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## **Madâ'in Sâlih Archaeological Project. Report on the 2016 Season**

Laïla Nehmé, Khalid Alhaiti, Thomas Bauzou, Pierre-Marie Blanc, Patricia Dal-Prà, Caroline Durand, Damien Gazagne, Zbigniew T. Fiema, Yvonne Gerber, Laurence Hapiot, et al.

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# Madâ'in Sâlih

## Archaeological Project

### Report on the 2016 Season

Edited by Laila Nehmé

With contributions by

Kh. Alhaiti, Th. Bauzou, P.-M. Blanc, P. Dal-Prà, C. Durand, D. Gazagne, Z.T. Fiema, Y. Gerber, L. Hapiot, G. Lubineau, M. al-Mathami, M. al-Musa, L. Nehmé, M. Peillet, J. Studer, D. al-Talhi, and F. Villeneuve

And the drawings of J. Humbert and R. Douaud

December 2016



*Page set-up*  
P. and M. Balty – Art’Air Edition



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## INTRODUCTION

The 2016 Madā'in Sālih archaeological season took place from 21 January to 5 March 2016. Work was exclusively concentrated on the residential area of the site. Work on the Nabataean tombs and in the tumuli – some of which were dated to the end of the Bronze Age – has now been concluded on site and only the study of bones from tomb IGN 116.1 and of some of the leather remains still has to be done.<sup>1</sup> In view of the absence of François Villeneuve and Laurent Tholbecq, fewer archaeological excavations were opened than in the previous years (fig. 1).

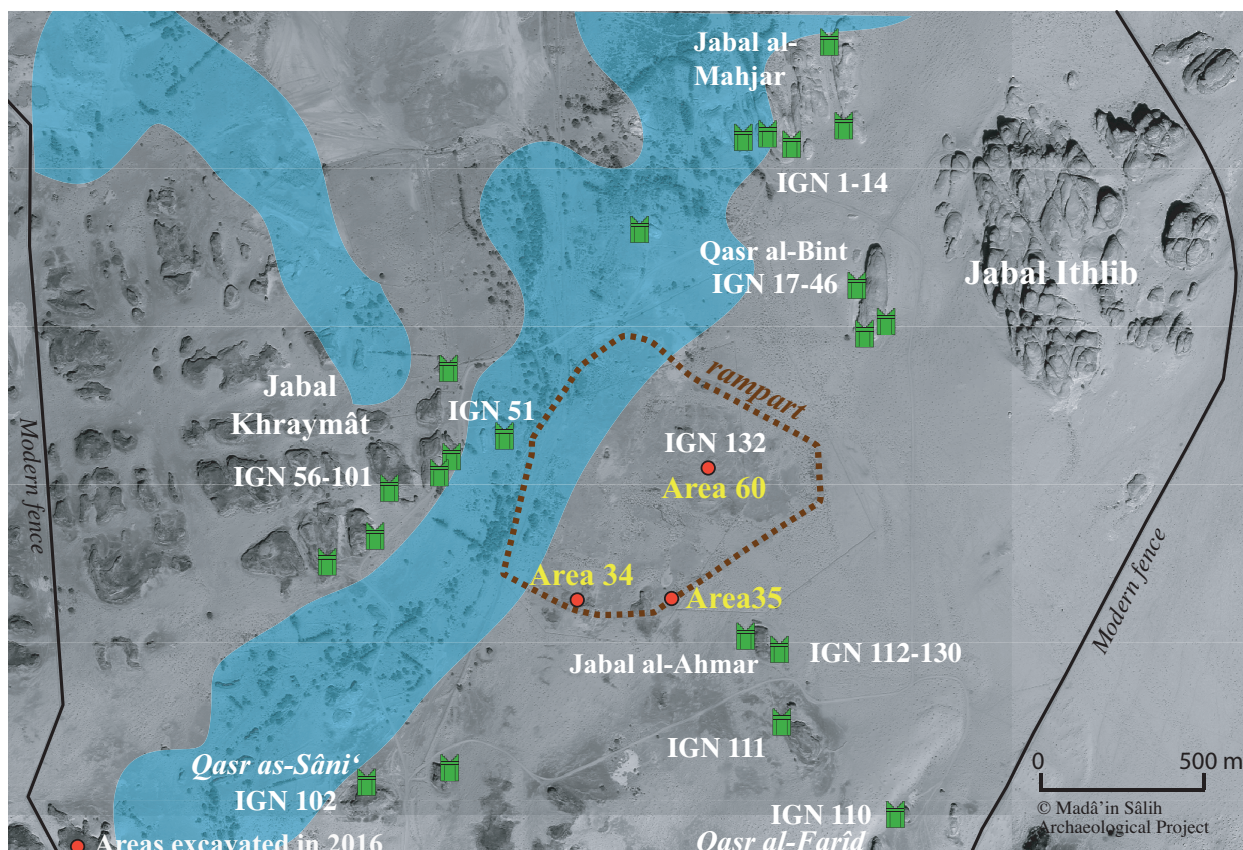


Fig. 1. The areas excavated in 2016 within the residential area.

During the six weeks of the season, however, the team was bolstered by the presence of five Saudi archaeologists, including the co-director, Daifallah al-Talhi, and four younger members of the Saudi Commission for Tourism and Heritage (SCTH). They have been members of the team for many years, are used to the project's methods, and are very well integrated. The director of the project would like to acknowledge the genuine and efficient contribution of these five colleagues, both in the field and in the excavation house.

For the first time the team was also assisted by Damien Gazagne, an archaeologist from Éveha, thanks to a collaborative research contract signed in 2016 between the UMR ArScAn and Éveha International (see <http://eveha-international.com/campaign/hegra-2016>). Finally, Pierre-Marie Blanc, director of the Hellenistic and Roman Near East team (one of the ArScAn/UMR 7041 teams) has replaced François Villeneuve for both the continuation of the excavation of the south-east gate and to supervise the team on site after Laïla Nehmé's departure.

1 - By Nathalie Delhopital, who was unavailable in 2016, and Martine Leguilloux, respectively.

