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**The Qalhât Project - Preliminary report on the fourth
season of excavations of the French mission
(25/10-12/12/2011)**

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The Qalhât Project

Ministry of Heritage and Culture
Department of Excavations and Archaeological Studies
Sultanate of Oman

Preliminary report on the fourth season of excavations
of the French mission
(25/10 -12/12/2011)



Sultanate of Oman
Ministry of Heritage & Culture



مَسْلَمَةُ عُومَانِ
وَدَارَةُ الْبَرَاءَةِ وَالشَّقَافَةِ



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Introduction

The fourth season of excavations of the Qalhât French Project took place from October 25th to December 12th 2011. 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 Archaeological Committee of the Ministry of Foreign Affairs and National Centre for Scientific Research (Cnrs) on the French side.

Members of the team were:

Dr Axelle Rougeulle (Cnrs, Umr 8167, Paris), archaeologist, director of the Project
Dr Thomas Creissen (University of Tours / Eveha, Limoges), archaeologist (exc. B12, B94)
Mss Magalie Dartus (Eveha, Limoges), archaeologist (exc. B12, B94)
Ms Anna Ihr (Göteborg University), archaeologist (exc. B12, B41)
Mss Gabrielle Choimet, assistant archaeologist (exc. B12, B94)
Mss Apolline Vernet, assistant archaeologist (exc. B12, B94)
Mr Vincent Bernard, archaeologist, draughtsman, architect, plans and analyse of architecture (B12)
Ms Hélène Renel (Cnrs, Paris), ceramologist, registration and study of the material
Dr Bing Zhao (Cnrs, Paris), ceramologist, specialist of Chinese ceramics.

Special thanks are due to the Department of Excavations and Archaeological Studies of the Ministry of Heritage and Culture of the Sultanate of Oman, to its Director Ms Biubwa Ali al-Sabri and all the staff, for their efficient help and support all along the expedition, and especially to Mr Khamîs Nâser al-‘Âmrî in the Sur region. As in previous years, the mission could not have been so successful without the collaboration of the French National Centre for Scientific Research which sent, besides the Director of the mission, Ms Hélène Renel as a specialist for the registration and study of the archaeological material, and Dr Bing Zhao as a specialist for the study and dating of the Far Eastern imports. This year, Eveha, a French archaeological consulting agency specialized in contract archaeology and heritage development, kindly put at the disposal of the mission two of its members, Dr Thomas Creissen and Mss Magalie Dartus. Furthermore, an extra sponsorship fund was again granted this year by the Total Group to start the archaeological and architectural interpretation of the plan of the ruins of the ancient city of Qalhât which was achieved in 2010.

The main objects of the 2011 season were as follows:

- Additional soundings in the Great Mosque area (B12) to check information missing from the previous season, especially about the north wing and courtyard and the accesses to the mosque.
- Excavation at building B94, a house in the north-western quarter, to check its plan and dating, to get information about the daily life in ancient Qalhât, and to prepare the complete clearing for restoration in the Development Project of the site.
- Resuming of excavation started in 2008 in the kiln area B41, to get a more detailed idea of the organisation and operating processes of this craft complex.
- Excavations and clearing of a funerary terrace in the western quarter, to check its plan and function and to prepare the restoration for the Development project of the site.
- Study of the material excavated and especially of the ceramics from the kiln area to draw a complete chrono-typology of the Qalhât production.
- Continuation of the surface survey of the site and surroundings, based on the results of the Cartographical Project, and in connection with the Development Project.
- All other necessary checking which could appear important in the course of the season.

1.

The great mosque complex (B12)

(A. Rougeulle, V. Bernard, T. Creissen, M. Dartus, G. Choimet, A. Vernet)

According to literary sources, the main edifice of the city of Qalhât was the Friday Mosque which was described by Ibn Battuta and Bras de Albuquerque. Around 1320, Ibn Battuta says that the city « has beautiful markets and one of the most beautiful mosques you could see, whose walls are covered with colour tiles imported from Kashân, similar to *zelij*. This mosque is very high, it overlooks the sea and the harbour, and it was built by the pious Bîbî Maryam » (Battuta, vol II, p. 112). Nearly two centuries later, Bras de Albuquerque gives a much more detailed description of the mosque destroyed by the Portuguese in 1508, “a very large building with seven naves, all lines with tiles, and containing much porcelain fastened upon the walls, and at the entrance to the gate a very large nave made with arcading, and above these was, as it were, a terrace looking towards the sea, all covered with tiles; the gates and roof of the mosque were all of elaborate masonry” (Albuquerque 1875 ed, p. 221). Some days earlier Afonso had “ordered a look out to be placed in the tower of the mosque” (*ibid*, p. 219), which means that it had a minaret.

The location of this building is since long one of the main questions arising about the city, and most scholars interested in Qalhât have wondered about it. According to T. Vosmer who directed a survey of the site in 1998 and then excavations in 2003, the mosque was probably located in the north-east quarter, at the place of a large building later identified as a house with courtyards (Qalhât Project B16) (Vosmer & al. 1998, p. 20 and fig. 25; see also Agius 1999, note 9 p.196). Following the description of Ibn Battuta, M. Ibrahim and ElMahi (2000, p. 131) identify it with the Bibi Maryam mausoleum (B1), in the western quarter, when P. Costa (2001, p.176; 2002, p. 58) suggests the large enclosure nearby (B3). As for B. and R. Bhacker (2003, p. 47), they note that “the description of the full frontal Portuguese attack on the city suggests that the Great Mosque was located nearer the headland rather than where the mausoleum is situated”, which means probably at the place suggested by T. Vosmer, in the north-east quarter.

The description made by the Portuguese of their attack against Qalhât is in fact rather clear and does not support any of the abovementioned locations for the Great Mosque. As a matter of fact, it is noted that “as soon as they disembarked they were to proceed at once to attack the city on the side near the mosque, which was close to the sea ...” (Albuquerque 1875 ed, p. 217). This means clearly that this mosque was located on the shore at a place where disembarkation was possible, i.e. along the beach in the south-east quarter of the city and not in the north-east one where the coast is lined by an inaccessible cliff, not speaking of the Bîbî Maryam area in the opposite extremity of the site, at the foot of the mountain.

The discovery of the Friday Mosque was among the main objectives of the Ministry of Heritage and Culture of Oman when starting the Qalhât Project. Fortunately, during the short preliminary visit made at the site in January 2007, A.Rougeulle discovered several stucco fragments and green glazed tiles on the surface of a large building (B12) located on the seaside overlooking the beach, in the middle of the south-east quarter of the city, which was consequently interpreted as the probable location of the mosque. Two soundings opened in 2008 on both sides of what was

supposed to be the qibla wall brought to light the complete stratigraphy of the area (S1) and lead to the discovery of the mihrab, the minbar and a pillar (S2), which allowed the clear identification of B12 with the great mosque of Qalhât (fig. 1 photo mihrab/minbar, 2008). Other soundings opened in 2009 in the four corners (S3-S6), together with a long axial trench from mihrab to sea (S7-S12), brought information about the plan, elevation and additional details on the chronology of this mosque. Finally, further excavations were held in 2010 in the surroundings, the northern wing (S15), the wall between the two courtyards (S13-S14), the surrounding wall of the unit (S16), the main entrance (S17-19), and an associated structure (S20).



A lecture about the mosque was given last July at the Seminar for Arabian Studies at the British Museum in London and an article is now on press (A. Rougeulle, V. Bernard & T. Creissen, “The Great Mosque of Qalhât rediscovered. Main results of the 2009-2010 excavations at Qalhât, Oman”, *Proceedings of the Seminar for Arabian Studies* 42, 2012). The detailed final publication is currently under progress and questions are still arising. As a matter of fact this building is extremely complicated, with several storeys, huge collapse layers and a complex chronological evolution, and it will not be fully understood without extensive excavations and clearing. Ten additional soundings were nevertheless opened, or enlarged, this year in the northern wing and courtyards (S14-15, 21-28) to try answering the main pending questions (fig. 2 plan of the mosque and location of the 2011 soundings).



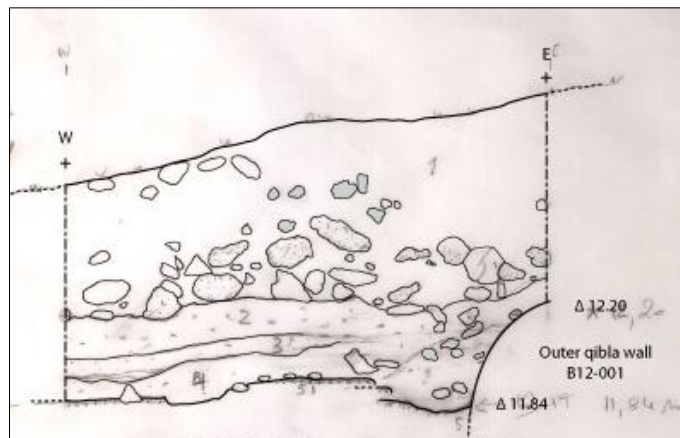
1-1. The mihrab, S22 (G. Choimet, A. Ihr)

The base of the outer wall construction for the mihrab niche is covered with very thick plaster. This smoothing plaster coats the complete wall, as were it is still standing. The external mihrab outline is square-like with rounded corners (fig. B12_S22/1 The mihrab from outside). This wall construction connects to a floor, which circumvents the complete base. Most of the floor is intact to a distance of some 10-15 cm away from the wall construction of the outer mihrab base, but occasionally it is broken just at the encounter of the two. The northern and western wall is excavated in 2011 and the mihrab niche itself in 2008. To the north, the qibla wall is connected to the outer wall construction of the mihrab base. This qibla wall was partly investigated further north in 2008 (UF 367, 374). The base of this wall is very similar to the base of the mihrab wall; very solid with a smoothing grey plaster coating. On this wall, we find two phases, where the first has thick plaster smoothing the face, just like the mihrab wall. This phase is curving inward itself, few decimetres up, creating a wall base of dignifying width. This phase also connects to the above mentioned floor, accordingly is linked to the mihrab base.



Onto this original smoothed wall construction a second layer of stones was at some point added (fig. B12_S22/2 Original qibla wall before restoration). Though, this time the face is not smoothed with plaster. The second phase holds strong plaster inside and in between stones, but does in this trench not coat the entire wall as the case is on the base. Moreover, the second phase does not connect to the mihrab wall, contrary to the first. This does however not imply that the second phase is of exceedingly later construction. Rather, the impression is it is added contemporary to the first, but with another batch of plaster; the two plasters drying with some time difference. In the excavation of 2008, further to the north this second phase is though covered with plaster; why we can assume the case was along the entire wall. The lack of plaster in the connection to the mihrab wall base must thus be explained with erosion by wind and water.

A burnt layer was located throughout the trench, indicating a time of great fire (fig. B12_S22/3 Northern section of S22). This layer might verify the destruction by the Portuguese in early 16th century. Beneath this burning event, we located not one floor, but three. The earlier mentioned floor is the first, i.e. the upper most. It is very strong, fixed with burnt lime inclusions in the plaster. Under this there is an older floor level that is even possibly harder than the first. Again we deal with a lime fixed mortar floor. Here we find inclusions of small pebbles and it is laid on a layer of pebbles, which measures 3-4 cm. Patches of floor is occasionally located between the two floors. This might well be reparation or renovation whenever the second floor was broken. The foundation of the floors (radier) is made of 3-5cm sized stones.



Ceramic tell a dating of 16th century in the upper layers of destruction, while little ceramic was found at floor level. The few shards found on the floors give an indication of 15th century. Closing in, we can say that the ceramic in this trench show of no old occupation.

1-2. The basins' area, S25/27 (T. Creissen)

In 2009, excavations had revealed the existence of several structures located around the north-west corner of the mosque. One is linked to the staircase located at the western extremity of the northern wing. The upper part of that staircase starts from a room which was partly circumscribed by walls B12-037 (north) and B12-031 (west). In wall B12-031, a door is open, at the bottom of which a threshold was found (B12-034). West from that wall, different floors were partly excavated. They are linked with another wall further north (B12-038, not exactly in the same alignment as B12-037). Just beyond the collapse was a layer of small pebbles (Uf 650/670) which is leaning on a white plastered floor (Uf 651). This one is cut by a small pit linked to a small channel running below the floor, which was just partly unearthed (Uf 652, 654, **fig. B12_S25/1 Pit and channel outside the threshold leading to the staircase of the north wing**).



All this allow us to be quite sure that another room was located in that area. In the aim to restitute its general set up, but also to have more precision concerning the relation between wall B12-034 and the north-west angle of the mosque, it has been decided to excavate this area this year. The upper part of the deposit has been removed with the help of a bulldozer.

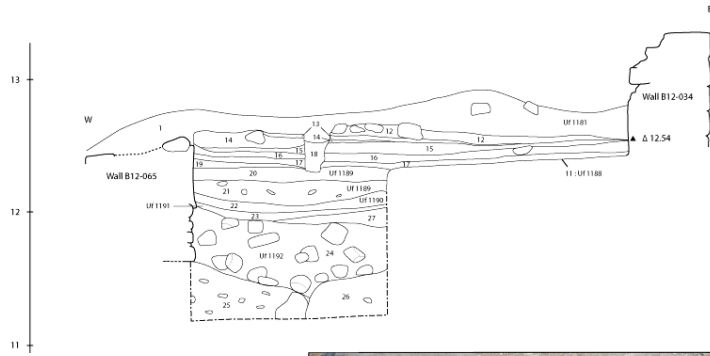
1-2-1. Stratigraphy

From ca. 13m 50, the surface was covered by a collapse layer including some stones and coral blocs in a brownish earth (Uf 1181). It has an east-west slope. About 3m 20 west from B12-031, this layer covered another wall, parallel to it : B12-065 (**fig. B12_S25/2 Wall B12-065**). It is made of big stones linked with earth. The inner face is partly covered by a grey coating. This wall is 80 cm wide and, including its



foundation, it is preserved for ca. 1 m high. About 1m50 west of the sounding, this wall is turning toward the east and it is linked to a west-east wall (B12-072) which belongs to the same room (sounding 27, **fig. B12_S25/3 Corner of walls B12-065 and B12-072**). The collapse layer is also lying on a thin ashy layer which is a little thicker in the north. It could be associated with a pocket of ashes that can be seen in the southern section.

In the northern section (**fig. B12_S25-4 Northern section of sounding S25**), this ashy layer is covering a thin layer of brown beaten earth leaning on another one filled with charcoal : all of them has been gathered into Uf 1182. They are cut by a pit only seen on the section, so its original extension is impossible to reconstitute. It might have been a posthole. Under Uf 1182 is a flat and quite thin – 10 cm maximum – level mostly made of small pebbles that could have been a floor. Its leaning on what looks like a beaten earth floor including few sherds on its surface, itself topping another thin layer of pebbles. Under that later, located in the western part, is a dark brown layer including remains of decomposed wood. All of these layers have been gathered in Uf 1183. They are leaning on a hard grey cement floor, which is only situated in the eastern part of the sounding (Uf 1188, **fig. B12_S25/5 General view of the basins**) where it is covering all the width of the sounding at ca. 12m 40 maximum (but at only ca. 12m 25 in the west, since it is quite sloppy). In the south section, it is covered by layers slightly different from the above-mentioned ones (**fig. B12_S25/6 South section of S25**). First, there is a layer of small pebbles



topped by quite thick – ca. 20 cm - “backfill”, heterogeneous, that is mixing few stones, brown earth, ashy pockets, some charcoals and also a lot of fish bones. Just above it, there's another layer of brown earth topped by another one containing a lot of small pebbles. All of them were considered as part of Uf 1183. Just above is a ca. 40 cm thick level of brownish earth including fragments of mortar (Uf 1182).

All these layers are leaning on a small masonry located around the middle of the section. It belongs to a much more complex structure linked with the above-mentioned cement floor. On the eastern part, remains of a quite narrow edge which is largely destroyed can be seen. It is about 20 cm large, and was made of coral blocs bonded in brown-orange mortar. It is running for about 1m 20 toward the west and is at least 70 cm wide. Further west, there is another specific layout. The edge is almost abutting a small step 15 cm high and 50 cm large, still partly covered with cement. There is a small interruption between that step and the destroyed edge, about 10 cm large : here, the cement floor Uf 1188 pass through that edge. This step is linked to a kind of large bench (B12-069). It is about 1m50 long, probably ca. 80 cm wide. Its construction is very specific: its leaning on wall B12-065 in the west. In the southern section, a small wall, made of coral blocs and 50 cm high. Remains of another one can be seen further north: it has the same alignment as the above-

mentioned edge. These walls were linked with another one, running north-south just above the stair, which can be seen in the section. All these walls associated with the western one of the room circumscribe a kind of compartment that was originally filled by earth and stones without any mortar. Some specific features of that construction should be mentioned. In the south section, there is a gap between its east-west wall and the north-south one (**fig. B12_S25/7 Details of structure in the corner of the basins' room**). This "hole" is more or less in front



of the supposed post-hole described in the north section. If the northern wall is largely destroyed, it has been possible to explore its lower part since the cement floor Uf 1188 is not present in this part of the sounding. Its foundation starts from approximately 11m 70, *i. e.* the same height as the ones belonging to wall B12-065. Beyond the floor level, the faces of these two walls are covered with a grey coating for *ca.* 30 cm from the height of 12m 05 (see *supra* **fig. B12_S25/5**).

