found, which had eaten at least six rats (*Rattus rattus*), remains of which were found in the stomach and in the dung balls²¹.

Finally it is not surprising to find cat remains around a sacred area because cats have always been venerated in the Near East since Antiquity, a tradition adopted by Islam, albeit in a much modified form. According to Hadiths, Muhammad prohibited the persecution and killing of cats. In Islamic tradition, cats are admired for their cleanliness. They are thought to be ritually clean ritually, unlike dogs and are thus allowed to enter homes²² and even mosques. Food sampled by cats is considered halal and water from which cats have drunk is permitted for wudu.

¹⁷ Smith I. 2005. The mammal, Bird, Reptile and Molluscs remains. In, Insoll, T. (ed.), *The Land of Enki in the Islamic Era. Pearls, Palms and Religious identity in Bahrain*, London-New-York-Bahrain, Kegan Paul, pp. 193-231.

¹⁸ Driesch von den A., Dockner, A. 2002. Animal exploitation in medieval Siraf, Iran, based on the faunal remains from the excavations at the Great Mosque. *Bonner zoologische Beiträge*, 50(3): 227-247.

¹⁹ Monchot, H. 2012. Preliminary study of the animal bones at al-Yamâma. *Preliminary Report. Second season of the Saudi-French mission in Al-Yamâma - Al Khraj area - 11 november-18 december 2012*, pp. 66-72.

²⁰ Beech, M. 2007. The large mammal and reptiles bones. In, Poulter, A. (ed.), *Nicopolis ad Istrum III: A late Roman and early Byzantine City: the Finds and the biological Remains*. Oxbow books, Society of Antiquaries of London, Reports of the Research Committee of the Society of Antiquaries of London, 67, pp. 154-197.

²¹ Driesch von den, A., Boessneck, J. 1983. A Roman cat skeleton from Quseir on the Red Sea Coast. *Journal of Archaeological Science* 10: 205-211.

²² Campo, J.E. 2009. *Encyclopedia of Islam*. Infobase Publishing. p. 131. [ISBN 1438126964](https://doi.org/10.1080/1438126964).