## THE MEMBERS OF THE 2016 SEASON WERE AS FOLLOWS:

1. Khalid Alhaiti, SCTH Riyad, archaeologist, Saudi national;
2. Thomas Bauzou, Université d'Orléans, numismatist, French national;
3. Pierre-Marie Blanc, CNRS – UMR 7041, archaeologist, French national;
4. Rozenn Douaud, CNRS – UMR 7041, draughtswoman, French national;
5. Patricia Dal-Prà, textile restorer, INP, French national;
6. Caroline Durand, post-doc IFPO Amman, ceramologist, French national;
7. Zbigniew T. Fiema, researcher, Helsinki University, archaeologist, Polish national;
8. Damien Gazagne, archaeologist, Évéha, French national;
9. Yvonne Gerber, researcher, Basel University, ceramologist, Swiss national;
10. Jean Humbert, independent draughtsman, French national;
11. Pierre-Yves Marion de Procé, administrator, French national;
12. Maher al-Musa, SCTH Riyad, archaeologist, Saudi national;
13. Laïla Nehmé, researcher CNRS – UMR 8167: archaeologist, French national;
14. Marie Peillet, independent metals conservationist, French national;
15. Ibrahim as-Sabhan, Masmak Museum, Riyadh, conservationist, Saudi national;
16. Jacqueline Studer, researcher Natural History Museum, Geneva, archaeozoologist, Swiss national;
17. Daifallah al-Talhi, professor at Hâil University, archaeologist, Saudi national;
18. Muhammad al Mathami, SCTH al-Qunfudhah, archaeologist, Saudi national.



**Fig. 2.** Team members gathered under the tent erected in front of the Hijâz buildings.



Four sites were opened in 2016: two in the north of the residential area (both in area 6) and two in the south (areas 34 and 35).

– area 6 stretches at the foot of the rocky outcrop IGN 132, topped by a Nabataean sanctuary, the principal element of which is a tetrapylon surrounded by a courtyard and a low wall. To the south-west of IGN 132 is a residential quarter consisting, among others, of a large – possibly public – building (the ‘architectural unit’ in D. al-Talhi’s report, areas 64–65, see reports by **D. al-Talhi et al.** and by **M. al-Musa**); to the east and south of IGN 132 is a large space bordered to the south by a city wall or temenos (area 60800, see report by **D. Gazagne** and **L. Nehmé**).

– area 34: a Roman fort discovered in 2010, studied since then and excavated since 2015 (see report by **Z.T. Fiema**);

– area 35, or south-east gate of the city, on the city wall, excavated since 2014 (see report by **P.-M. Blanc** and **F. Villeneuve**);

Apart from the excavations and study of the material, other work was undertaken during the 2016 season: the removal of the excavation dump that had accumulated to the east of IGN 132 since 2010 with a small mechanical excavator, in order to make the space available for excavation; the restoration, by I. as-Sabhan, of area 1, excavated by G. Charloux from 2008 to 2011, as well as of several walls belonging to the large building



**Fig. 3.** Mudbrick ‘parking’ area: for the mudbricks to dry properly, they must be regularly turned.



**Fig. 4.** One of the large buildings of the Hijâz railway station.

to the south-west of IGN 132; finally, the production of mudbricks ready for use for future restoration (**fig. 3**).

As the al-‘Ulâ Museum, where the team normally resides, was under repair, the team was lodged in the al-Hijr railway station, within the site itself, in buildings that have been renovated several times by STCH and occupied for the

first time since the railway was abandoned in 1924 (**fig. 4**). Despite a few difficulties with faulty plumbing and the January cold in Hijâz at 900 m altitude, the members of the project were delighted to move into the station buildings, thus avoiding daily trips between al-‘Ulâ and the site (c. 25 km per trip), providing better security as a police station guards the entrance to the site 24h a day, and allowing members of the team greater freedom of movement.

## NEW PUBLICATIONS BY MEMBERS OF THE PROJECT

- W. Abu-Azizeh, N. Delhopital, C. Durand, Z.T. Fiema, Y. Gerber, L. Nehmé and F. Villeneuve. Forthcoming. “Report on the 2014 and 2015 Excavation Seasons in Some Areas at Madâ’in Sâlih”, *Atlat* (submitted early 2016).
- P.-M. Blanc, Z.T. Fiema, D. Gazagne, L. Nehmé, J. Studer, D. al-Talhi and F. Villeneuve (with the collaboration of Thomas Bauzou and P. Dal-Prà). In press. “The Saudi-French Madâ’in Sâlih Archaeological Project”, *Bulletin of the British Foundation for the Study of Arabia* 21: 29–31.
- Ch. Bouchaud 2015. “Agrarian Legacies and Innovations in the Nabataean Territory”, *ArchéoSciences* 39: 103–124. Available online: <https://archeosciences.revues.org/4421>
- L. Nehmé (ed.) 2015. *Les tombeaux nabatéens de Hégra*. (Épigraphie et archéologie, 2). Paris: Académie des inscriptions et Belles-Lettres. With contributions by J.-Cl. Bessac, J.-P. Braun, J. Dentzer-Feydy and L. Nehmé (publication in two volumes, 920 pages). See [www.aibl.fr/publications/collections/epigraphie-et-archeologie/article/les-tombeaux-nabateens-de-hegra?lang=fr](http://www.aibl.fr/publications/collections/epigraphie-et-archeologie/article/les-tombeaux-nabateens-de-hegra?lang=fr)
- L. Nehmé (ed.). 2016. *Madâ’in Sâlih Archaeological Project. Report on the 2015 season*. Available online: <https://halshs.archives-ouvertes.fr/halshs-01311865>
- L. Nehmé. Forthcoming. “New Insights into the Nabataean Long Distance Trade”, in M. Luciani (ed.), *Proceedings of the Workshop ‘Archaeology of the Arabian Peninsula: Connecting the Evidence’*, Vienna, ICAANE, April 2016 (submitted July 2016).
- J. Rohmer. Forthcoming. “From Nabonidus to Aretas: a New Political Chronology for Northwest Arabia in the Later 1st Millennium BC”, *ibidem*.
- F. Villeneuve and Z.T. Fiema. Forthcoming. “The Roman Military Camp in Ancient Hegra”, *Akten des 2015 Limeskongresses, Ingolstadt* (submitted 15/04/2016).