In the part lacking the cement floor, it was possible to carry on excavations. At the same height than this floor, there is layer made of brown and hard sediment with few pebbles. It is covering a much more compact layer with few small elements of coral. Both have been gathered in Uf 1189, which is *ca.* 30 cm thick. Just below, Uf 1190 is quite soft, brownish, with some small pebbles. It is topping a very compact level of small pebbles mixed with ashy sediment (Uf. 1191) that appear at *ca.* 12m 05, *i. e.* the same height as the coating of both wall B12-065 and the northern face of B12-069.

Just under there is a thick layer of stones and earth leaning on the foundations of both these walls. This in turn covers a layer of small stones/gravel that is going under these foundations. A piece of glazed star is visible in the section. These two layers belong to Uf 1192. The latest one is filling a pit cut in quite an homogeneous sediment, light brown, which is mostly made of fatty clay and contain few inclusions (also considered as Uf 1192).

1-2-2. Interpretation

A new room was built at the northern angle of the mosque, partly abutting it. For this construction, a former layer (the last one described) was cut by a trench (?) which was filled by gravels. Above them, walls were built: the western one of the room (B12-065), but also the northern one of B12-069. This "bench" or whatever it is should then be considered as part of the first setting of that room. When the foundations were finished, stones and earth were put down against their faces. Above this backfill, a floor made of small pebbles was set up and the walls were covered with coating.

After a first occupation (Uf 1191), the room was modified. A backfill was installed, and its upper part constitutes a floor in the western half of the room whereas this floor is made of cement elsewhere (Uf 1188). Linked with this new floor is the small dismantled edge associated with B12-069. This might have been part of a basin which was functioning together with the bench. This edge is interrupted near its junction with this former structure: there was probably an evacuation hole. This could explain why the floor is so sloppy toward the west. Some new floors, backfills or occupation layers partly covering the cement floor or the bottom of the basin are the witnesses of a late occupation (Uf 1182/1183). The post-hole above-mentioned could belong to them. It is quite hard to understand why the stratigraphy of is not the same in the south and the north section, since no

traces of the edge of the basin was found in the upper layer : it was probably already destroyed at that time. This is also the case for part of the “bench”. In a last time, all these remains were covered by a thick collapse layer, partly coming from the room itself and, probably, partly from the mosque.

The date of the first construction remains unclear. According to the result of 2008 sounding, the height of the foundation fit well with the so-called fourth phase, i. e. the fifteenth century. But according to H el ene Reel's study, the ceramic found in the first backfills linked with the construction might belong to the fourteenth century, even if most of the sherds are very used (Uf 1192). In the same way, the material associated to the early occupation seems to be earlier than the fifteenth century (Uf 1189-1190). Concerning the latest occupations, part of the material dates from the early sixteenth century (Uf 1182-1183).

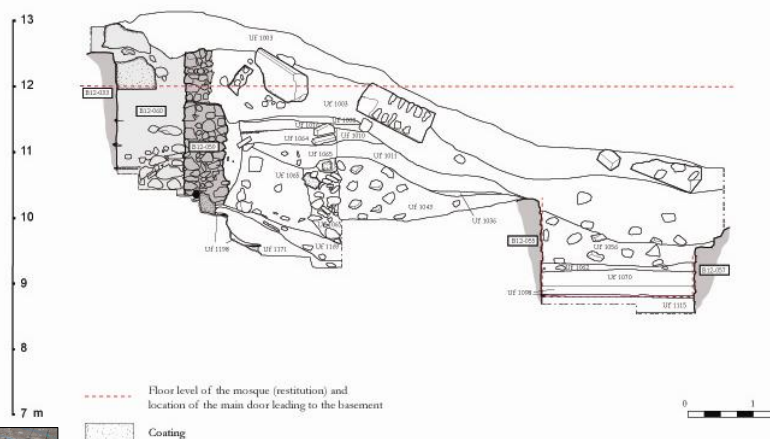
1-3. The staircase of the northern wing, S15W (T. Creissen)

Along the northern wall of Mosque B12, a trench has been dug during the 2010 excavations campaign (sounding 15 west) Three partitions wall perpendicular to it were then found, as well as two doors leading to the basement of the mosque. Moreover, in the western part, a stairway was partially uncovered, in association with different walls (B12-060). Chronology of this staircase remains uncertain: was it belonging to the first stage of the mosque or should we consider that it was built during a second phase? It's partly to try to solve that particular problem that we have decided to excavate a little bit more the western part of this trench. But another purpose of that comeback was to check if another partition wall is not located in that area, between the western wall of the staircase (B12-033) and the one following the western side of the main door (B12-055). We were also looking for further information regarding the function of all these structures.

We first have to remove part of the overhanging layer because there was a risk that big pieces of wall might fell in the trench during excavation. We have also clean all that area and the surrounding walls to understand how they are working together.

1-3-1. Stratigraphy (fig. B12_S15/1 northern section of S15 west).

The surface (ca. 13m max.) is made of collapse layers, the upper one mostly consist of decomposed plaster or coating mixed with few coral blocs and pieces of mortar (Uf 1150). In this



upper part, the sediment is quite soft. A big piece of masonry was removed from it (fig. B12_S15/2 fragment of masonry on top of the collapse layer up the staircase). It is about 1m10 long for 90 cm large and 52 cm wide. It is made of coral blocs and strong greyish mortar, and a white coating covered the four sides. A piece of the same masonry has been kept further east, and another one

was removed last year. All of them belong to the same pillar, at least 3m high. Beneath the removed piece, there is another fragment of collapse wall – this time built with a yellowish mortar –, which is about 52 cm large, 90 cm high and 1m 20 long (**fig. B12_S15/3 general view of the staircase from top before 2011 excavations**).



In the trench itself, the first layer excavated was made of a quite hard brown sediment including many big fragments of a very hard floor (Uf 1064, equal to Uf 1010 excavated last year). Just below, Uf 1165 is a very thick layer including many corals blocs, especially in the eastern part, pieces of broken wall and very soft light brown sediment. This is also a layer of collapse (in 2010, different layers were distinguished, Uf 1011 and Uf 1043, the last including much more coral blocs). At the bottom of that layer, two big pieces of a very thick mortar floor were found (**fig. B12_S15/4 fragments of mortar floor down the collapse layer**). Under Uf 1165, 1169 make a slope towards east (ca. 10m 20 for the apparition level in the west, ca. 9M 60 in the east) and is much thicker in that direction (ca. 5cm against 20cm). It is made of very soft brown sediment including some sherds and, also, a mould for stucco decoration. Covered by this layer, Uf 1171 is made of very soft white-grey sediment, and is also very sloppy. It is about 30cm wide in the central part, but only 10cm in the east, where it became flat. A lot of charcoals are included in that layer, as well as many fish bones, ceramics sherds and few bronze objects, among which five coins. Half a grindstone was also found.

This layer is mostly lying on a stairway, the one partly excavated last year (B12-060, *supra* **fig. B12_S15/3**). Four new steps have been discovered; some of them still topped by a very thin and hard layer of brown sediment (Uf 1198). The first step, in the east, is about 25 cm high and 35cm long (its northern end is under the section, so its original width remains unknown). It is made of stones or coral blocs and a strong mortar. Few parts of a grey coating are preserved. The end of the stair was provided with a piece of wood, whose print is still visible even if the wood itself is completely rotten: all that remain was a hard brown and moist dust (**fig. B12_S15/5 details of lower steps showing remains of rotten wood**). This piece of wood was stuck in the northern wall of the mosque, where a hole was made for that purpose: the same sys-





tem was already observed for the stairs discovered in 2010 along the wall B12-033 (**fig. B12_S15/6 details of upper steps showing traces of beams**).

The second step is also provided with wood, this time a least two different pieces: the color of the rotten wood differs, and a nail that fixes them together has been found. Here, the stair is very high, around 50 cm, for

ca. 40 cm long. The two last steps are much lower (**fig. B12_S15/7 the staircase seen from down**): only ca. 15 cm for both of them. The first one is about 70 cm large. They are completely covered with a strong grey coating very well preserved (Uf 1199), and no pieces of wood were attached to them. At the bottom of the last step, the grey coating could have been the floor of the room were this staircase was leading (at ca. 9m 40) as well as the upper part of another stair. Here, the northern wall of the mosque become larger, the upper part of this enlargement curved on the top. The same kind of building process has been observed in the qibla, but one can also think that this peculiar shape belong to a landing: the stairway might have turned towards the north in that part.



Outside the trench itself, the earlier layer excavate this year is located beyond the first step of this stairway. It is mostly made of pebble mixed with many sherds and bones, and was certainly used as a backfill for the construction of this part of the building (Uf 1155, **fig. B12_S15/8 the backfill for the construction of the upper step**).

Finally, the cleaning of the walls has allowed us to make further observations. The wall B12-059 – which belong to the eastern part of the staircase – include a flat level of yellow mortar at the height of ca. 11m 60, *i. e.* about 1m 50 above the

step built at the bottom of it. This kind of print is only 1m 20 long, and further north the wall is higher: one can assume that, originally, this was the case everywhere, even above this flat area. In front of that print, at the same height, they are three flat holes into the northern wall of the mosque (**fig. B12_S15/9 location of beams, probably for a door, above the third step**).



1-3-2. Interpretation

The stairway begins in a small room built around the north-west corner of the mosque, the floor of it at around 12m 10. It's going down until 9m 40 at least, through ten steps or more. The stairway is first running west-east, then north-south until the bottom of the above-mentioned wall B12-059 (*supra* **fig. 8 and 14**). In that area, the three holes into the outside wall of the mosque as well as the flat print in the mortar clearly demonstrate that there was a lintel, probably made of different pieces of wood. Above this lintel was a much damaged piece of wall made of coral blocs which can not be kept in 2010. The print of it can still be observed in the outside face of mosque's northern wall. We can be sure that a low door – between 1m 40 and 1m 50 – was originally leading to a room east of this wall. Since no partition wall has been discovered, we should conclude that this room is delimited by the recess wall B12-055 and, in the north, by the long wall B12-037 (*supra* **fig. 8**). The stairway continues in that room along the northern wall of the mosque. The floor is probably made of the same cement as the one observed at the bottom of the stair (Uf 1199). Since different pieces of a broken floor were found in the bottom of the first collapse layers (Uf 1065, *supra* **fig. 12**), we can suppose that they were first covering the roof of that room, even if only about one square meter of this supposed ceiling/floor was found.

Before its complete collapse, the room was partly filled by two layers that are covering the stairway (Uf 1168/1171). This one was probably not used anymore, and these layers might belong to an abandonment/squatting phase.

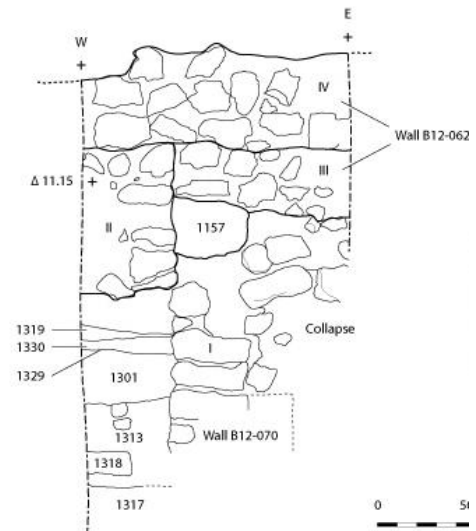
Then, the superstructure began to collapse: pieces of floor fall into it, as well as a thick layer mixing coral blocs, coating, pieces of wall and mortar. The floor fragments found in one of the upper collapse layer (Uf 1064/1010) could come from the ceiling of the second stage of that building, if this one ever exists. On the top, it has been said that three pieces of a same pillar were found, one of them still in the section. We can ascertain that they were originally located top of the wall B12-033, in its northern part, *i. e.* where the staircase began. This mean that the walls of the room located at the entrance of that stairway reach at least the height of *ca.* 15m 60. When this pillar fall, it has dismantled part of the wall B12-059, especially the portion located above the pieces of the lintel. Since that very piece of wall is still lying just above the level where this lintel was certainly set in the masonry (the flat mortar print, *supra* **fig. 11**), we should conclude that the room located beyond was already filled when all these masonries collapse. This probably means that the destruction was not brutal, but progressive: the building was certainly not completely and suddenly destroyed by the Portuguese.

We have written in the foreword that it was decided to carry on excavation in that sounding partly to determine if the staircase belong to the first building phase of the mosque complex (*ca.* 1300) or to the second one (fifteen century ?). There is no trace of rebuilding in the northern wall of the mosque around the holes intended for the lintel or the steps, which can lead to the conclusion that all this was built at the same time. But the holes are so small that it was not really necessary to modify the masonries to fix them, so this clue is not really useful. It is in fact the ceramic contained in the backfill set up for the staircase (Uf 1155) that provides an answer: some pieces are not older than early fifteen century (see the ceramic study of H el ene Renel). We should then conclude that all that part was built in a second time.

1-4. The western upper courtyard, S23 and S24 (M. Dartus)

1-4-1. Sounding S23

The sounding S23 is located south of wall B12-062. The excavation was made on a square about 2m aside and 2,10m of depth. The purpose of this sounding was to find out the level of the foundations of the wall B12-062 and to understand the stratigraphical relationship with the wall B12-058 (wall of terrace associated to the north wing of the mosque – cf sounding S24). Four phases of occupation were discovered in this sounding (fig. **B12_S23/1 North section of S23**). The most ancient phase is associated to a north/south wall (B12-070) and four successive occupation layers (UF on 1313, 1301, 1330 and 1319) in connection with this wall. The second phase is characterized by the presence of a pillar 0,50m wide and a level of occupation (UF 1157). The third phase consists of a low west/east wall, leaning against the pillar of the previous phase. Finally the wall of terrace B12-062 constitutes the last phase of occupation. In this sounding the bedrock was not reached due to the discovery of wall B12-070 which occupies almost the entire surface of the sounding at 10,65m. Actually the levels of occupation of the first phase could only be observed on less than one square meter.



Phase 1

The wall B12-070 is directed North/South, and built with pebbles the module of which varies 0,15 m in 0,50 m. The width of this wall is about 0,60 m. In connection with this wall several layers of occupation appeared. The most ancient are characterized by very fine brown/grey sediment (UF 1313). Its level of apparition is 9,98m. It mainly consists of earth and ashes with numerous inclusions of coal, with a thickness of 0,15 m. The presence of some small stones found during the excavation does not find here explanation. This occupation is based on a layer of compact pure clay about 10cm thick (UF 1318) which seems to correspond to a floor.

No floor could be observed between the first occupation and the layer of rather compact clayey sediment of ochre/orange colour which succeeds it. This layer has a thickness of 0,15 m. It could be interpreted as being an occupation or preparation for the installation of the following floor.

A level of gravels and compacted pebbles (UF 1330) 5cm thick covers the previous clayey layer. The occupation in connection with this floor is clayey brown/grey sediment with inclusions of charcoal. On the surface of this occupation and in the northwest angle of the sounding was noted the presence of a summary hearth (UF 1319) to a level of 10,45m.

The following layer is orange clayey sediment which seems to correspond to the last occupation of the phase 1.

In the section east of the sounding an orange mass of fallen rocks of pebbles and earth occupy the stratigraphy until a height of 11,05m which corresponds to the arase of the wall. In the north section, this mass of fallen rocks appears only east of the wall B12-070, what illustrates the direction of its collapse.

The space of excavation was too narrow at the bottom of sounding so it was not possible to observe the contemporanéité of the fine and sandy layer of soil (UF 1317), situated under the UF 1318, with the wall B12-070.

Phase 2

The pillar registered in the north section of the sounding 23 was not able to be observed that

on 0,50m of width. It is built with pebbles about 0,30m of module for the facing east and with rather sandy orange mortar of earth with some stones of 0,15m of module for the blocking.