### Outreach

Interview for *Ancient History et cetera*, “The Nabataeans of Ancient Arabia”, <http://etc.ancient.eu/interviews/nabataeans-ancient-arabia/>

## TELEVISION DOCUMENTARY

In the autumn of 2015, the mission was contacted with a view to make a 26-minute TV documentary film as part of a series of programmes – entitled *Enquêtes archéologiques* (Archaeological investigations) – on the current state of world archaeological research. Comprising about twenty episodes, this series was produced on behalf of Arte by the French production company TSVP (Tournez s’il vous plaît). Following discussions with reporters, it was decided to focus on the chronology of the site. The film was made at the beginning of June 2016, the final editing is almost finished and the film will be broadcast in winter 2016-2017.



Fig. 5. Filming the final sequence of the TSVP/Arte documentary.







**Fig. 1a.** Detail of the general plan of the area excavated in 2016 and ground plan showing the location of the sections.

through the curtain wall, which was built entirely of mudbrick and is 2.30 m thick. The walls of the gate are of mudbrick, occasionally interspersed with stone, and the facing of both the facade and the walls of the gateway is constructed of stone, apparently reused from earlier buildings, as is the structure of the threshold and doorframe. While the side and back walls (inner side) of the towers are a little under 1 m thick, the front walls (outer side) are more than 2 m thick. This is explained by the fact that the curtain wall was preserved, with its standard thickness, on the inside of the towers (continuation of wall 35005 in tower 12, and of wall



**Fig. 2.** General view before excavation, wall 35002 and deep sounding, viewed from the south-east.



35006 in tower 13) probably only up to a certain height, thus creating 'platforms' inside the towers (35071 in tower 12, 35158 in tower 13). Thirty-one Greek, Latin, and Nabataean inscriptions and graffiti (including two very short graffiti found during the 2016 season, one of which is in Nabataean) were found engraved on the walls lining the gateway and a few on the facade near the corners of the gateway. Some of these inscriptions were already present on the reused stone blocks that make up the four walls, others are graffiti written on the walls of the gate after it was built. None of the texts is accurately dated, but considered as a whole they are evidence of the use of the gate during the Roman period, in the second and certainly at least at the beginning of the third century, which concurs with preliminary studies of the pottery. The date of the construction of the gate, probably at the beginning of the Roman era, and the possible existence of an older gate in the (Nabataean) wall, are still open to question. Apart from its construction, the history of the gate as briefly described above is complex and comprises several phases that will not be considered in this report. It will instead concentrate on the study of the construction phase of the gate, especially the earlier phases that first came to light during the 2015 season.

F. Villeneuve, who was in charge of operations from 2011 to 2015, was unavailable in 2016 and P.-M. Blanc took charge. This report was produced jointly.

During the 2015 season, a deep sounding ('sounding H deep' on **fig. 2**) in front of tower 13 revealed the presence of underlying levels in the stone facade wall of tower 13. The area being too small to appreciate their implication and to collect sufficient material, it was decided, in order better to understand these phases and define their chronology, to extend the original sounding (**fig. 1**).

This was the principal aim of this excavation, conducted between 21 February and 5 March with the help of three efficient workers. J. Humbert was responsible for plotting the general layout and producing the final sectional drawings; Y. Gerber made a preliminary study of the pottery contexts; and M. Peillet was in charge of the finds, including washing and sorting.

### ADDITIONAL OBSERVATIONS IN TOWER 12

In conjunction with the main sounding in front of tower 13, a few minor interventions, providing a great deal of information, were made in tower 12. The collapse of part of the south-eastern internal wall of tower 12 (2014 'trench F') in the winter of 2016, necessitated some clearing up. This rapidly turned into a small archaeological excavation when it became apparent that the original wall of platform 35071 (see above) had been preserved in very good condition under a deposit of degraded mudbricks. Excavation of this deposit (**fig. 3**) and of the preserved archaeological layers enabled us to confirm the hypothesis, proposed in the last few years, of the existence of two



**Fig. 3.** Sounding F, interior of tower 12, looking towards the south corner.





Fig. 4. North-western facing of platform 35071, looking south-east.

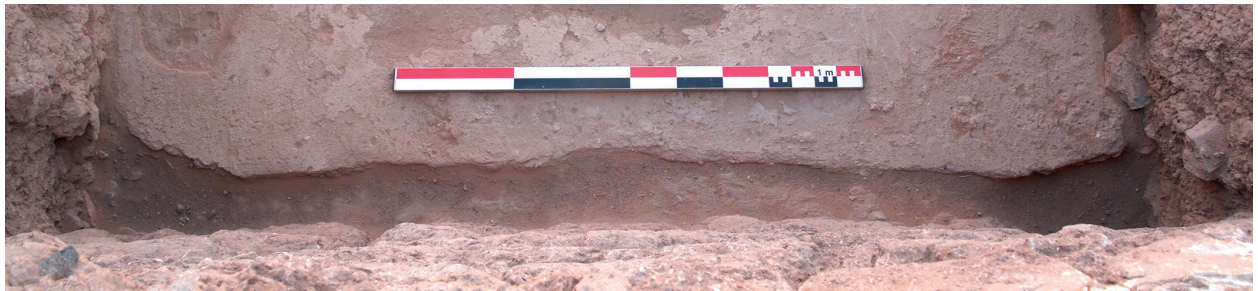


Fig. 5. Sounding F: foundation trenches, viewed from above from the south-east.

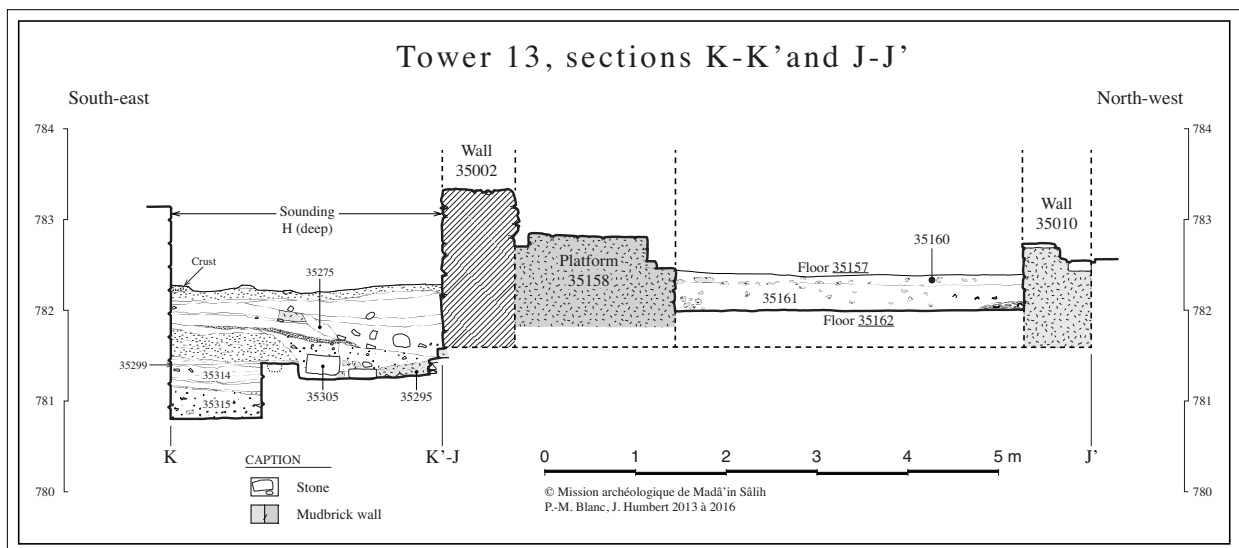


Fig. 6. Extended sounding H and tower 13, south-east–north-west section, south-western side (see fig. 1a).

construction phases, the tower defined by walls 35003, 35008, and 35009 being of a later construction than platform 35071, which is itself a remnant of wall 35005 (fig. 4).

We were thus able to excavate the fill at the end of two small foundation trenches, which served to erect walls 35003 and 35008; these foundation trenches cut through the trench dug out for platform 35071 (fig. 5). The latter, which is older, appears as a narrow residual trench ca. 0.10 to 0.14 m wide, filled with bricks projecting from the wall (level 781.97 m) and covered with a very loose fine brown-grey soil (locus 35207). A deposit of orange-coloured moderately packed soil, 3 to 5 m thick, forms the floor of the tower's occupation phase, *locus* 35208, corresponding with the level excavated in 2014, *locus* 35042, which covers a layer of hard soil that is older than the tower. The two small trenches cut through both this floor and the previous trench. A small amount of material was collected in the fill (35206): stone fragments, an unpainted Nabataean sherd, and some faunal remains. The floor layer covered by 35208/35402, which was reached in 2014 in the whole interior of the tower – but was not at that time not identified as a floor – is thus earlier than the construction of the tower. Our 2016 excavation did not extend below this level.

### EXTENDED SOUNDING H IN THE FACADE OF TOWER 13

In view of the time available and the state of preservation of the remains, the questions raised by the 2015 'H deep' sounding (see above) led to the opening of a 3 x 3 m trench ('H enlarged') around the original sounding.

By choosing to extend the H deep sounding laterally, to the south-west and north-east, it was necessary to excavate from the upper levels, particularly in the north-east, where excavation was resumed from the surface (fig. 7). After removal of the hardened surface layer (*locus* 35220), we excavated several laminated layers (*locus* 35221) created by degraded mudbricks which quite probably came from the construction of curtain wall 35006. This sediment covered the remains of sterile dune sand (*locus* 35222).

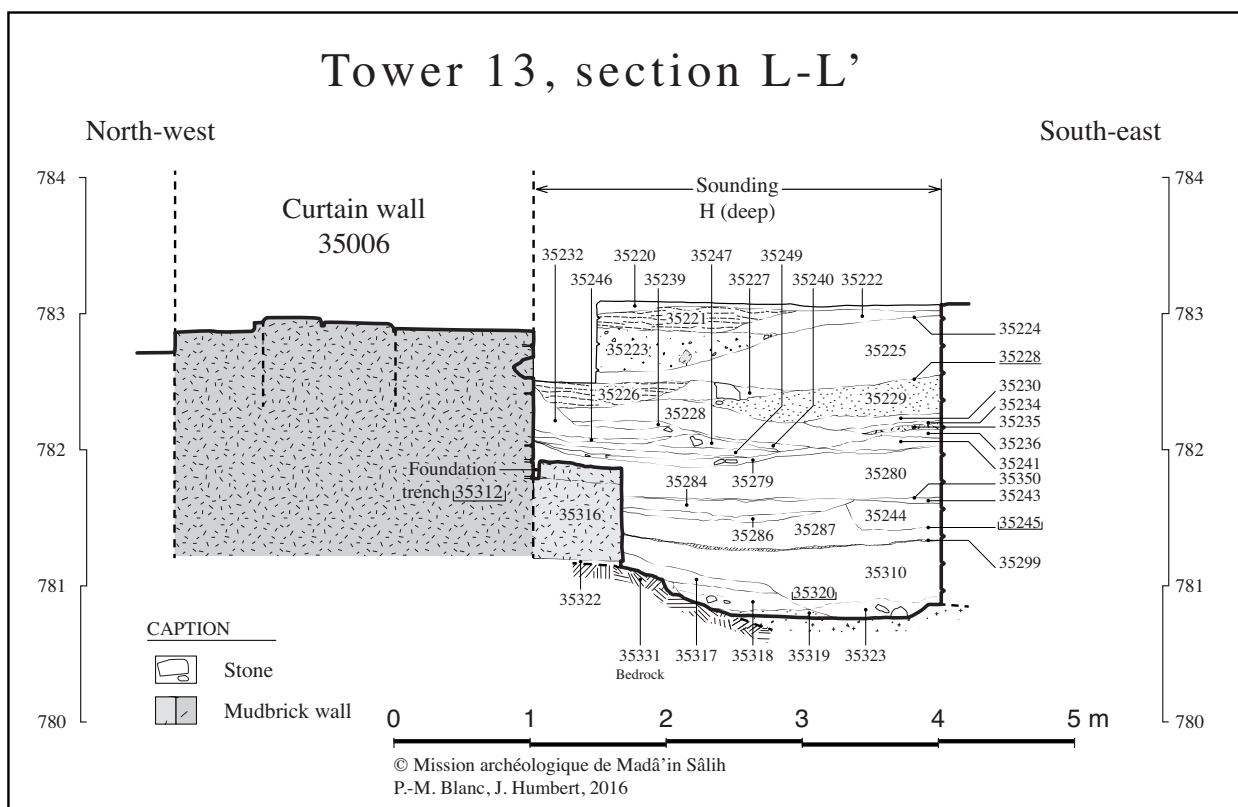


Fig. 7. Tower 13 and extended sounding H, north-west–south-east section, north-eastern side (see fig. 1a).