The base of the foundations of this element was clearly observed in the north section of the sounding. It leans on the arase of the wall of the previous phase. The layer of demolition of the wall B12-070 seems to have been dug to install foundations on approximately 0,20m of depth. The layer of gravel of pebbles (UF 1157) corresponds to the ground in connection with the pillar. It was observed that this layer thickens around the pillar while it is very fine (0,05 m) and hardened (UF 1158) on the rest of the sounding. Its level is 11,10m.

Phase 3

The sounding 23 shows the construction of a low wall (cf north section) coming to lean against the facing east of the pillar of the previous phase. This low wall is directed west/east, it is built on two wall sill plate. They consist of limestone blocs and pebbles of 0,20m of module and bound with some clayey mortar of orange earth. No layer of occupation in connection with this low wall was able to be observed in this sounding.

Phase 4

The wall B12-062 is directed west/east. It is parallel to the wall of terrace B12-037 in approximately 8m in the North (**fig. B12_S23/2 Wall B12_062**). At the level of the sounding 23 only ones three wall sill plate are still existing. They consist of limestone and pebbles of a module going of 0,20m to 0,30m bound with some mortar of orange earth. This wall is built on the arase of the pillar of the phase 2 and that of the low wall of the phase 3. It is however wider than both elements of the previous phase what explains the projection observed during the excavation. The height of the foundations of this wall is 11,25m. The upper layer of the sounding 23 corresponds in priori to the destruction of the wall of terrace B12-062. At the end the sounding 23 shows the layers of occupation of the phases 3 and 4 disappeared in this place but could remain somewhere else.



1-4-2. Sounding S24 (M. Dartus)

The sounding 24 is situated to the West of the wall of terrace B12-037, along its north face. The excavation was made on a rectangle about 4m of length, 1,50 m of width and 2,50m of depth. The purpose of this sounding was to reveal the level of the foundations of the wall B12-058 and to discover the layer of occupation in connection with it. The confirmation of a phase of previous terrace determined in the sounding 1 was one of objectives of the sounding 24. Effectively two phases of occupation were determined during the excavation. The most ancient contain two north / south directed parallel walls (B12-061 and B12-066), a layer of occupation (UF 1304) et a layer of demolition (UF 1300). The second phase is determined by a backfill of levelling (UF 1187), a terrace wall (B12-058) and its foundations (UF 1174), a layer of occupation (UF 1171) and layers of demolition (UF 1162 et 1163).

Phase 1

Both walls (B12-061 and B12-066) are directed the North / South (**fig. B12_S24/1 View of wall B12-065**). They are parallel and spaced out of 3m. The level of the arases is respectively 11,22m et 11,48m. Both are built with limestone and of the coral arranged in rather irregular wall sill plate of a height of 0,15 m on average. Stones are bound with a mortar of very crisp brown earth. No filler was observed on these walls. The layer of associated occupation has these walls (UF 1304) consists of hard-packed surface with numerous inclusions of coal, ashes and limestone. Its level of apparition is 9,95m. The superior layer is a powdery brown layer of soil which could be interpreted as some decomposed wood. In that case he could involve a collapsed floor. The discovery of wide pieces of ground in mortar in this layer would suppose the presence of a screed put on the floor.



Phase 2

The remaining rise of both walls of the previous phase is about 1,50m of height. The layer (UF 1187) consisted of pebbles, a module included between 0,15m and 0,25m, a very fine brown earth and a plaster. This layer seems to correspond to an elevation intended to fill partially the volume up to the arase of these two walls. The rest of the filling (UF 1174) is constituted by stones and by coral as well as by very fine brown earth but this time it was not observed by presence of plaster. This layer exists only under the wall of terrace B12-058 and could correspond to a system of foundations. Of more the wall of terrace of the phase 2 is perpendicularly built in both walls of terrace of the phase 1 and comes to settle on their arase.

A firmly packed layer of soil of 0,20m of average directly put on the arase of the walls of the previous phase was discovered during the excavation. It comes to lean against the wall of terrace just (B12-058) over its supposed foundations (UF1174). This layer is probably the layer of occupation in connection with the wall.

The layers of demolition (UF 1162 and 1163) are probably the result of the destruction of the wall of terrace.

For this sounding were brought to light indeed two various phases as regards the north terrace of the mosque.

1-4-3. Comparative stratigraphy

The soundings S23 and S24 seem to share some resemblances in the stratigraphy. The surface of the layer of activity of the phase 1 of the sounding 24 is at a height of 9,95m. Among the occupations determined in the phase 1 of the sounding 23 the UF 1313 admits a height of 9,98m. At the level composition these two layers are both made of a fine and sandy sediment containing ashes and charcoal. These occupations are in connection with directed north/south walls about 0,60m of thickness the distance between each of which is of 3m. It seems that the most ancient phase identified in the soundings 23 and 24 is characterized by a set of parallel walls. The presence of a wooden layer decomposed with pieces of ground into mortar in the sounding 24 suggests that these walls supported a floor as well as a constructed ground and it that it was probably for a terrace. Afterward this set was destroyed and an elevation was to give evidence to level the space and so build a new terrace.

1-5. The western upper courtyard, S21 (G. Choimet)

1-5-1. Sounding S21N

Sounding S21 is located east of S23-24, between the two courtyards where wall B12-062 connects to the terracing wall B12-067. It had already been open in 2010 (although no name had been given), as a small square trench, precisely to check out that connection and follow the edge of wall B12-062. The aim of the 2011 excavations was to make clear whether or not the retaining wall B12-067 was running north up to building B13, thought to be the governor's residence (see 2010 report). That is why we decided to open a 1x1 meter trench just north of the 2010 excavated area.

After going through a surface sandy soil and a rather thin layer of collapse (Uf 1151, 1302, *ca.* 20 centimeters thick), it finally came out that the terracing wall stopped suddenly a few centimeters after its connection with wall B12-063 (same alignment as B12-062 but much lower, and also brought to surface during the 2010 season in Sounding S14). As an alternative, it breaks and starts running to the west (**fig. B12_S21/1 The corner of the terracing wall B12-067 (top left)**). The limit of the sounding was thus removed about 60 centimeters further west to ensure the corner and clear the north facing wall.



Underneath the collapse lay two layers side by side: Uf 1153 (only seen in the north part of the sounding) and Uf 1154, 1303 (west part of the sounding, abutting on wall B12-062). Uf 1153 yielded quite a lot of finds, mainly ceramics and animal bones, plus a few plaster fragments (whitish to pinky-brown: crushed corals?). This layer also contained a lot of pebbles in light brown-grayish sediment, and has been interpreted as a backfill layer. On the contrary, very few stones (and none next to the wall) were found in Uf 1154, 1303, described as a compact unit of dark brown earth, and which is probably also part of the backfill phase.



Beneath Uf 1154, 1303 came a hard brownish surface (Uf 1166), without any inclusions, which we first thought was a surface that had been exposed out in the open, and left uncovered. Finally, we came to the conclusion that it was rather some mortar dripping off the wall for it slips from it, curves and gets flat. This surface covered a very compact and homogeneous earthy heap that is hardly understandable, for it does not look like a backfill layer and has more or less no stones or pebbles in it. Quite the opposite but next to it and under Uf 1153 was Uf 1167, exclusively made of medium-sized stones, with no soil in between but gaps, and therefore considered as part of the filling phase (**fig. B12_S21/2 North section of S21N**).

That northeastern part of S21 yielded mostly ceramics

and bones. Some plaster inclusions were also found in Uf 1153 and 1305, as well as mortar clumps in Uf 1154, 1303 and 1305, and one brick fragment in Uf 1303.

We assume, although information is missing, that the excavated area was almost certainly filled, probably twice, with Uf 1166 as a possible floor level or exposition surface. About the angle of the terracing wall, it appeared that it continues further down, but slightly set back. That is also, in all probability, an evidence of a multiple phased wall.

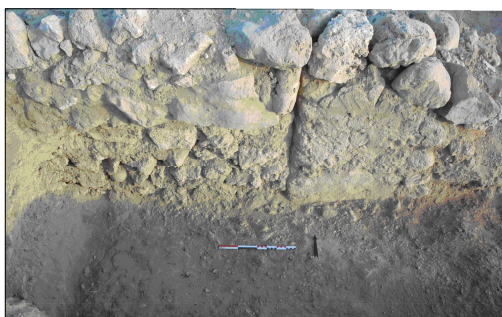
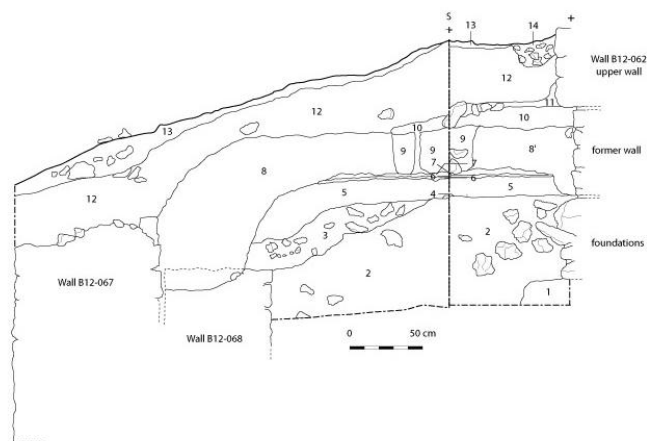
Excavations in that part of the sounding were stopped about 1.40 meters under surface (Δ 9.87), when the work that had been planned in B12 was considered as over. Nonetheless, a lot of questions still remain unanswered, and more research should be led between the B12-062 wall and building B13 so that the problem of the access between the two courtyards could be better understood, as well as the relationship with B13.

1-5-2. Sounding S21W

A second part of S21 was opened afterwards in the southwestern corner of walls B12-062 and B12-067 (retaining wall), in order to 1/ clear the south facing wall B12-062, 2/ further document the stratification of the terrace, and 3/ the connection between the above mentioned walls.

As in the northeastern part, a thin layer of surface soil had been removed (Uf 1185, layer 13 on the section drawings), made of very loose beige sand and a few medium-sized stones. That surface layer stood on a compact dark brown layer (Uf 1185, layer 12) mixed with pebbles, that goes over wall B12-067, and is therefore later and interpreted as an abandonment stratum after the sediment from the western high courtyard flowed to the east.

The enlargement of the sounding towards the west allowed us to study the wall B12-062 for almost 3 meters long. This wall appears to have been built in at least three different phases (**fig. B12_S21/3 south and west sections of S21W**) from the surface, and starting from the west corner, three rows of quite big stones (that are also visible in Sounding 23) lean on an anterior phase of the same wall, less wide and made of smaller nodules, mainly coral blocks (average 10-15 centimeters). This former wall surmounts a 50 centimeters layer of very coarse foundation.

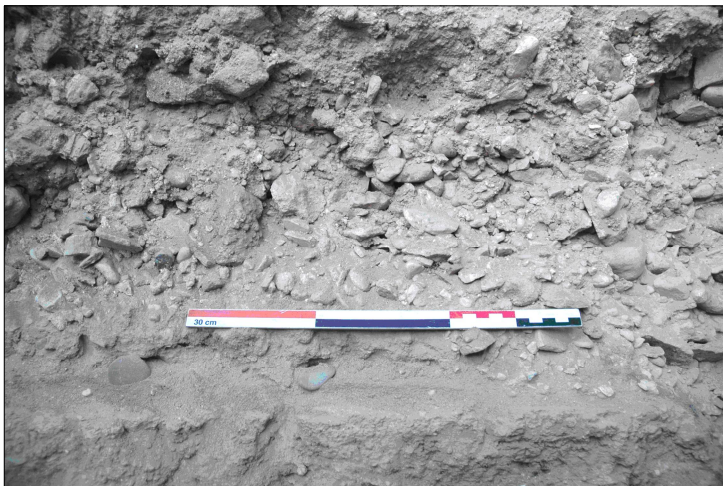


At 1 meter, a massive coated pillar (*ca.* 70-80 centimeters wide) stands on top of the same type of rough stone foundation (both foundations might be contemporary as they look very similar), and seems to join together several structures, raising the question of its dating in the chronology of the different walls (**fig. B21_S21/4 Wall B12-062 before foundations and B12-068 had been uncovered: upper wall, former wall and plastered pillar**)

On the east side of the sounding, another wall appeared (wall B12-068), parallel to the terracing wall B12-067 and right next to it, but 40 centimeters lower. Its west outer face is made of quite big stones (up to 30 centimeters), while the space between this face and the B12-067 wall has been filled with medium-sized stones. It has been uncovered to a height of 35 centimeters (top of the wall at Δ 10.23). Neither mortar nor coating has been observed to keep the soil and stones, but a clump of agglomerate gravels on top of one of the facing stones.

Underneath the abandonment stratum 12 already mentioned, and leaning against the upper wall B12-062 was a thin and horizontal layer of hard grey clay (Uf 1185, layer 11) observed over 30 centimeters long in the west section, and clearly connected to the base of the three top rows (Δ 11.33). This level is interpreted as mortar trickling down from the wall coating.

This clay layer stood on a very loose one (Uf 1185, layer 10), white-grayish and abutting against the top of the former B12-062 wall. It is unmistakably visible in the west section, but vanishes to the east although it seems to lean against the terracing wall. This flat layer (ca. 15 centimeters thick) sealed a pit and a posthole (both Uf 1185, layer 9) that were dug into a loose demolition layer to the south (Uf 1185, layer 8, many coral blocks, plaster and coating fragments), and the filling of the foundation trench of the former wall to the north (Uf 1185, layer 8', pebbles and gravels level with more or less no dirt).



Below 8 and 8' layers were two very thin flat strata: a red-orange solid clay floor (Uf 1185, layer 6), not more than 1 centimeter thick, that was covered by a 3 to 5 centimeters filthy deposit (Uf 1185, layer 7). Both were cut to the north by the foundation trench and its pebble filling (8'), and are subsequently prior to the lower B12-062 wall (**Fig. B12_S21/5 Uf 1185: Orange clay floor (layer 6) cut by the foundation trench of former wall B12-062, itself filled with rubble (layer 8')**). To the south, they disappear into the

section. This orange floor (Δ 10.85) has also been uncovered in Sounding 23 (west end of wall B12-062). It topped a powdery/dusty beige level (Uf 1186, level 5) that contained some big charcoals up to 2 centimeters long, pebbles and small stones. That layer, together with the clay floor and its filth deposit protrude on B12-068 wall and are consequently later to its ruin.

Beneath lay two units, hardly understandable: Uf 1186, layers 3 and 4. Layer 3, which is only to be found in the south section, is made of sandy dirt mixed with small cobbles. On top of it but also extending further north is layer 4, a thin level with many small plaster pieces. Both stick out onto wall B12-068.

At the bottom of the sounding was a thick and compact level of clayish brown earth (Uf 1193, layer 2) containing mostly coral blocks, plaster fragments, some pebbles and a few charcoals.

And at the very base of the foundations of wall B12-062 was found a jumble of gravels (average: 3 to 6 centimeters) that goes under the foundation in the northwest corner of the sounding, but lean against it further east where the wall seems to go deeper. The foundations and this layer, which yielded a lot of ceramics and fish bones, are obviously contemporary.

The decision to stop on an arbitrary flat level at the bottom of Uf 1193 was led by the constraints of the 2011 schedule when the B12 complex had to be closed after two weeks of field work.

1-5-3. Chronology and dating

Finally, and even though we don't attempt to date precisely the different phases of the construction of that part of the terrace, the detailed study of the sections allowed us to suggest the following relative chronology. The erection of the plastered pillar earlier described seems to occur first, together with wall B12-062 foundations to the west. Wall B12-068 (first retaining wall?) is somehow associated to that pillar, although the filling layers 2 to 5 go over it. Anyway, at some point, the floor was set at Δ 10.85 (6). The former B12-062 wall was then built on top of some foundation already existing, breaking the orange clay floor. It is interesting to notice that this wall gives the impression, in a way, to fill a gap (same as the one that could exist between two columns *i.e.*, sidewalk or any kind of passageway). After that, B12-068 must have collapsed, probably immediately followed by the building of the definite retaining wall B12-067, with the aim of strengthening the whole structure. Once the ground leveled with rubble (8) and the foundation trench filled with small pebbles (8'), the floor was raised again and renovated with a posthole and a pit (9), later sealed (10) at a slightly higher level (Δ 11.33). At last, the top of the terracing wall fell down and allowed the soil from the western high courtyard to slip down (layer 12), not to mention the later surface soil deposit (13). About the dating of the different layers and phases, no charcoal or organic sample was taken for analysis. The ceramic study would probably allow some more precision. All that can be mentioned at the moment is that all the bottom layers yielded Yemeni Mustard ware, known to date back to 1350-1450.