**Fig. 8.** West facing of mudbrick wall 35201, southern end, looking north-east.

It is useful to note the presence of a great number of animal holes or tunnels, in particular those of the green bee-eater (*Merops orientalis*), which nests in the sand. Some of these tunnels are more than 1.50 m deep. Many traces of insects, including ants, centipedes, and scorpions, and larva, worms, and snakes, were found in the excavation and nearby. The presence of bioturbation should persuade archaeologists responsible for the study of finds to take care that no sherds have intruded in contexts that appear certain. These tunnels or holes were plotted on the plans with cross-hatching.

Below are the results obtained, beginning with the lower levels.

The yellow sandy bedrock was identified in two locations in the extended sounding ‘H deep’. It consists of a ridge projecting in a north-east–south-west direction, and it appears to be deeper towards the south-east (**fig. 7**).



**Fig. 9.** Foundation trench of wall 35049 with fragments of mudbrick used as fill (right), viewed from the south-east.



To the north, under the mudbrick corner unit 35316, the bedrock does not appear to have been cut, while a little further to the south-west, it has been cut through, no doubt in order to stabilize and flatten the surface to enable the erection of the mudbrick wall 35201 (see below).

This rocky ridge could explain the construction of the gate at this location: it would have gained extra height in relation to the area situated to the south-west and north-east.

Towards the centre of the sounding, a level containing a hearth was uncovered (*locus* 35329), cut through by the trench of wall 35201. It was positioned directly on the sandy bedrock, which was fire-reddened by the hearth; the surface here appears to be horizontal. Some soil samples were taken but no material was found in context.

The hearth was covered by levels of occupation relating to mudbrick wall 35201. This wall, oriented north-east–south-west and extending beyond the south-east baulk of the sounding, measures 0.65 m wide. Six courses have been preserved (**fig. 8**).

It runs at right angles to the mudbrick masonry 35089 uncovered in 2015 (under dressed wall 35002), to which it appears to be joined; it is also associated with unit 35316. A deep sub-circular pit was partly dug into wall 35201 causing the disappearance of the associated floor levels in the east corner of the sounding. It is thus difficult to characterize the spaces on either side of this wall, and it is too risky to say which side was the interior and which side was the exterior.

This wall was levelled during the erection of the wall face containing the carefully pecked stone block (35049) uncovered in 2015. The foundation trench of this ‘wall’ shows that it was installed in the mudbrick masonry 35089, partially – perhaps even to a great extent – preserving it. It appears to be a kind of thin covering of dressed stones placed ‘in front’ of the pre-existing mudbrick construction. Its south-eastern foundation is very precisely positioned in a rather narrow trench (ca. 12 to 18 cm) and comprises three courses of irregular stones projecting by 15 to 16 cm, bound with a kind of very thin light grey mortar and resting directly on the bedrock. The fill contained fragments of mudbricks laid vertically (**fig. 9**).

The trench narrows, as it cuts into wall 35201, to just a few centimetres in the north-east of stone block 35049, and it is filled with stone splinters placed obliquely or vertically (see **fig. 1** and **10**). This stone block, measuring 1.20 m long, 0.30 m wide, and 0.14 m thick, belongs to a section of wall, orientated south-west–north-east, with a visible length of almost 2 m. At the time of its rearrangement, the height of this wall, above the preserved stone block, must have consisted of a minimum of four courses, about 0.70 m. This is attested by *loci* 35279, 35280, 35288, and 35289, which were placed horizontally in front of these courses before they were lost. The facade joints were filled with a hard grey mortar, some fragments of which were still visible as they remained in place after the stones were removed, thus enabling us to calculate the length of the lost stone block that lay above (see **fig. 10**).



**Fig. 10.** Block from wall 35049 showing trace of a vertical joint, viewed from the north-west.



**Fig. 11.** South-eastern end of stone wall 35002, mudbrick foundation, and trench cutting through blocks 35089 and 35316. Nabataean graffito. Viewed from the south-east.

It is possible that this structure, in the western corner of the sounding, turned to the north-west, thus covering at right angles a mudbrick unit – or walls – dating before tower 13 and significantly smaller. This seems to be the most plausible explanation for the presence of a trench, dug in a south-west–north-east orientation, the fill of which we excavated (*locus* 35295: **fig. 6**, bottom right of section K-K'), and which contained several fragments of the same hard grey mortar that was found on the surface of block 35049 (**fig. 10**).

Based on this hypothesis, one can reasonably assume that this small mudbrick unit, the western corner of which must have been close to mudbrick unit 35316, anticipated tower 13, i.e. it was the north-east tower or bastion of a small gate in the city wall, located slightly to the north-east of the great gate studied since 2011, with a gateway located under the south corner of tower 13.

This was followed by a substantial backfill of the space formed by the corners of walls 35201 and 35049–35089. At its top, at a height of 781.80 m, a bed of mudbricks and scattered stone blocks formed a kind of unexplained paving (reoccupation?). Two floor levels linked to the fine stone covering of the small mudbrick unit – mudbrick tower or bastion – were exposed. The first, *locus* 35350 (**fig. 7**), as well as a local deposit located in the 'axis'

of the supposed ancient passage, runs over the levelled wall 35201. During this phase, it would appear that the corner unit 35316 was preserved, although probably at a greater height than at present. It is not known what its function was at the time. The second floor is associated with a small additional structure erected against wall 35049 and visible in the middle of the south-west side of the sounding (*locus* 35296). Only one sandstone block survives from this addition (**fig. 1a**: see the block with the altitude 781.57 m); it is finished with bricks, forming a 50 cm edge jutting out from wall 35049 and consisting of at least one course. This element, the function of which is imprecise (buttress, support, bench?) was partially reused after a phase of abandonment (?) during which a ca. 30 cm thick layer of sterile sand was deposited.

A temporary floor was established at the top (level 781.85 m, see **fig. 6**).

The partial reuse of this structure, *locus* 35305 (see **fig. 6**), located in front of the carefully pecked wall took place in the next phase.

Later, reuse of the fine stone wall 35049 (and its other elements, now lost) was effected by digging through unit 35316 as well as through the rest of the original mudbrick unit (35089). The latter was ultimately dug through (*locus* 35336) in order to lay an overlapping course (ca. 5–6 cm) of mudbrick, on which wall 35002 was built: the south-east face of tower 13 (**fig. 11**).

The resulting wide trench was then backfilled with several sedimentary layers. Some of them contain a great quantity of mudbrick fragments, almost certainly broken off from units 35089 and 35316, as well as glazed sherds. A narrow trench, *locus* 35312, was dug into the remains of corner unit 35316 in order to



create a probable new outline for curtain wall 35006 (fig. 11, right).

On wall 35002 the presence of joints 'smeared' with a hard grey mortar was observed. The mortar was reinforced with small pebbles in order to save on raw material. At the eastern corner, at the end of the last block of the third course from the bottom, use of a very hard mud mortar was also observed to compensate for the shape of this block, which was irregular compared to the upper and lower courses (fig. 11, centre and right). This joint was preserved from erosion by the construction – probably very soon after it was made – of a mudbrick unit (*locus* 35237) measuring 0.50 m wide and ca. 0.70 m long underpinning the corner; it served as a buttress, preserved over one and a half courses of mudbrick where it adjoined stone wall 35002 (fig. 12). It was dismantled in order to proceed with the excavation.

## CONCLUSION

We are thus in the presence of several phases that preceded the great gate with a facade of reused stones. The **first** phase is a hearth placed directly on the bedrock.

The **second** phase (see fig. 1a) associates the mudbrick masonry 35089 and the corner unit 35316 (these two elements probably belong to a rectangular structure) with a wall at right angles oriented north-west–south-east, wall 35201. The sherds suggest a Nabataean date for this phase towards the end of the first century BC or the beginning of the first century AD.

The **third** phase corresponds to one of embellishment: a facade of dressed stones (as shown by the fine unit 35049 and its solid foundation) on the south-eastern side and possibly on the south-western side of mudbrick unit 35089. This is possibly already a system to close or control the town associating, on a city wall, two mudbrick units with a central gateway that could be closed: a bastion or tower under the eastern part of tower 13; a passage under its southern corner and under the north-eastern part of the later passage and, hypothetically, a bastion or tower, roughly under the east corner of tower 12. A preliminary study of the pottery also suggests a Nabataean date for this phase, in the second half of the first century AD.

After a fairly long period of use, attested by four floor levels and an equal number of sandy deposits, this structure was radically modified, including the enlargement and shifting of the layout towards the south-west and the reuse of wall stones, in order to create the structure identified in 2011 and excavated since then, which was probably erected during the second century AD and which constitutes the **fourth** phase of this sector.

Finally, the 2016 season has enabled us to identify, in the foundation of wall 35002, a curious fill (*locus* 35332) of a clearly rectangular groove (*locus* 35333) (see fig. 2, bottom centre; fig. 11, left, and fig. 13, centre), measuring 65 x 42 cm, which was opened in the wall. This fill, possibly indicating a cache, will be excavated in 2017.



Fig. 12. Mudbrick buttress adjoining stone wall 35002 and mudbrick curtain wall 35006, looking north-west, before it was dismantled.



**Fig. 13.** *General view at the end of excavation, looking north-west.*

More generally, the results obtained in 2016 show that in order to confirm or invalidate the hypothesis of an earlier Nabataean gate, the 2016 sounding will have to be considerably extended: to the south-west of sounding H, in the eastern part of the gateway, and in the south-eastern part of tower 13. The function of the narrow mudbrick wall 35201, as yet unexplained, will also need to be defined.

## AREA 34. PRELIMINARY REPORT ON THE 2016 SEASON

Zbigniew T. Fiema (University of Helsinki)

The 2016 fieldwork season of the Saudi-French Project in Madâ'in Sâlih (ancient Hegra) included the continuation of excavations in Area 34. While the following report presents the detailed results of that season, it is necessary, for the clarity of argumentation and the overall interpretation, to include a brief account of the 2015 season. Area 34 is located directly to the west of Hill B – one of the two major southern landmarks in the topography of the Madâ'in Sâlih settlement. Its top once held a stone-built citadel, the plan of which, however, is currently incomprehensible, due to the fact that the site served as a quarry in the 20th century. However, the citadel, whichever form it had in antiquity, must have remained in a close functional relationship with the structures in Area 34 described below. The western side of Hill B steeply slopes westward forming a stony plateau, ca. 135 m east-west x ca. 90 m north-south (including the north-