1-6. The northern low courtyard, S14 (A. Vernet)

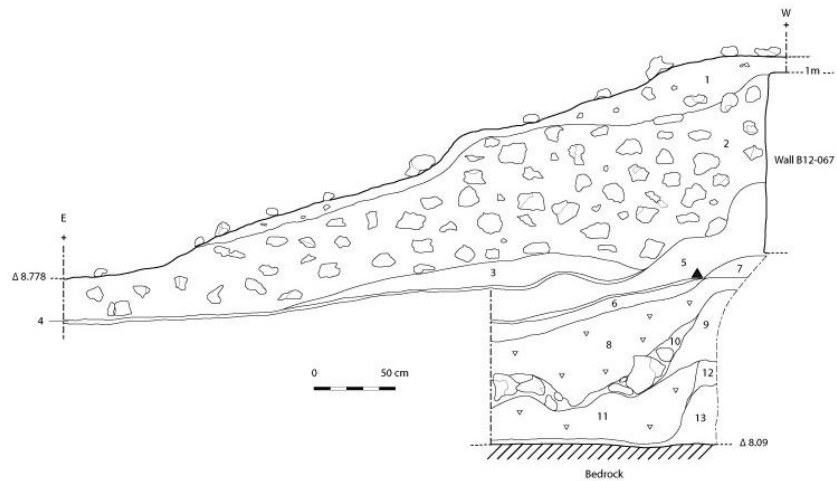
As seen from the surface, the wide area which surrounds the mosque on its western and northern sides shows a strong declivity following an approximate line between the middle of the northern wall of the mosque and the south-eastern corner of B13. As a matter of fact, excavations in 2009-2010 showed that the surface of the western courtyard on the *qibla* side was about level Δ 10.50 in its first stage, Δ 12.00 in its last period, that the surface of the eastern courtyard near the beach was around 8.00, and that these two courtyards at different levels were separated by a terracing wall (B12-067).

The first sounding S14 had been opened in 2010 against this wall, in the corner with wall (B12-063). This year it was extended to most of the lower courtyard. This work was made possible by the intervention of a bulldozer during one day. It consists to clean the area of the sounding of the surface layer and a high filling of stones measuring about 2m. This refill had been dated by the ceramic around the XVIth century which is the abandonment of Qalhât. After this primarily work we clean the wall, it's well preserved with seven rows of middle round stones, we actually clean some earth mortar still on its northern part (**Fig. B12_S14/1 The retaining wall seen from the low courtyard**). After the cleaning of the area, a relatively flat level appears, it consists of pebbles in a light brownish earth. It appears that the wall



foundation's is constructed on this level of pebble which indicates a second construction phase. On the north western angle of the sounding, which corresponds to the crossing of the walls (B12-067 and B12-063) we find a structure which passed behind the two foundations walls. It appears to be a fire structure with two hearths superposed. The northern part is a bank of large lime stones roughly different of the walls ones. We didn't find any trace of burning on the stones which testify the fire structure apposed on the stone bank. Material from the filling of the area can be dated to the XIV-XVth centuries.

A deep sounding has been done on the south on the structure to found the stratigraphical sequence on the area to the bedrock (fig. B12_S14/2 South section of B14 showing the filling of the low courtyard). The trench is a square of 160 x110 cm with 2 m deep to the bedrock. We can ob-



serve that the pebble stone lies on two sequences of filling. The first one is a layer of packed earth which can be used as a filling for the pebble layer, the ceramic dating is about the XIVth century. This first filling ends with a light layer of rootlet, which attest a short abandonment of the area before the levelling for the pebble. The second one is a large filling, very heterogeneous, content gravels, pebble and ceramic material. We can underline the presence of a lot of fragments of tiles belonging to the green decoration crosses of the mosque, and Kashan tiles style already known and new ones which deserve a more researches (fig. B12_S14/3 Kashan tiles from the early layer of S14).

1-7. The façade of the north wing, S28 (T. Creissen)

The area of the northern courtyard was covered with a huge amount of collapse masonry (B12_S26/1 The north courtyard before 2011 excavations). Following the clearing of S14 (see *supra*) these collapse layers were also removed this year against the north wing and in the area of the minaret (see *infra* S6), to obtain new information about the general set up of that part of the complex. If most of the work was done with the bulldozer, a manual sounding was also dug at the bottom of a wall discovered along the north wing after this preliminary clearing (S28).



1-7-1. Stratigraphy

The general profile of this area is very sloppy toward the north. Its upper part is covered by a collapse layer including a white and slightly pink soft sediment made off decomposed mortar and plaster (Uf 1314). Among it are many coral blocs as well as big pieces of masonry. Some of them are still lying on the surface (fig. B12_S28/2 The area of S28 after excavations), some were destroyed and another one, now



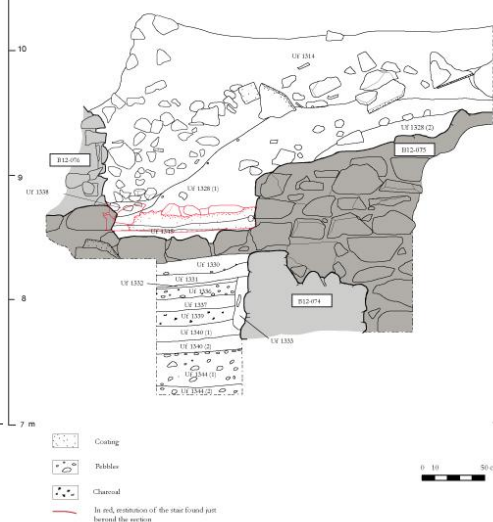
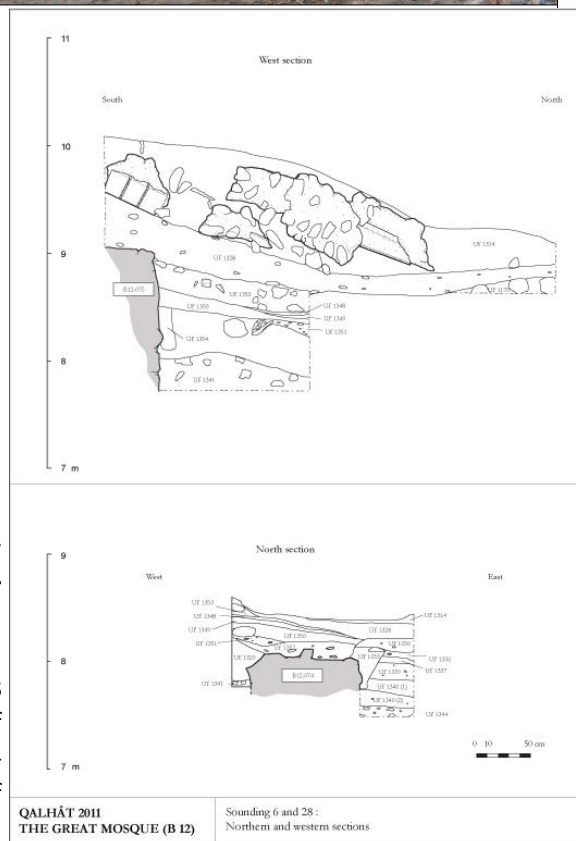
broken in two pieces, is kept in the western section (fig. B12_S28/3 Elements of the superstructure preserved in the west section of S28; fig. B12_S28/4 West section of S28). The profile of that later is rather complex. It is a half-column in the upper part,



which is made of small ash-lars of sandstone (fig. B12_S28/5 Fragment of a column in the west section of S28). Further north, the second piece is polygonal, also using some cut stones, and this part is adorned

with a stucco frieze (interlaced stars).

In the southern part, Uf 1314 is locally lying on a layer made of pebbles covered by a black and sandy layer which seem to have been a fireplace (Uf 1338). This is very localized (fig. B12_S28/6 South section of S28). In fact, in most of that area, Uf 1314 is covering a layer of brown earth including a lot of pebbles and also some stones or coral blocs (Uf 1328). This layer has the same sloppy pro-



file as the former one. North of the sounding, it is covering a collapse layer mostly consisting of stones mixed with brown earth, without any remain of mortar (Uf 1170). Uf 1170 is coming from the collapsing of the terrace wall B12-067 (see sounding S14).



In the south, Uf 1328 is directly lying on walls or related structure. For instance, it's the case for the wall B12-075 as well as for the threshold associated with it (**fig. B12_S28/7 Wall B12-075 and its threshold**). This wall is running east-west, but it has not the same alignment as neither wall B12-058 nor wall B12-037, both discovered last year further west. It is at least 90 cm large, and about five meters of its length has been unearthed. This wall is mostly made of stones, among which are many white sandstones blocs : this kind of construction was not previously observed in

the mosque area. The threshold related to that wall belong to an entrance which is 1m 10 wide (the fireplace Uf 1338 above-mentioned is located in that area) . It is provided with at least one step covered with a grey coating, which is more or less 25 cm high (**fig. B12_S26/8 The threshold in wall B12-075**). The upper part of that wall is not regular: part of it has of course disappeared because of the collapse. In the west, this wall reaches the height of ca. 9m50, whereas in the east, after the threshold, it is not preserved beyond ca. 8m60. In fact, in that area this wall is topped by a second masonry, very large, which is mostly made off coral blocs and a pink mortar (B12-076). Some kind of a large and regular scar can be seen on its north face, all through its height. It is filled by stones mixed with a dark grey mortar. Since B12-076 is built slightly further south than B12-075, there's a small recess at the bottom of that masonry combining two walls. This second wall stopped regularly where the above-mentioned door is, so the gateway was still open. No remain of an equivalent to B12-076 can be seen further west, on the other side of the door. Another entrance is open in B12-076, about two meters further east, where B12-075 seems to end. A small sounding was opened here in order to check if this is really the case (**fig. B12_S28/9 The eastern threshold in wall B12-076**). Big pebbles and a threshold were found, part of them covered by a strong grey coating that is also covering the eastern part of B12-075. In that area, a new masonry, narrower, was added against the east end of B12-076 in a second time. Above this wall, a collapsed cupola is still lying.



In the west, just under Uf 1328, top of wall B12-075 is hidden by a layer of quite hard fat clay, orange-colored and including few stones (Uf 1328, 2). Beyond the threshold is a layer of brown and quite hard sediment including small pebbles and fragments of white coating (Uf 1345).

It has been decided to open a deep sounding (S 28) at the bottom of wall B12-075 to reach its foundation level (*for all the layers described after, see the fig. 11 and 12*).

North from wall B12-075, Uf 1328 is lying on another collapse layer, Uf 1353, made of a grey-brown sediment including many small stones. Just under is a very thin beaten earth floor (Uf 1348), about 2/5 cm thick. It is quite hard, made of clay and orange. It was observed only in the section and, according to this, it was not present everywhere in the sounding. Uf 1348 is covering an ashy and sandy black grey layer including many pebbles, also just observed in the section (Uf 1349). Just under is an heterogeneous level including pebbles and small sherds which is maybe a backfill, *ca.* 10/15 cm thick (Uf 1350). Underneath, Uf 1351 is a layer or a structure with few stones, some of them almost on edge, among some kind of hard white mortar mixed with some pebbles. Its original extension remains unknown since it was observed only in the section. It is resting on another very heterogeneous layer, Uf 1352, brown and quite sandy, including small pebbles and stones.

Uf 1352 is covering a wall, B12-074, which is about one meter large and run toward the north (**fig. B12_S28/10 Perpendicular wall B12-074**). The highest part preserved is at *ca.* 8m 35. This wall is linked with B12-075, but part of its upper stones have been dismantled: there's now a hole were these stones were originally joining B12-075. On the east, two layers are now leaning on the face of B12-074, Uf 1330 and 1331. Both of them are made of brown sediment including small pebbles, which are much more numerous in the first one. The threshold of B12-075 seems to rest on B12-075. On the west, the face of wall B12-074 is completely covered by a very hard layer made of brown clay including bones, glass and quite many ceramic sherds (Uf 1329), which reach the height of *ca.* 8m 50. A posthole, about 10 cm large and 50cm deep, has been dug in that layer (Uf 1354). Just under Uf 1329, Uf 1341 present the same kind of sediment, but mixed with many stones of a very irregular shape. Some of them are yellow, other red or almost purple, and all are including gypsum.



On the east, the construction of B12-074 has cut many older layers. A trench is dug through these layers, and its partly filled by a soft and brown sediment including stones – mostly round pebbles – but also pieces of the same kind of hard clay as the one used the bind the stones of the wall (Uf 1333). The first level that is cut is a light brown beaten earth floor no more than 3cm thick (Uf 1332, *ca.* 8m 15). It is lying on a layer of small pebbles, quite homogeneous (no sherds are mixed with the stones) which is probably another floor (Uf 1336, *ca.* 10 cm thick). Just under, Uf 1337 is grey, soft and a little fat and has few inclusions. It covers Uf 1339, brown colored with almost pink parts, which contain some charcoals. Beneath, Uf 1340 probably mix two different layers which are brown and compact, with some charcoals. Just under, Uf 1344 is made of small and medium sized pebbles mixed with yellow sand and many small and used sherds of pottery. On the bottom, stones and sand are mixed with grey sediment. The excavation was stopped at the height of 7m 14 without reaching the bedrock.

1-7-2. Interpretation

The earliest layers are the ones older than wall B12-074 just above-mentioned. No wall, no building, not any structure could be linked with them. They were very partly dug : no more than half square meter for each of them. The ceramic contained in the earliest one (Uf 1344) is so used that it is not possible to assume any dating. But the one that was found in the layers 1340, 1339 and 1337 allow us to place them in the second half of the thirteen century.

These layers were then cut for the construction of wall B12-074. As we have seen, this wall is linked with B12-075, and all of them belong to the same building phase. The layers that are leaning on the western face of B12-074 (1329 and 1341) are clearly backfill. The upper one stopped at *ca.* 8 m 50, which is approximately the height of the highest stone of B12-074 but also of the hole left by the removed stones of that wall that were previously built in B12-075. We should then conclude that B12-074 was partly functioning as a very low terrace wall and that the floor related to it was at *ca.* 8m 50 in the west. No floor can clearly be related to this phase in the east: the first layer discovered under the collapse one is Uf 1330, which seem to go under the threshold. Anyway, one could assume that the circulation level was more or less at the height of the bottom of that threshold, *i. e.* around 8m 30. The central door opened in B12-075 already existed at that time, but it is not yet possible to assume if another one was built further east. Also, it is still not possible to estimate the original length of that wall.

Many sherds were found in the backfill Uf 1329. According to them, this building phase should be attributed to the first half of the fourteenth century, which is more or less contemporary with the construction of the supposed mosque of Bibi Maryam (c.1280-1320). These walls were certainly part of that mosque. Since the door is not far from the one found in the eastern part of the north wall of the mosque's basement, one could assume that there was probably a room between these two entrances. In sum, wall B12-075 could be part of an early "northern wing". The single post-hole dig into Uf 1329 may belong to the same phase, but it's impossible to reconstitute its function.

In a second time, wall B12-074 was partly modified: some stones were removed, and an heterogeneous layer now covered the destroyed part (Uf 1352). It is topped by a strange layer (Uf 1351) which might be related to these changes, as well as Uf 1350, maybe an occupation layer. Unfortunately, it's not possible to propose any dating for this transformation because of the total lack of material. Nor is it possible to ascertain that these transformations have any relation with the construction of a new wall (B12-076) above B12-075. As seen before, this new wall is starting from *ca.* 8m 70, *i. e.* about 80 cm above the highest part of wall B12-75 preserved west from the door. This could mean that in that part, wall B12-075 was not modified. When B12-076 was built, another entrance exist further east, whether it is a creation or the reutilisation of an older door. The fact that the same coating is covering both the threshold and the remaining part of B12-075 is not really meaningful: it could have been put on the former masonry when this door was built or could indicate that all these settings belong to the first building phase. So, it is still not possible to know if B12-075 was originally running further east or not. In a second time, a narrower masonry was built on the former jamb. This might be related to observations made last year. In fact, the entrance leading to the basement of the mosque in that same area was shortened in a second time.

We should then reconstitute at least three main building phases for that area. First, construction of B12-074 and B12-075 with the related doorway, all of them linked to the "first mosque". Then, partial disruption of B12-075 (and B12-074?). And, finally, shortening of the doors. Such was probably the general setup of that part of the mosque before its abandonment. The problem is that wall B12-075 is not in the same alignment as B12-058 and B12-037, both of which were still up before the collapse of the mosque. This means that, if a northern wing ever existed in the later stage, it was probably made of different rooms rather than of a single building and homogeneous building. The small occupation layer Uf 1348 could be related to the latest phase of the use of that area, since it was directly covered by the early collapse layer. It might be the same for Uf 1349, just under it. But no material allow us to propose a date for this late frequentation.