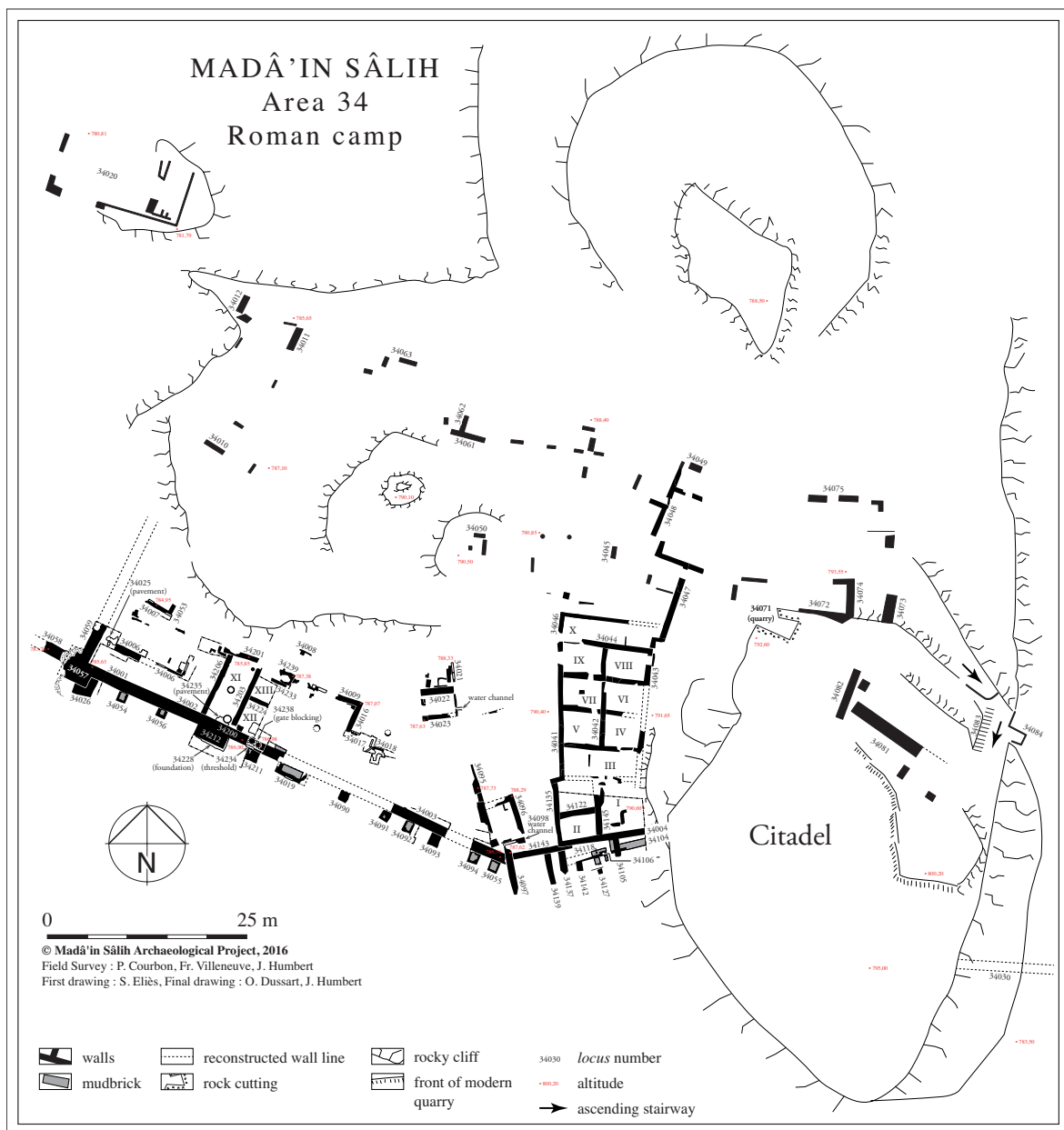


Fig. 1. Area 34: the Roman fort. Top plan following the 2016 fieldwork season (J. Humbert).



west slope of Hill B) which turns then into a long spur or flat ridge continuing northwestward. The surface of the plateau is ca. 10–15 m below the summit of Hill B and it remains a few meters higher in elevation than the surrounding area. The surface of the plateau is uneven; it gently rises from the southern edge (at ca. 787 m) northwards to reach the elevation of ca. 790 m asl in the northern part of the plateau, and then sharply drops to the level of ca. 785–787 m.

The fieldwork in Area 34 directly relates to the extant city wall, traditionally referred to as the rampart, investigated through the systematic ground and geophysical survey, the examination of aerial and satellite images, and the actual excavations (Villeneuve 2010, 2014). The rampart, 2937 m long, encloses the entire settlement in Hegra (52.5 ha), and, with some exceptions (*infra*), is generally built of mudbrick. The width ranges from ca. 0.85 m (in stone-built section) to 3.90 m, the average of mudbrick sections being ca 2.25 m. What remains of the rampart in Area 34 – the foundations and the lowermost courses – is entirely stone-built. Currently, thirty-six towers about the outer face of the rampart. Assuming the consistent distance of ca. 35 m between each other, at least eighty towers are postulated. Most of the towers, ca. 4 m long and ca. 3.50 m wide, were presumably added after the completion of the rampart, they appear solid (i.e., buttresses) and almost all feature stone foundations, also where the curtain wall lacks stone foundations. Four or five gates have been located in the rampart, including a major gate in Area 35. The ceramics from soundings, the stratigraphy as well as the construction technique imply that the rampart was built in the 1st century AD, thus during the Nabataean period.

The 2016 fieldwork in Area 34 included a thorough clearance of the entire surface of the stony plateau, including the collection of surface material – ceramics, coins, metals and stone artifacts. A new trench (Trench B = Rooms XI, XII and XIII), ca. 8 m east-west and ca. 13 m north-south, was opened in the central part of the ‘wide rampart’ (*infra*) near the place where the existence of a gate was suspected. Additionally, the visible wall lines in the entire area were cleared and exposed for photography and the update of the area’s ground plan, the latter entirely superseding all previous plans and associated descriptions (**fig. 1**). The prior hypothesis that the extant ruins in Area 34 resemble a fortified camp is now fully confirmed and it is evident that its function closely relates to the Roman military presence in Hegra (Villeneuve and Fiema forthcoming). Furthermore, as argued below, this fortified complex finds more appropriate designation as the Roman fort in Hegra, rather than a camp.

### General description

The pre-2015 explorations of the area, supplemented by the imagery provided by the kite-flown camera, revealed numerous, substantial stone foundations/walls on the plateau in Area 34. These were arranged in long, often parallel, and subdivided rows, seemingly forming a meaningful entity. It is now evident that this architectural complex is a rough quadrangle consisting of series of rooms surrounding an irregular central courtyard. The rampart there, which is the most significant architectural feature in Area 34 and the ‘backbone’ of the complex, runs on the southern edge of the plateau. The architectural complex stretches for ca. 85 m east-west and over 65 m north from the rampart, i.e., the built-up area is little over half a hectare in size (**fig. 2**).