The history of the abandonment of this complex remains quite obscure... South of the sounding, the first layer of collapse is Uf 1353, which lean on the north face of wall B12-075 : this one might be

well preserved at that time. The earliest collapse of a wall that could be certified in that area is that of the terrace wall B12-067. Some stones and earth were falling from the western part, forming a huge slope against it. Then, a layer of abandonment starts to fall from the south. Since that layer is covering part of wall B12-074, this must have been now largely destroyed. Yet, no big stones were found in Uf 1328. This layer is also leaning on the threshold, which shows that it was still possible to use it until this deposit. Then, the main parts of the building collapse: it consists of big pieces of masonries, including decorated ones, partly come from the north wing, partly maybe also from the minaret.

1-8. The minaret area, S6 (V. Bernard)

The area around the minaret was covered with a huge mass of collapsed masonry. To complete the clearing of the north courtyard and check further information about the minaret and the northern wing, this area was completely cleared down to the floor of the courtyard, except for some large pieces



of collapsed masonry which were left in situ, lying on the floor (fig. B12_S6/1). These clearings confirmed that the minaret had a square shape of about 4.5 x 4.5 m and that it was in the line of the northern wing, at the north-east angle of the basement of the mosque.



The most interesting parts of masonry found in the collapse are:

- a part of a huge arch in a wall about 1m thick, whose original position could not be determined yet (fig. B12_S6/2).
- a fragment of the top of the minaret , with decorative crenellation still in situ (fig. B12_S6/3)
- a small half cupola with a decoration of a frieze of stars and crosses in blue and green glazed tiles (fig. B12_S6/4).
- a frieze of interlacing stars in stucco
- elements of decoration of the same type



2. The house (B94)

(M. Dartus, T. Creissen, A. Vernet, G. Choimet, A. Rougeulle)

The second objective of the 2011 season was to excavate a typical Qalhâti house, to understand its plan, spatial organization and function; and bring information about the daily life of the inhabitants of the city. Researches in domestic buildings were already done in previous years, in houses B16 and B21, as in the possible “palace” B13. But these structures proved to be too huge and difficult to reach for machinery to be cleared, and only limited soundings were dug there.

The house chosen for excavation this year is of a rather large but reasonable size, about 22 x 13m, i.e. about 290m² and looked as if built straight on the bedrock, which means that deep and dangerous soundings were not necessary. From surface observation it presented a plan which seems rather typical at Qalhât as it can be observed at several other buildings including B13: several rooms around a courtyard and a high elevation of ruins, as a tower, in a corner. It was furthermore located along the northern track which crosses the site, near an empty space where rubbish from excavation could be piled up and then carried out of the site by a bulldozer and a truck. To conclude, it was located very near to B19 and B21, two structures which were already rather extensively cleared in 2008. The three buildings and the small squares in-between could therefore constitute an interesting set to be entirely cleared and restored for showing in the development project.



As all Qalhât site, house B94 was entirely covered with small blocs of coral from the collapsed superstructures. As the last two years were rather rainy, it was also covered with small bushes. The first work was therefore to clear the surface from bushes and stones (**fig. B94/1-2 General views of house B94 before excavation**).

Then the upper part of the walls was excavated and the rooms cleared from peripheral collapse down to the surface level in the centre. Then soundings were opened in each room to check the thickness of the collapse and occupation layers, the presence of domestic structure and the level of the bedrock. As the floors were much



deeper than expected, only some parts of the rooms were completely excavated, but the plan of the house was nearly entirely cleared (fig. B94/3 Plan of B94). The building is in fact composed of two separate units, north and south with no connection visible, at least in its last stage.



2-1. The northern house

The northern house measures about 16m east-west and 8m north-south. It is accessible through a door 1.60m wide which is located at its eastern extremity, near the corner with the tower B94P.

2-1-1. The entrance, B94F (M. Dartus)

The gate of the house leads to the entrance room, which measures 6.5m north-south and 4m east-west, i.e. a surface of 26m². Nearly opposite, in the west wall, is a second door 1.35m wide, leading to what seems to be a courtyard (room B94D, see *infra*). The south part of the room, ca 1.60m wide, was not excavated to the floor as the south wall, between the entrance and tower B94G, seems to be rather weak and could have collapsed; the structures possibly associated with this area were therefore not uncovered.

The part of the room north of the doors was excavated. Here, a small wall 30cm wide and 1m high separates the northern extremity of the room, 1.20m deep, from the rest of the room. It was probably at the origin a small cistern, which was later filled with stones and the structure then completely covered with a coating, maybe transformed into a wide bench (B94-001). A small late Bedouin hearth with burnt pebbles is still visible on top of it. Two narrow other benches, 60cm high, are located against the west and east walls of the room, abutting north against the cistern and probably

ending south at the jamb of the doors.

At the foot of the wall of the possible cistern, 1.40m far from the west wall of the entrance, we discovered a post-hole 15cm deep and 20cm in diameter. If the structure was really a cistern, this post-hole could have been used as part of a system to take water (fig. **B94/4 The entrance of the north house, with the possible cistern**).

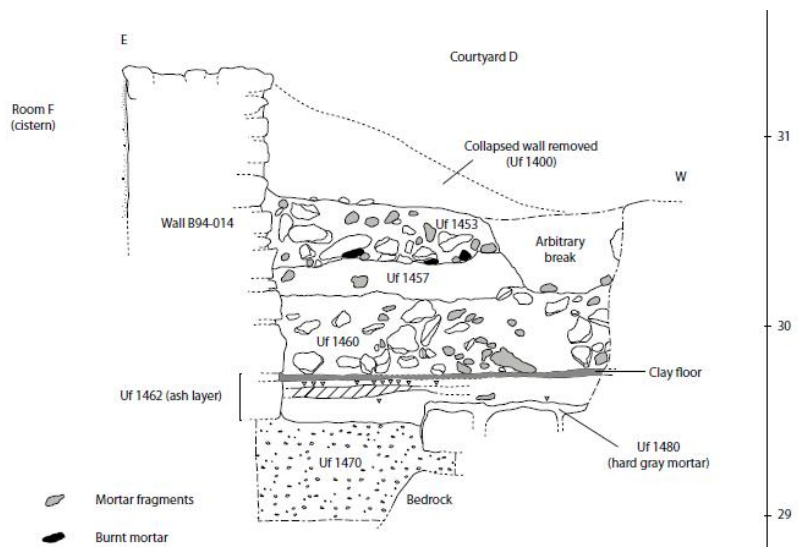


2-1-2. The courtyard, part east, sounding B94D/2 (G. Choimet)

A 2.7x1.6 m trench was dug in the northeast corner of “room” D, thought to be a courtyard given the fact that the surface soil was much lower than the neighboring rooms (except courtyard I). The aim of that sounding was to help documenting the stratification of the house, and of course its chronology.

Some cleaning was first conducted to clear walls B94-003 and B94-014 (running east-west and north-south respectively). The top soil associated to the last collapse phase of the house has been recorded under Uf 1400, as in the rest of Building 94. A second destruction layer was taken out (Uf 1453). As in the upper level, Uf 1453 yielded mostly big stones in beige sandy loose over ca. 40 cm. A lot of plaster fragments were also found, together with mortar pieces, some of them being highly burnt. The plaster is 3 to 4 cm thick, light brown colored, sometimes slightly orange, with a lot of small inclusions; those fragments clearly appeared to be broken remains of a floor. We must assume then that they fell down from a likely storey of the adjacent room F (cistern); on the other hand, we can't dismiss the hypothesis of a wooden structure, running possibly all over the courtyard, although no posthole has been found in that northeast area (but some have been uncovered in the other courtyard, see Sounding 1/I). Underneath lay an abandonment layer with more or less no stones (Uf 1457), but gravels in a rather compact brown sediment, occasionally mixed with ashes. Uf 1457 stood on another collapse layer: Uf 1460 consisted in stones (up to 20 cm) and loads of mortar pieces in an orange-brown clayish layer (fig. **B94/5 South section of sounding B94D/2**).

That first collapse phase fell onto a very soft yellow ochre clay floor (Δ 29.79) that was standing on an ashy layer full of fish bones, most of them burnt. Both were recorded under Uf 1462 number for the floor had not been seen at first glance. The ash layer was more complex than expected: the top 3-4 cm appeared to be very soft, and held a lot of charcoals, some of them quite big. On the opposite, the lower ash level was rather compact, and mixed with small gravels very tight to each other. In between was found a horizontal layer of white solid burnt lime (Δ 29.72), although only over 80 cm. This faded white level has been interpreted as a probable burnt floor and would explain the charcoal residue just above, and the set up of a new floor level. Together with the excavation of Uf 1462, two perpendicular



horizontal layer of white solid burnt lime (Δ 29.72), although only over 80 cm. This faded white level has been interpreted as a probable burnt floor and would explain the charcoal residue just above, and the set up of a new floor level. Together with the excavation of Uf 1462, two perpendicular

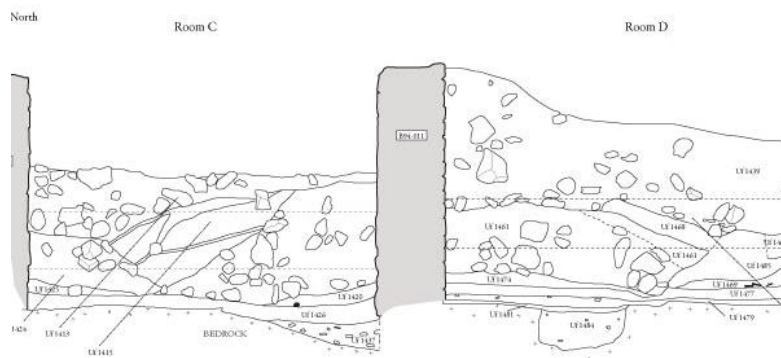
rows of stones were brought to surface: one running north-south over 1,20m along the west section, and the other one running east-west ca. 20 cm north of the south section (see pictures and section drawing). The one running east-west stops before the wall although its foundations stand slightly deeper (Δ 29.34). Both of them were covered with a very hard gray mortar that does not crumble easily (Uf 1480).

At that point, part of the bedrock was reached, in the northwest corner of the trench, and along wall B94-014 to the east; Also, three deep pebbles pockets were excavated (Uf 1470) along wall 014, all of them filled with typical backfill material as medium and small stones (2-3 to 6-9 cm), bones, and a lot of ceramics in a rather compact orange-ochre sediment. Those three filling layers are very similar although not next to each other. All are therefore contemporary, not to mention the fact that they all lay under the wall (and under both 003 and 014 in the northeast corner). It finally turned out that all these (the two stone rows and the pebble filling) were simply some kind of fitting out previous to the construction of the walls: the inhabitants filled the natural cavities and ridges of the bedrock to flatten the ground and make possible the building of the house. This is to be related to what had been found in Room C.

About the walls, B94-014 is here preserved over 2,5m and is made of stones (up to 50 cm at the bottom, then goes decreasing as we go up) and coral blocks for the very top rows. The stones are kept in a light brown mortar, from time to time mixed with gravels, and are quite tight to each other if compared to other parts of the house. This west face is not coated, contrary to the east one in room F. This also proves, if needed, that D was efficiently a courtyard. Wall B94-003 is not as high as 014 for it is only preserved over 1,9m, and its stones and corals are much smaller (except for the four lower ones). The mortar is here very soft and has been burnt at the bottom, as well as B94-014.

2-1-3. The courtyard, part west, sounding B94D/1 (T. Creissen)

This sounding has been dug in the western end near room C and the entrance leading to room A (see infra). It is partly circumscribed by the walls B94-011



(north), B94-010 and B94-008 on either side of the western entrance leading to room A, and, finally, B94-013 (south) (fig. **B94/6 East section of soundings B94D/1 and B94C**).

Stratigraphy

In the upper part, the first collapse layer reach sometimes more than one meter thick (Uf 1439, partly dug as Uf 1467). It is made of stones and coral blocs mixed with a quite sandy brown sediment. This layer is leaning on the walls B94-011 and B94-013 and it cover a low masonry – ca. 70 cm high – abutting that wall (B94-041). That “bench” is built with stones and coral blocs (fig. **B94/7**

Structure B94-041). It seem to include a former structure located in that corner of room C, with stones embedded in a white mortar (it appear at the same height as B94-041). Under Uf 1439, Uf 1468 is a localized layer of very hard clay including small gravels and few ceramic sherds. It has a north-south slope. This layer is divided in two parts in the section. It has been partly dug as Uf 1467, and its original development toward the west is not known. Below, Uf 1461 is mixing stones, coral blocs and few pieces of mortar in an heterogeneous brown-grey sediment. Its southern part is much more sandy, but it could be associated with the same layer. Located under Uf 1461 and Uf 1468, Uf 1485 as the profile of small heap leaning on the above-mentioned “bench”. It is very sloppy toward the north. This layer is made of compact clay and has been observed only in the section (it was dug as Uf 1467) : its primary extension remain unknown. Under Uf 1485 and Uf 1461, there is a very heterogeneous layer mixing a brownish sandy part (near the access to room A) with others much more clayish. It is about five to ten centimeter thick (Uf 1474, **fig. B94/8 Sounding B94D/2**). In the southern part, the sediment is much more sandy (Uf 1469).



Below, at ca. 29m 70, Uf 1477 is a beaten earth floor, very soft, made of an homogeneous brown earth including some sherds – part of them leaning on the surface –, as well as pieces of an iron chain. This layer is leaning on all the wall surrounding the sounding - including the threshold of the access leading to room A – but it is going under the “bench” B94-041. Under that floor, Uf 1479 is much more heterogeneous. It is made of a brown earth including pockets of a grey or orange clayish mortar/coating in the northern part and it is leaning on the walls. In the southern half of the sounding, Uf 1479 is directly topping the bedrock. But in the other part, there is a thin and fatty layer of dark brown or grey sediment which is thicker in the west (Uf 1481, ca. 2/4cm), which is passing under wall B94-011. It is topping the bedrock except in the middle of the sounding. Here, there are some depressions in that bedrock which are filled by small gravels – not that many – and a brownish earth (**fig. B94/9 Sounding B94D/1 bedrock**). This backfill contain some pottery sherds.



Thanks to that deep sounding, it is possible to describe more accurately some of the walls. B94-010 and B94-011 have been briefly describe above (*see sounding C/1*). The former one finished in that area in the place of the entrance to room A were a threshold made of big stones is still in place (**fig. B94/10 Threshold in wall B94-010**). At the bottom, the wall is wider, with some kind of thickening toward the east. The masonry is made of medium sized stones and small coral blocs bonded with a light brown mortar. The wall B94-011 is leaning on both this wall and its thickening. The southern face is completely covered by a coating made of clay mixed with ashes : it is partly orange, partly grey. The wall B94-008 is rather similar to wall B94-010 : big stones in the lower part, medium sized ones and coral blocs in the upper one. At the bottom, there is a huge and irregular stone that is probably an unmoved part of the bedrock included in the masonry.



The lower part of B94-013 is hidden by B94-041. Its upper part is mostly made of coral blocs bonded in a grey mortar.

Interpretation

Some irregularities in the bedrock are filled with a backfill and, upon that filling and the bedrock itself, a small “occupation” occurred which could be testified by Uf 1481 (this could have happen during the construction of the house). Upon that one, Uf 1479 is partly constituted pockets of mortar which are similar to the coating of wall B94-011. This layer was probably used as a floor during the construction of this wall. The other walls belong to the same time. Soon after, a beaten earth floor was set in that part of the house. Upon that, a small bench is built, maybe in place a former structure. Uf 1469 is leaning on that bench and could be attributed to the late occupation of that area, as well as Uf 1474. Nonetheless, above the former one, the function as the date of the quite hard clay heap leaning on B94-041 is not clear (Uf 1485). It could be an undefined setup belonging to the very last time of the occupation, or it could be linked with the collapse (melted mortar ?). The first definite collapse layer is Uf 1461. It is covered by a big piece of hard clay, which is difficult to understand (Uf 1468) : was it working with the above-mentioned setting ? This could explain why part of this seem to be fix in that heap, when the other one is now leaning upon it. If this is right, this was probably a kind of mud edge linked both with the heap and the so-called bench. Later, all this was covered by the last collapse layer, Uf 1439. No remain of any kind of roof has been found in that sounding and the size of this space seem to indicate that room D was in fact a courtyard. It this yet impossible to give more precision about its daily use.

2-1-4. The corner room, B94C (T. Creissen)

In the north-west corner of the supposed courtyard (*room D*), the relief was quite hilly (**fig. B94-11**). A quick surface cleaning (Uf 1400) has revealed that a room was located here. A deep sounding was open in its western part while the all area was cleaned to understand the global set up of that part of the building.



*Stratigraphy (see supra **fig. B94-6**)*

Just below the surface layer (Uf 1400), part of a north-south wall appear (B 94-010) as well as a large east-west wall which delimit the northern extension of the house (B 94-003) and another one, parallel to it, located 2m70 further south (B 94-011). The sounding is located between these three masonries.

The upper collapse layer as a sloppy profile, going from west to east. It is heterogeneous and mixing a quite hard orange clay level with grey and ashy part. They are covering a layer mostly consisting of a light brown and soft sediment. Many stones and coral blocs are included in theses layers which have been gathered into the Uf 1407, about 70 cm thick. It is not visible in the eastern section because of the slope profile. But, just below, there is another collapse layer, containing many stones, which is probably identical as the lower part of Uf 1407 (Uf 1413). Further down, the stratigraphy was quite complex, mixing an area filled with ashes in the central part and others with many stones on the sides. Since many stones were still included, it was possible to be sure that we were still in a collapse layer. It has then been decided to create a global Uf – Uf 1415 – and continue to going down, waiting for the section to understand the global process of that collapse. Under Uf 1415, Uf 1420 is made of an heterogeneous sediment including some stains of orange and clayish mortar, and also ashes and charcoal. The material was partly mixed with the one belonging to Uf

1415 and 1424. This later is also located beneath Uf 1415. It has no stratigraphical link with Uf 1420. Uf 1424 is heterogeneous, mixing a brown sediment and clayish orange parts. The limits between Uf 1424, 1415 and 1420 were not clearly established during the excavation process, so the material is mixed. Uf 1425 is also a mix of those layers.

Below them, Uf 1426 is an homogeneous floor made of beaten earth. It is made of a very soft and light brown sediment including few small pebbles. Some sherds cover its surface, as well as part of undefined iron piece. In the northern part of the sounding, this floor is directly covering the bedrock (at ca. 29 m 60 maximum). Nonetheless, further south, this one is characterized by the presence of a deep – but natural – depression (**fig. B94/12 The bedrock in room B94D**). In its upper part, it is filled by a layer including many small pebbles/gravel and few medium sized stones. There are also a lot of pottery sherds as well as some coins and half part of a cornelian (?) ring. All of them are mixed with a brown and soft earth. Just above, Uf 1444 also contain a lot of ceramic associated with small fragments of limestone mixed with a brown and compact earth. Both wall 010 and wall 011 seem to be built directly above this backfill (**fig. B94/13 Corner of walls B94-10 and 11**). Apart from the sounding, the Uf 1407/1413 was also removed from all the area of room C in the aim to see all its wall and the entrance, which is located in the south (**fig. 36**). The upper part of the eastern wall has been completely cleaned (B94-012).



Interpretation

The construction seems to be rather homogeneous, even if only the walls B94-003 et B94-010 are clearly linked (**fig. 37**). B94-012 is leaning on B94-003, whereas B 94-011 is leaning on B94-010 (its relation with B94-012 is yet not clear). These wall were partly built directly above the bedrock, partly upon a backfill which was certainly brought here just before the construction (**fig. 34 and 35**). According to the ceramic, this backfill seem to date from the first half of the fourteenth century. Above this filled depression, the wall B94-010 is mostly made of big stones set in irregular rows. Medium sized stones are still used for the middle part of this wall, whereas the upper one is almost only made of small coral blocs bonded in an orange mortar. This wall is about 60 cm large and more than 2m of its height is preserved. Wall B12-011 is also partly built above the backfill. It is only about 50 cm large, and reach the same level as the former one. Few big stones are used in the lower part, coral blocs in the upper one. It is provided by an entrance 90 cm wide. The northern wall (B94-003), almost 1m large, is all made of big stones and the lower part and coral blocs for the upper one. Just part of the eastern wall (B94-012) was unearthed. It is about 85cm thick. All these walls circumscribe a room measuring approximately 12 m² (2m 70 x 4m 50).

This room was then provided by a floor – Uf 1426 – which is just partly covered by the occupation layers (?) Uf 1420/1424. No specific feature allow us to propose any precise use for that room/ Above these floor/occupations layers start the collapse. Two sloppy heaps were abutting the northern and southern wall when a very thick layer mixing ashy parts with others, clayish and rather compact, including small gravel, fall down. This could belong to the roof of the room. Afterwards, the collapsing of the wall continue (Uf 1413/1407/1400).

2-1-5. The basins room, B94A (T. Creissen)

This room is located in the north-west corner of the house. A unique entrance communicate with the courtyard D in the east. Room A is circumscribed by walls 007 (west), 003 (north), 010 (east) and 009 (south). It was excavated in two times: first, a sounding was opened in the southern part and the section drawn, then it was almost completely unearthed (part of the filling has been kept in the south to maintain the wall).

Stratigraphy

The upper part is covered by a layer mixing stones, coral blocs, gravel and earth which partly covered the top of the walls (Uf 1400). Just beyond, Uf 1409 is made of a soft earth including many stones and coral blocs as well as pieces of mortar. The next layer, Uf 1411, contain few stones/coral blocs, in earthy sediment including small pebbles. It is quite hard. Many pieces of what seem to be flat vegetal and very light remains – maybe palm bark – are included in it. This layer is quite thick (ca. 80 cm). Just under, there is a layer mostly consisting of stones, which in fact was mostly observed in the section. It has been considered as part of Uf 1414, even if this one is a layer mostly made of a very soft earth including sand and many very little white inclusions. This is probably a beaten earth floor. In the south-east corner, between Uf 1411 and 1414, there is layer containing many ashes and pieces of ceramic (Uf 1488). In that same area, Uf 1411 is topping a kind of heap made of very hard orange clay (Uf 1497) leaning on the threshold separating this room from the courtyard. This heap is covered by a layer of soft earth mixed with sand which is the same as Uf 1414. Under the layer of stones, there is a low bench abutting the western wall (B94-029, fig. **B94/14**). Below the heap and the supposed floor, the next layer is made of a soft and dark brown earth (Uf 1419). It covered a brown-grey cement floor (Uf 1428). During the exploration of the northern part of the sounding, some specific structures linked to that floor were discovered (B94-034). They consist of four “basins” separated by largely destroyed edges (fig. **B94/15 The basins**). All of them were covered by the above-mentioned Uf 1419. We have decided to create separated Uf number for the northernmost basins, hoping that their filling might help to understand their function. Uf 1493 is located in the north-east basin. There was a big piece of a glass bottle crashed in that layer, just above an half-frog (fig. **B94-16 Glass bottle**). Uf 1496 fill the western basin. It includes many stones.



All these structure are covered by a strong grey cement which, originally, go back up the edges. Some coating is still visible up to ca 50 up the floor level at the bottom of wall B94-007. The central edge is linked with wall B12-003 and, according to what remain, it was probably about 60 cm high originally (fig. **B94-17 Wall B94-007**). This edge is ca. 30 cm

large, like the central east-west one. The “facade” is made of a larger edge, *ca.* 40 cm. All of them are built with stones and coral blocs bonded in black clayish sediment including many small pebbles. These basins are almost square: 102 cm large (east-west) and 108 cm long. The above-mentioned “bench” (B94-029) is leaning on these edges and is covering the cement floor. The level of stones above-mentioned was not present further north, and Uf 1419 is leaning on that low bench.

All the walls are made with stones and coral blocs, the later mostly used for the upper parts. Walls B94-003 and B494-004 are approximately 90 cm large, wall B 94-010 about 60 cm and B94-009 only 50 cm.

Interpretation

It has not been possible to observe the foundation of the four walls circumscribing the room. All of them seem to have been built during the same time, as well as the threshold leading to the courtyard. Just after their completion, as cement floor is set. The northern part of the room is occupied by four small basins, completely covered by a strong coating, which were *ca.* 60 cm high for a little bit more than one square meter. Their function remains unknown.

In a second time (?), a small and low bench is built along the western wall. It might have been erected when the basins were no more in use. In any case, whatever is the exact chronology, these basin are later destroyed, and all the room is partly filled by a quite thin backfill. In the entrance, a ramp is set up. Then, a beaten earth floor is set up everywhere. This floor looks like the Uf 1474 observed in the sounding D/1 which belong to the latest occupation of the courtyard.

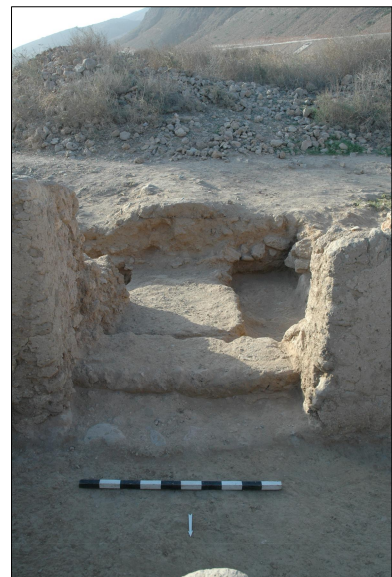
After, the house starts to collapse. The first collapse layer includes few stones but a lot of undefined vegetal elements that might belong to the roof. Then, the walls collapse and almost completely filled the room.

2-2. The southern house

2-2-1. The south street and the door (G. Choimet)

After an access had been uncovered during clearing in rooms L and H, some quick excavations were led outside the house, to its south side. Once the erratic stones removed, a 1,20 m wide entrance door was brought to light between walls B94-007 to the west and B94-048 to the east. The threshold was preserved about 90 cm to 1m high, and both inner faces of walls 007 and 048 still held remains of plaster coating (fig. **B94-17 Door and structure B94-046 seen fro the exterior**).

After removing the surface soil (Uf 1400) and a destruction layer (Uf 1473), we reached the two doorsteps, *ca.* 10-15 cm each, made of stones embedded in hard light pinky coating (structure number B94-046). For the lowest one was quite eroded in the middle, we observed hard brown mortar lying just beneath the coating, into the step itself. Wall 048 inner face was quite well preserved, but wall 007 jamb was badly destroyed (Uf 1458) and a solid reddish mortar had slipped onto the passageway, not to mention the collapsed stones.



To the exterior, the last street level had been found a few centimeters below the upper step, that is to say that people had to get down to enter the B94 house. But the upper step and the street level were not found in connection: a 15 cm gap had been observed together with very faded wood remains. We presume thus that a wooden beam was set up between the two walls, parallel to the steps. Moreover, a post also seems to have been erected on the south facing side of wall 048, just before the door opening. This speaks in some kind of wooden gate or any closing system's favour (**fig. B94-18 Structure 046 from top: (from south to north) street level, wooden beam traces, steps and entrance hall**).



From the outside (**fig. B94-19 Door and structure 045, 046 (doorstep) and 047 from the outside**), the entrance area showed two structures, one on each side of the door. To the east, a 70 cm high wall seat (structure 047) lay along wall 048, starting from the doorstep. Its eastern extremity is unknown but a stone collapse had damaged the top of it, about 3m east of the door. This wall seat was built against wall 048 and was totally covered with hard gray plaster.

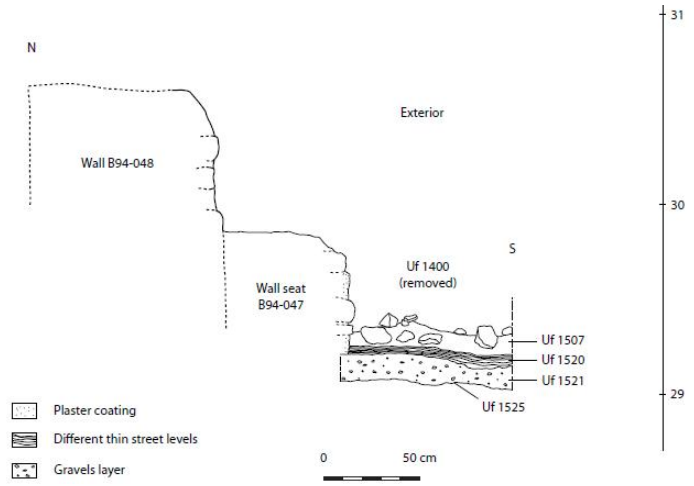
Concerning the stratification of the street and its relations to the house, it is to be mentioned that different street levels have been picked out, although all of them have been gathered under Uf number 1520. Those layers are very thin and compact, made of brown-grayish fine dirt. To the bottom, wall seat 047 (**fig. B94-20 Wall 048 and wall seat 047**) stands onto one the lowest of these floors; that floor topped a gravels layer (Uf 1521) which was prior to the wall seat as it goes under it. Another floor surface was uncovered just beneath (Uf 1526). Unfortunately, excavations had to be stopped on that light beige earthy layer.



With successive repairs of the road, the street level was raised up, and the last one now stands slightly higher than the wall seat base. Finally, the street was enclosed by a collapse layer (Uf 1507) that fell on top of that last upper floor, probably after the abandonment of Qalhât.

On the other side of the door, wall 007 was preceded by a stone structure (B94-045) that is hardly understandable and would deserve further excavations. It consists in two rows of medium to

big sized stones running north-south along ca. 1m. It has been only uncovered on its east side, that showed remains of a rather soft gray-ochre coating with small gravels inclusions. Those stones lay on Uf 1525 already mentioned and were apparently leaning against wall 007, as far as we could observe it. Above the two lower rows came 3 to 4 more rows, made of smaller nodules (B94/21-22).



A flat layer of very small gravels (average: 1-3 cm) was found above them, thus covering the whole structure and going inside the wall. This layer has not been interpreted yet but a small additional cleaning of wall 007 to the west might bring some more indications concerning the function of the B94-045 structure (wall seat? previous wall/structure?...).

2-2-2. The entrance, B94L

Once the gate of the southern house passed, we arrive in an entrance room (B94L/H) which was furnished with several benches of different width and height (fig. B94/23-24 **The entrance to the house and the staircase**). To the left hand side (west) was situated a staircase leading to the first floor, with an intermediary platform giving access to the door of room B94B (see *infra*). The walls, floor, benches and stairs were all covered with a strong plaster. To the right (east) hand side, a door was leading to a room (B94Q which was not excavated. And in front of the entrance was an other door leading to what seems to be the courtyard of the house, B94I (see *infra*)



2-2-3. The madbasa room B94B

This room is located in the southwest corner of the house and it was accessible through an intermediary platform in the staircase of the entrance. It is a long room, 8 x 2.6m, and two soundings only were excavated, in the north and south extremity of the room.

The northern back part of the space was occupied by a madbasa, a typical Omani structure to produce date honey (dibs) (**fig B94-25**). The shape seems rather complicated but only a small part of the structure was cleared and its exact dimensions and layout are unknown. It is therefore difficult to know if this madbasa was for domestic consumption only or if it was also for selling. A layer of squatter reoccupation was found on top of this structure, with ashes, charcoal, bones, shells, and ceramics.



Excavations in the southern front side of the room, in front of the door, brought interesting information about the chronology of the house. As a matter of fact, it appeared that the wall between the entrance and the room was based on an earlier wall built in large coral blocs, which was associated with a strong mortar floor and several thin layers of occupation. This is one of the rare clues that this area was occupied before house B94. The walls of the house itself were built above the previous wall and occupation layers. They are associated with a level with many stones, including two complete grinding stones (**fig. B94/26 occupation of room B94B in the second phase**), which is at the same altitude than the madbasa in the opposite part of the room.



2-2-4. The courtyard B94I (M. Dartus)

The courtyard of the southern house in B94 measures 3 x 10.7m. It was located in the centre of B94, against the courtyard of the northern house (B94D), both separated by a wall the original height of which is not known. In any case, no communication between the two houses was registered. Two soundings were opened in this area, in the east and west part of it

Sounding I/1

The sounding 1 made in the courtyard is situated in its eastern extremity, against the wall B94-036. It measures 1,70m of width on 4,50m of length. Two phases of occupation were registered.

The earlier level is made of an occupation layer on the bedrock (UF 1445) made of a rather fine brown earth. It was observed that this layer goes under the north wall of the room I (B94-013). This last one thus takes place after this layer of occupation.



The second phase is characterized by a floor in thick hard-packed earth, 20cm thick, at the altitude of 29,35. The associated layer of occupation (UF 1406), 10cm thick on average, made of a sooty brown earth. The wall of the courtyard are B94-008, 013, 026 and 036). Two banquettes are located along the south and east walls, the first one 0,90m wide, the second 0,50 wide. They seem to correspond to the foundations of the walls as the associated floor cover them. They are built in pebbles of 20cm of module and in rather compact mortar of earth. Four postholes (cf photo) are localized in the southwest of the sounding 1/1 and seems to define a structure which is beyond the limit of the sounding. The hole of the biggest post (0,25m of diameter) cuts the south banquette of which indicates that it is of a later phase.

Sounding 1/2

The sounding 2/1 is situated on the in the western extremity of the courtyard, along the wall B94-008. This sounding has for dimensions 1,80m of width and 2,80m of length. Two phases were also determined in this place.

The first phase is composed of a posthole only. Its diameter is 0,20m and its depth 0,15m. It probably belongs to a structure situated beyond the sounding. The phase 2 corresponds to the construction and occupation of the room I (B94-008, 013, 026 and 036). The level of the floor associated to this phase 2 is in hard-packed surface. Its altitude is at 29.40 and its thickness is of 10cm. Two post holes are associated to it. They are situated in the north half of the sounding, distant one of the other of 0,30m and making a north / south directed line. Their diameter is of 20cm and 15cm, their depth is of 15cm. Thick under the layer of collapse.



2-3. The outside rooms

2-3-1. Room B94J (A. Vernet)

Room J forms the north-western corner of the house (related walls 02; 03; 04; 05). By walls clamping study's we can assume that the room J had been planned during the main construction phase because the western wall (02) is linked with the big northern wall of the house (03).

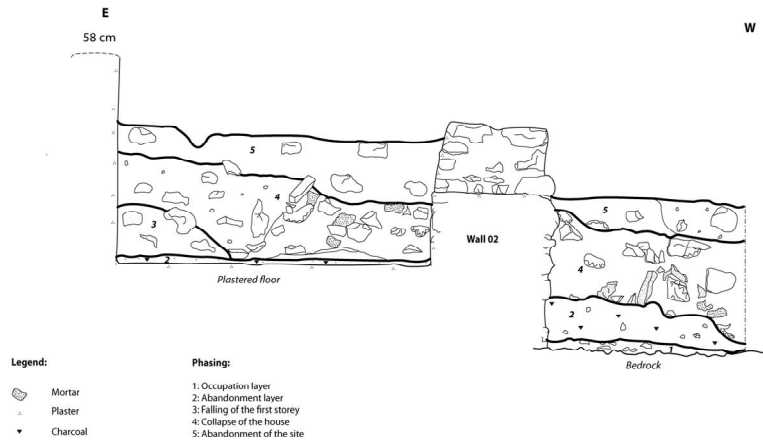
During the excavation of J, a section had been done over the external wall of the room, down to the bedrock to have a stratigraphical sequence of the street connection with the house. This external sounding allows us to say that the street level consists more or less of the bedrock. We can distinguish a small occupation earthy layer on the top of it, containing small pebbles, charcoal and ceramic sherds (UF1448) [see picture: phase 1]. Above it there is three fillings corresponding to the abandonment of the house [phase2], the collapse of the building [phase4] and to the abandonment of the site [phase5].



There is an access to the room from the west, but none to the house. This entrance is very particular because it is not a door opening on the street level as we can expect, actually it consists of a kind of window built in the wall O2, one meter high from the bedrock. This opening is not cut on the wall but belongs to the original blue print because the builders paid attention to the stone dressing and the opening regularity. The interior of the room is very well done; we must notice a beautiful greyish mortar lying on the four walls of the room and on the floor. This mortar is smoothy and doesn't present any structures attesting to the purpose of the room.

In the stratigraphical sequence we cannot notice an occupation layer, there is only collapse layers corresponding of the different times of the house bringing down after its abandonment. The first one, lying on the floor, is a very thin collapse earthy layer containing only some charcoals, it can be interpreted as the house abandonment's. A second phase contains a pocket of earthy sand colour layer heterogeneous where

we have found a lot of ceramics (1430) but there are only sherds, not whole piece. This is archaeological evidence that this pocket comes from another part of the house, may be the first storey, and had been spreaded out during the collapse. It is sealed by a high collapsing layer big stones and coral mixing with mortar pieces that are typical of a wall demolishment. Actually we can identify this layer on the street area, over western wall of room J (1448), and in the room A, on the east side (1409)



2-3-2. Room B94K (A. Vernet)

Room K is located on the south of room J. Besides the first observations on the location and tightness of the two rooms, it appears that their architecture and stratigraphical sequences are totally different. First we can notice that the room is totally blind; we don't notice any kind of openings, even blocked on a second phase, in the walls construction. We have to admit that this room must have a special purpose not known until further researches. The room walls are constructed on the bedrock, an earthy plaster is still visible on the upper part of the western wall. The first levelling of the room is a heterogeneous high filling of gravel and brown earth (1449). It contains sherds dating from the early XVth century.

The surface is more or less levelled by a thin beaten earth layer which forms a banquette when it reaches the eastern wall (O4). We cannot say if this layer had been used as a floor because the surface is damaged (1450). Even though the filling and the levelling belongs to a first phase and may be to the first house occupation phase. This can be assumed because on the top of it we only found very heterogeneous collapsed layer. The first one is a compacted level of earth mixing with pebbles, medium stones and gravels; it seals the beaten earth layer (1442). Above it, on the western side, there is a pocket of gravels (1446), the ceramic datation is about the XVth century.



The last collapse layer is very interesting. It consists of a big fill of very thin packed earth of light colour, containing a special material, not identified yet, which as the aspect of textiles fragments. On the top of this layer, we find a layer with yellowish mortar corresponding of a construction collapsing.

2-3- 3. The south-east room, B94M (M. Dartus)

The room M is located in the south-east corner of the house B94 and, as rooms B94J & K it has no direct connection with the inside of the house, at least on the ground floor. It measures approximately 2.8 x 3.8m, i.e. a surface of approximately 12m². Two phases of occupation were characterized in this room. The phase 1 consists of an elevation of levelling (UF 1492), of two north / south directed walls (B94-039 and B94-040) and of an associated layer of occupation (UF 1489). The phase 2 corresponds to the construction of the room M with four walls (B94-018, 021, 022 and 023), with associated occupation (UF 1455 and 1451) and demolition (UF 1443, 1471 and 1434) layers.

Phase 1

Wall B94-039 and B94-040 are parallel and spaced out of 0,20m. They are both directly built on the bedrock and their arase is at a height of 28.96. A backfill (UF 1492) was then settled to level the ground. It consists of very dry and compact orange-coloured, clayey sediment mixed with small pebbles. This backfill was observed in the East and on the West of both walls. It would seem that it also served as a floor because the layer (UF 1489) is above directly put at a height of 28,87m. It consists of one earth furnishes and sooty on a thickness of 0,05m. This layer seems to correspond to the occupation of the phase 1. It was not observed east of the wall B94-040. The inside of the building of the phase 1 would be on the West of the wall B94-039. Of more this last one is coated on its western facing.



The construction line observed in the masonry of the south wall of phase 2 allows to say that the wall B94-039 had a rise of at least 2m while there is no element to estimate the minimal rise of the wall B94-040. A hardened level recovered the wall B94-040 what implies the abandonment of this masonry before the construction of the room M. The walls, the backfill and the layer of occupation lay under the foundations of the walls of the room M which proves their anteriority (cf figure).

Phase 2

The preserved heights of the walls are of 1,80m to 2m for the south wall (B94-022), 1,70m to 2,35m for the east wall (B94-018), 2,30m to 3,25m for the north wall (B94-021) and 2,25m to 3,25m for the western wall (B94-023). They are built on the arase of the walls of the previous phase, in limestone blocs and pebbles the module of which varies from 10cm to 30cm. Stones are arranged in more or less regular courses, with a space between stones which can reach 15cm; they are bounded with a mortar of very fine earth and very furnish. The inside is made of small stones of around 10cm of module in the same mortar of earth as for the facings. This technique of construction makes the wall very fragile. The negative of a horizontal wooden beam was also observed in

the masonry of the western wall, at a height of 1m approximately. The wood is decomposed today but the shape of the negative suggests a half-trunk of 0,10m of diameter. This beam was included in the masonry to strengthen the wall, probably against earthquake, but its absence now makes it much more fragile

The wall B94-022 presents an abnormality in its construction. As a matter of fact, a blow of sabre was observed on all the height of the elevation, at approximately 2m of distance of the western wall and 1,60m of the east wall. This abnormality is also visible on the plan, as it appears clearly that the wall B94-022 widens at the level of this line in the masonry.



The volume occupied by the layer of the most ancient collapse is divided in two parts, about in the middle of the room. That level appears at an altitude of 30.50, its thickness is of 1,40m in the South, 1m in the centre and 1,20m in the North. The eastern part is made of a succession of layers of brown powdery reddish sediment which could be interpreted as some decomposed wood. At rather regular intervals some layers of ashes interfere with the layers of decomposed wood. The part of collapse in the western half of the room is totally different in its composition. It is characterized by the presence of many limestone blocs, pebbles and especially corals of a more important module (0,50m on average) than in the elevation of the room. These elements are mixed with some mortar of earth.

This layer of demolition supplied a very large quantity of ceramic and fish bones. It is to note the rather important average of mammal bones in comparison with the rest of the house. The layer of demolition UF 1471 is equal to the previous layer. The layer of following demolition (UF 1434) consists of limestone blocs, pebbles and corals of a module comparable to that of the elevation of the room as well as the brown earth. It appears at the level of the arase of the south wall, at 30.90. This layer was differentiated from the layer of general demolition (UF 1400) due o the presence of several small squatter hearths in-between.

Interpretation

An opening 0,75m wide was discovered in the south wall of this room, with a threshold located approximately 1,25m (alt.30.31) over the level of the floor (alt. 29.06). No other opening was discovered in this room and the question of the function of this room is at the moment unanswered. The real peculiarity of this space is that it does not contain a door at ground level. The opening discovered in the east wall, due to its width, would correspond rather to a window. What implies that the detailed levels could belong to an underground storeroom. The threshold (32,89m of the door situated between rooms P and G would seem to correspond to the level of ground of the first floor. The maximal rise preserved by the room M is for a height of 32,22m at the level of the north wall. In spite of the disappearance of the rise of the room M corresponding at the level of the first floor it is possible to imagine an access to the storeroom and to the room P by this last one.

The space searched the room M is divided into two parts in the demolition (UF 1443). The part West is characteristic of the demolition of rise in stones, mortar and filler. The module of stones and corals observed in this layer does not correspond to that used for the rises still in position by the room M. It is likely that the wall B94-039 of the phase 1 preserved a utility in the struc-

turalization of the rise of the phase 2 and that the elements of big module result from the demolition of this wall. The blow of sabre observed in the south wall of the room aligns itself perfectly with the facing is of the wall B94-039, the southeast angle of the house was thus built by leaning against the wall of the first phase. The wall B94-039 thus had to separate the room M in two parts, the part is had to receive wooden arrangements (maybe of type shelves) in view of the quantity of decomposed wood found in this place.

The basement

The southeast outside angle of the house presents a base (cf photo), it is built in an arc in the summit then in vertical rise for them 0,80m of the base. The sounding made in this place allowed of observed that the construction was put on the the layer of leveling (UF 1436), after a level of circulation, a caillouti of small pebbles (UF 1435) was installed. Walls B94-022 and B94-018 are built in the same time that this basement. The ground level (UF 1455) have an appreciably same level (29,06m) that the outside ground (UF 1435). The height of the base is of 1,20m between the outside level of



circulation and the base of the wall B94-022. It is to note that the base is built on a line of three very big limestone blocs (UF 1421) directed est/west. It is possible that this line corresponds to an outside arrangement in connection with the phase 1 of the house.

3. The ceramic factory (B41)

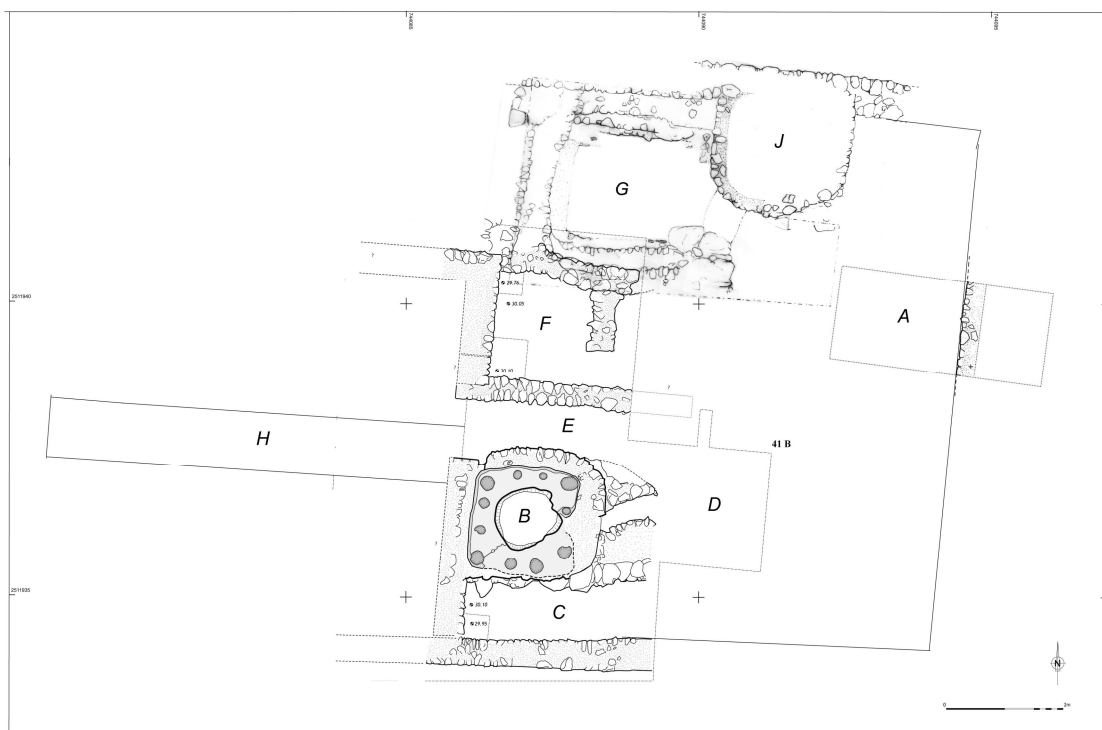
(A.Ihr, A. Rougeulle)

In 2008 slags and ceramic wasters were found scattered on a wide area on the surface of the central quarter of the site not far south of house B21, and a detailed survey led to the discovery of a ceramic factory (B41). Soundings were thus made there, and a pottery kiln together with a lot of kiln refuse dated to the 14th century were excavated. These excavations yielded a huge amount of ceramic material, including refuse from the kiln, which were studied in 2008 and 2009 by H. Renel and allowed to draw a preliminary chrono-typology of the Qalhâti productions of this period.



Recently, a special project of chemical analyzes of the Qalhât ceramics was launched in cooperation with the LADIR (Laboratory of Dynamics, Interaction and Reactivity, Umr 7075 / UPMC Paris 6) of the Cnrs, in the frame of the large Sorbonne University Labex Project Michem (Multi-scale Chemistry. From sole molecule to nano building). Thanks to this project, a post-doc researcher will be hired next year to analyze the ceramics, slags and wasters of Qalhât, to get information on several subjects:

- establish the physical and chemical characteristics of the Qalhât wares from kiln B41, glazed, unglazed and painted
- identify other Qalhâti wares, produced in other Qalhât kilns still undiscovered, and in particular verify whether the crosses-and-stars green glazed tiles of the great mosque were produced at Qalhât
- establish the difference of characteristics between some Qalhât productions and similar wares which are thought to be Hormuzi, and so the existence of local imitations of Hormuz ceramics. This would help enlightening the trade network of Qalhât harbour vs Hormuz
- bring information on the firing process in the kiln through the study of slags



Excavations in the kiln area B41 were therefore resumed this year and two more kilns were discovered (fig. B41/1 General view of kilns B41G and J; fig. B41/2 Preliminary plan of 2008 and 2011 excavations at B41;)

3-1. The kiln B41G (A. Ihr)

The interior size of the second kiln measures 205 x 135 cm and at floor level the 2:nd kiln gives the impression of being square (fig. B41/3 Kiln B41G). If this is the case at roof level is unfortunately not to be known. The exterior of this kiln measures 300 x 300 cm approximately.



The south section has a wall not starting at surface, but some 75 cm down, which is the actual kiln wall to the south. The south section wall was located already in 2008 and is built with rather big stones in the upper rows; 20x15 cm, while the lower rows are of smaller stones; 10x10 cm. The south face of this wall reaches down to the bedrock (investigated in 2008). This south kiln wall is equivalent to the west kiln wall connects nicely to the west kiln wall, which still holds slag in situ. The north face of the wall is dressed by a thin lower wall at 1 m depths, which means at the same level as the ledge wall on the west section. This lower wall is a single stone wall with only two rows. At this level the stones size averages 10x8 cm. It would have been dressed with poorly baked bricks and in this way making out the continuation of an inner ledge, still found on the west section. The gable of these two walls is nice and tidy. A very huge stone 66x46 cm forming the gable is placed on top of smaller stones, indicating that it has been intentionally placed there. Next to this huge stone is another big one, just north of the first. This second large stones is placed in such a manner that it makes out the southern limit of the entrance/door of the 2:nd kilns combustion chamber.

In the west section of 2:nd kiln we start from the surface with a wall, which is not straight and not connecting to the north running wall located in 2008. This wall gives the impression of slightly curving and is built by 15x10 cm sized stones. In the north it connects to an east running structure wall, but here the wall in this west section is leaned against the structure wall. On its east face it is dressed by an inner wall of small stones; 12x12 cm. This inner stone wall is the actual kiln wall and is coated with light green slag (fig. B41/4 Slags on the wall of kiln B41G). Three layers of slag are seen on an average of 2-3 cm thickness. The slag gives us the notion this being the combustion chamber of the second kiln. Noticeable is that this inner wall is curving at its upper end, indicating a vaulted interior of this combustion chamber. Also, this inner wall runs all way north to meet the structure wall in the north section, in a way of going over the top of the kilns north wall. 115 cm down the kiln wall we find a ledge, also this coated in slag. This ledge is only found in the west in situ.



The north section holds a structure wall, starting from the surface and made by big stones in the upper rows; 20x15 cm, while the lower rows are of smaller stones; 10x10 cm sized stones. This

construction of bigger stones on top of smaller stones in a wall is likewise the case in the south section kiln wall. The corner of the western slightly curved wall and the north structure wall is filled out with mixed sized stones and earth, as to fill out the space created when an inner wall was added to the north side of the kiln. As the filled corner is irregular and not nicely build up structure, we can assume that the structure wall was already standing when the inner walls for the kiln was built; as if they used an existing wall to lean the kiln to. Some 80 cm down the structure wall on this north section, we find the kiln wall; 10x10 cm sized stones. This wall runs into and inside the kiln wall of the west section, while the west wall runs on top all way to the north structure wall. The east end of this kiln wall was at some point destroyed by one reason or the other, not known to us today. Anyway, the destruction is seen by the collapse of the interior wall; being broken and stopping with no gable, and later refilled with earth, stones, burned and un-burned fish bones with a few smaller stones.

Same destruction counts for another wall, an interior lower set wall, some 50 cm further down the kiln wall. That is 130 cm down the surface level. Now, this deeply set interior wall is built by slightly bigger stones than the prior described kiln wall. Here we find stones size average to 15x15 cm. The connection between this interior wall and the kiln wall on the west section is that the interior wall on the north is going inside the kiln wall on the west. On this interior wall there is a second interior wall. The lowest interior wall used to be dressed with poorly baked bricks, one brick was found in situ in the corner of the west and north sections. We understand that the lowest walls in the north section and thus probably the south section accordingly where built up by poorly baked bricks in the lower compartments of the combustion chamber. Erected to an equivalent height of the west section ledge, we have evidence that the ledge was circumventing the entire interior of the kiln. The bricks are angular 11x5x16 cm and tempered with rather large grains of different sandstone material and white salty pieces, most probably parts of coral/madrepore to make them solid. The clay in the bricks is poorly baked, sometimes with slag on one side, while the other side differs in colour and texture. The non-overheated side of a brick is red in colour and somewhat soft in the sense of not being sintered. The red colour changes into yellow the closer to the slag side we look, which is a sign of it being baked. Pieces of temper is still found in the yellow parts, but in the slag the coral has evaporated and the sandstone sintered completely. Evaporation is seen as small bubble holes in the slag, giving a porous slag. By this, we can conclude that the bricks are rather much baked on one side only, and that they originally only were sundried when used in the kiln. This makes sense as they would become baked in the kiln. They are only found in the lowest levels of the interior of the kiln. One brick was found in situ in the north-western corner, almost in the bottom of the kiln. This brick is dressing the lowest wall, but is behind the green slag layer. We also have some bricks being overheated with a sintered layer, light green in colour. They were used to coat the lowest interior wall, to create a ledge of the interior kiln wall. We have collapsed bricks with slag attached to one side, while the other side of the brick is poorly baked. The difference in colour of the sides on the bricks is another sign of its poorly baking.

Not far from the bedrock, but not situated on it, we have a huge stone, which is used as part of this lowest interior wall – the ledge. The two inner walls destruction in the north section is just above and next to this huge stone. Surprisingly though, is that this large stone is used in wall construction, not at the bottom, but one row of stones up. It has later been reused as a stabiliser to a third kiln, which is leaning against it. Under this wall we have a layer of yellow clay situated just on top of the bedrock. This yellow clay is local earth being heated.

The connection between the west side and the north side on the inside of the second kiln is seen by a nice interior, rounded corner of west- and north-section found coated with slag. This corner of slag goes all way down to the floor.

In the north part of the east section no evidence of wall remains for B41G kiln exists. Here it has been cut by another kiln, B41J. To the south though, we have the entrance or door, at least half of it. The south part is intact holding a big stones, or two, one for the inner wall as a gable, the other as narrowing the entrance, as earlier described in the south section. Two layers of burnt ash and mud is located (black and red) partly cutting underneath the third kiln. Similar kinds of burnt layers are seen in the entrance of the third kiln. Underneath and to the north of the big entrance stone we find small pieces of slag in situ, indicating the limitations of the kiln size to the east. This important find does not only confine the size of the kiln but it also shows us that all the interior of the kiln was coated in the same kind of light green slag.

A building reconstruction of the second kiln would be as follows; we have one structure wall starting at surface level. It is running east and is described in the north section. This is the very first wall. Second construction event is the slightly curving surface wall seen in the west, which is leaning to the structure wall. Thirdly is the north kiln wall and after this the second interior kiln wall in the north section. After all these walls, they would have erected the kiln wall running from the east in the south section turning 90 degrees and continuing as kiln wall in the west section, where it goes over the north kiln wall. As a last event we find the lower ledge walls, circumventing at three sides at least. Added to and leaning against the east running structure wall is the third kiln, cutting the second kiln in its north-eastern corner and half its entrance.

3-2. The kiln B41J (A. Ihr)

The interior of the kiln at door level is 126 x 128 cm. The exterior of this kiln measures 190 x 210 cm and it rises today 150 high, were the bottom stones are large (20 x 25) and the upper stones minor (12 x 12) (fig. B41/5 Kiln B41J built in the ruins of B41G). The entrance measures 50 cm in depths and the stones here measure on an average of 12 x 9 cm in size. Beneath the entrance there are two layers of burnt ash and clay (black and red). As we find these layers under the contemporary door, we know the kiln was closed at the time of firing.



The interior of this kiln is completely covered with light green slag on all walls around and the roof alike. Actually it has three layers of slag. The roof construction of this 3:rd kiln is by 15 ventilations holes (B41/6 Ventilation hole in B41J) varying in size, but no big hole is found in the middle, as the first kiln from 2008 has. This third kiln is the combustion chamber of a furnace. The roof of the combustion chamber is accordingly the floor were the ceramic pot would have been piled and here we have a wall thickness of 24 cm. This wall is coated in yellow clay, which is the colour the local earth receives by heating.

The connection between the 2:nd and the 3:rd kiln; the north structure wall is prior to the 3:rd kiln as this runs behind the third kiln.

The 3:rd kiln is build leaning against this structure wall, just like the case was in the first kiln excavated in 2008. The 3:rd kiln does not go down to the bedrock, which the second does. Instead it is standing on 30-40 cm of immensely heated earth. This layer of earth was heated prior to the erection of the 3:rd kiln, by combustion in the second. Hence, the second is prior to the 3:rd.

In front of the third kiln we have a large pit, its bottom reaching down to a depth of 110 from the surface. This means that the entrance of the third kiln was covered with more than half way down by this pit. The pit contains a homogeneous filling of burnt fish bones and ash. With the existence of this pit, we have the proof of this third kiln being refilled with material from yet another kiln of later existence than the third.

3-3. Wasters and slags (A. Ihr)

Aside from ceramics we have a lot of waster found in the collapsed layers while excavating kiln B41G. Wasters are ceramic objects which were overheated in their burning process, making them collapse and sometimes fuse with other matters (**fig.B41/7 Waster of a pseudo-textile jar**). They are light green in colour, somewhat less bright than the slag. This waster alike the slag in the collapse layers, must have come from another kiln, more precisely from kiln B41J found in this area. Hence the second was used as a trash area for the third. This came to our knowledge when we realized the third kiln was later than the second.



Slag is accordingly created when a kiln is overheated. Every time a kiln is overheated it creates slag, but in times of perfect or low firing temperatures the kiln would not slag. If we have a kiln with three layers of slag, this means that this particular kiln has been overheated three times. This does however not tell us whether the kiln was used for lower temperatures several times between the vitrification of the walls. Slag is created as a fusion of minerals in the earth and ash from the fire. In high temperatures this fusion, also called vitirfication is seen as a bi-product of the actual production and use of a kiln. In the area of B41 we find two kinds of slag. The light green slag seen on the walls inside the kilns is a fusion between the mud or earth to smoothen the walls and the ash from the fire. This slag is thin and measures on average 1.5-4 cm and is often found with mud on its back side. The other kind of slag we find is black and contains enormous amount of burnt fish bones. This slag is contrary to the light green not thin, rather it is unshaped and deformed lumps of varying thickness and width. We have lumps measuring as much as 18 x 13 x 13 cm. The obvious content of this slag is burnt fish bones seen by the fact of parts of fish bones included in the slag. Considering the lack of wood in this area, fish and to some extent madreporae has been used as fuel for heating the kilns. Analyses of the slag compared to the clay of the interior of a kiln, shows on different levels of Sodium (Na) and Strontium (Sr). Three times higher levels of Na is found in the actual slag compared to the clay. For the Sr, it measures almost the double in the slag compared to a ceramic shard. These enhanced levels correspond well to material grown in saltwater conditions.

3-4. The trench B41H (A. Ihr)

We opened a long trench stretching to the west and starting just on the back side of the 2008 kiln. 7 meters long and 1.5 m wide (**fig. B41/8 Trench B41H**), the purpose of this trench is to connect the 2008 north running wall with the western space of the B41 area.

At a depth of 1.23 m we reached a floor or a surface. This surface layer is yellow with some white inclusions. The inclusion is burnt lime and the yellow layer is, as seen in the kiln an event of heating the earth. Thus, this layer has been indicating an exposure to heat of some sort or the other.

In the east end of the trench, we located the west face and its gable of the wall which the first (2008) kiln is leaning against. This wall does not stand on the bedrock, but on a 20 cm thick deposit of earth where no stones are found, just like we discovered on its east face in 2008. Next to this wall, in the south section there is a big pot, more or less complete, fixed in the section.



In the middle of the trench, we reached a white (not coral-white, but light-grey-white) layer, which is limited in the east by a destroyed wall and in the west by a nice, low set wall. This wall keeps one row of stones on its west face, standing on bedrock, while the east face holds two rows of stones, before reaching the bedrock. The white layer is powdery and holds small inclusions of black burnt fish bones. That this layer has been processed by heat is thus clear. It is 40 cm thick and underneath we find a layer reddish mortar, which is laid right on the bedrock. Considering the demarcation of the layer and the mortar on the bedrock, it is clear that the homogeneous white layer has a deliberate purpose here. As seen with the small wall description, the bedrock is sloping downwards to the east. An elevation difference of a good 70 cm between the west end of the trench and the east end is noticed.

Considering utensils found in the B41 area, this year major materiality group is the tripod. Moreover, wasters fill out many a bucket. Especially found in the west part of the trench, where not only wasters and ceramics were found, but also a lot of ceramic slag. In one day we had as much as 8 buckets of pottery and wasters. The east part of this trench held enormous amount of slag. This end is half the door located in 2008, which is connecting to the first kiln. Inside the kilns no wasters are found, so evidently they had the habit of cleaning the kilns and toss the wasters and slag in other places, something like this trench. Consequently, at some point this area and the door were refilled with wasters and ceramic slag of a production in a kiln.

3-4. The waste B101 (A. Ihr)

Before resuming excavations at B41, several soundings had been opened not far to the southwest, in an area which was covered by scattered slags and wasters. Except for a grave in the southeast the area was rather flat as in B41 and it was thought that there could be here a second ceramic factory.

S1: East of the grave runs a wall to the north and this we can follow till it joins with a perpen-

dicular one, running east. In the angle of these two walls, the area is of another kind than the area where the grave is set. Here, the area is at a lower level and the use of it is not known as we stopped excavating as soon as we located the walls. No bedrock level or any indication of practice was traced.

S2: Lot of ceramic slag on the surface, hence the trial excavation to the north of the grave. A layer of burnt fish bones and some ceramic slag, give an indication that there is a pottery production in the vicinity. Stones set in strong mortar, giving the impression of a collapsed wall.

S3: West of the grave, trench with wall running north, although this north wall could not be located in the northern trench, S2, as would be expected (**B41/9 Sounding B101_S3**). The wall segment that is located stands with 8 rows of stones and two stones wide. The wall is found in a level lower than the grave, and it does not run parallel to the gable of the grave, hence we can assume the wall has no connection to the grave. Instead, we know that this wall does not stand upon the bedrock. There is a layer of pebbles in between the lowest row of stones in the wall and the bedrock. Mortar is stuck between the stones, a mortar of reddish-brown colour with white burnt lime inclusion.



S4: Extending the trench of S3 to the south in a purpose of clarify the correlation of the wall and the grave. The wall is connected to a perpendicular running wall, thus we have the inner angle of the connection, rather much in 90 degree. Parallel to the perpendicular wall, runs another wall, creating a narrow pathway. As the trench is small a holistic interpretation of the walls and the area in question cannot be done. But as we now know the wall are not set in angular directions to the grave, nor are they in any matter physically connected, the grave and the wall can be said to belong to two different events, separated in time.

S5: At short distance, north of the grave, stands a small Mosque. Here the surface is flat and holds quite some amount of ceramic slag. In one such slaggy area we opened a trial trench. Quickly we reached the bedrock and therefore we opened a similar trench in elongated direction to the west. Some 5 meters apart, the bedrock again was reached at 25 cm depths.

S6: The very same as S5, but the trench was placed in a south-north direction rather than west-east, as in S5. The area once more held numerous amounts of ceramic slag, why we choose to place the trial trench here. Bedrock reached at 45 cm depths, but this trench was at least very rich in ceramic waste.

S7: A third time we choose to enter an area of abundant ceramic slag. This time we found slag just slightly to the north-east of the same small Mosque. This area is included in the flat region, mentioned before. Bedrock was reached at a depth of 82 cm and no indications of ceramic production were seen whatsoever.

S8: Before entering the flat region of the small Mosque, a wide wall is seen in the surface. Here we placed a trench to comprehend the connection of this wall to the bedrock. Excavating, the amount of ceramic waste was astonishing. Further down a layer of ash and fish bones gives additional indication of ceramic production in the vicinity. Bedrock at 73 cm and the wall does not connect to it; only two rows of stones are visible in the section. The wall is built upon 30 cm of sandy earth.

S9: Similar to S8 we excavated at a wall to see its first building phase. Located close to S6, the wall still standing is high and filled with pebbles. It almost appears to be recently erected. But, archaeologically we can say it is older than expected, as its continuation in depth is found by two more rows and as such, is set right on top of the bedrock.

Interpretation: The ceramic slag and waste points to ceramic production and same counts to layers of ash and fish bones, although we never were able to locate an actual kiln. As archaeological material is indicating pottery fabrication, we must assume there is a kiln of some sort in the vicinity. It might be under the actual grave, leaning against a wall as in B41, or it might have been destroyed to such an extent it cannot be found any more. In the end, we do know it cannot be east off the grave, as the area there is at a lower elevation and no ceramic waste was detected here.

4. The material

As every year, the material from the 2011 season was photographed, drawn and registered by Helène Renel, from the National Centre for Scientific Research, Umr 8167, Paris. As excavations at the kiln B41 and the house B94 delivered a huge mass of ceramics, this registration and the study could not be finished and will be completed next year. About 50 pieces will at the end be registered as DA objects (see DA file).

This year, Dr Bing Zhao, a specialist of the study of Far Eastern ceramics from the CNRS, Paris, also participate to the mission to analyze all the Oriental ceramics imported to Qalhât, which proved to be of Chinese, Burmese, Thai and Vietnamese origin. This study is also still under process and will allow a good understanding of the trade networks of Qalhât harbour with the Orient.

A big project of chemical analyses of the Qalhât ceramics will be held in 2012, and this in the end will allow a unique comprehensive study of these material, from all points of view