There is a marked difference between the eastern part of the quadrangle (ca. 1/4 of the entire complex) and the central/western parts (ca. 3/4 of the complex), as primarily reflected in the construction manner of the rampart and in the overall orientation of the walls and structures in these parts (**fig. 3**). In the eastern part, the rampart (*locus* 34004) is narrower than its central-western counterpart (henceforth ‘narrow rampart’) and of generally inferior construction manner than the latter. The orientation of the narrow rampart and some of the walls *directly* adjacent to its northern side roughly follows east-north-east–west-south-west and that might only partially be related to the unevenness of the terrain which slopes sharply westwards from the top of Hill B. In the central/western part, the rampart (from west to east *loci* 34001, 34002 = 34200, 34203) is much wider and features a more regular masonry (henceforth ‘wide rampart’). The wide rampart





**Fig. 2.** Area 34: the Roman fort. Drone view from the north-west (photo M. Lefrançois).



**Fig. 3.** Area 34. The southern part of the Roman fort featuring the narrow rampart (upper central, by the slope of Hill B), the wide rampart (central and southern area) and the evident different orientation of these ramparts. Trench B in the center. The eastern wing of rooms in the upper left (photo M. Lefrançois).

does not run on the same line as the narrow rampart; instead, it follows the west-north-west-east-south-east orientation, shared also by the adjacent structures. Furthermore, there is much greater symmetry and regularity in the central/western part of the complex; for example, the wide rampart turns a perfect right angle with the wall (*locus* 34059) running north-north-east in the area of the south-west corner tower of the quadrangle. These differences are certainly not accidental and cannot only be partially related to the difficult terrain. Instead, it is suggested that the apparent lack of conformity between the narrow and the wide ramparts and thus the eastern and the central/western parts resulted from the fact that these were constructed in different periods – Nabataean and Roman – and with different intended function. The situation is further complicated since the narrow rampart and some walls located directly by it originated in the Nabataean period, but these were all substantially modified and reinforced during the Roman period when the wide rampart and the central/western area structures, i.e., the Roman fort, were constructed.



### *The Narrow rampart and trench A*

The narrow rampart (*locus* 34004) is the easternmost part of the southern perimeter wall of the complex (see fig. 1). It runs east-north-east–west-south-west for a distance of ca. 12 m, then it is abutted by wall 34143 (ca. 9 m long) which continues the direction of the narrow rampart. In fact, wall 34143 appears to be the connecting element between the narrow and the wide ramparts and thus presumably dates to the construction period of the latter. At the end of its course, wall 34143 is abutted by the perpendicular wall 34097 which is, in turn abutted by the wide rampart 34003 (fig. 4).

Rampart 34004 is built directly on the bedrock, merging on the eastern end with the steep slope of Hill B. It features small blocks in irregular coursing, is ca. 0.85 m wide and is currently ca. 0.75 m high. Directly south of the rampart are remains of a large-scale, combined mudbrick-stone fortification reinforcement, at least ca. 2.75 m in width. Specifically, ca. 2 m from the outer face of the rampart, a parallel wall was built, with the outer stone revetment (*locus* 34106) and the mudbrick backside (*loci* 34104, 34118). The revetment is ca. 2.10 m high, made of ashlar in regular courses and of much higher quality than the narrow rampart. The space (ca. 1 m wide) between this front wall and the narrow rampart thus formed a



**Fig. 4.** Area 34: the Roman fort. The easternmost part of the wide rampart (*locus* 34003), abutting wall 34097. View from the west.



**Fig. 5.** Area 34: the Roman fort. The eastern wing of rooms in the lower central. Trench A and the narrow rampart in the lower left, the wide rampart in the central and upper left (photo M. Lefrançois).

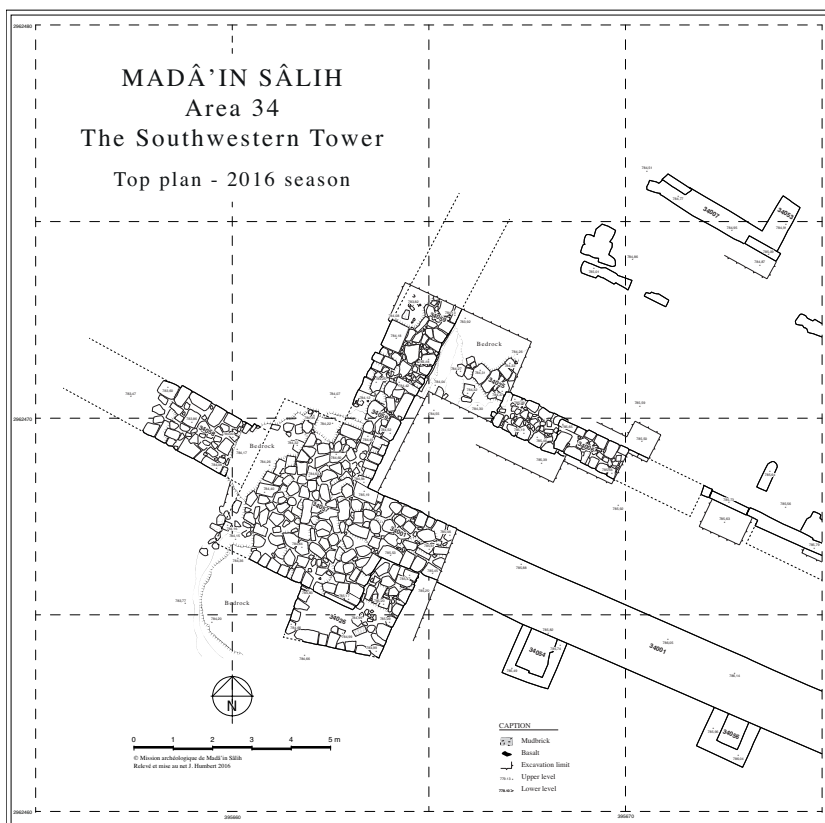
casemate subdivided by cross-walls (34105 and 34137) and filled with stones and soil. The datable material was overwhelmingly of a 2nd century date, i.e., later than the construction of the narrow rampart (*infra*). Further south, series of perpendicular, stone and mudbrick cross-walls (*loci* 34141, 34130, 34127 and 34142) abutted the stone revetment, while a massive deposition (*locus* 34128) of intentionally layered, flat, whitish sandstone fragments sloped upward toward the front wall, as if creating a *glacis*. Finally, in the westernmost part of the narrow rampart area, two large, parallel north-south stone walls (*loci* 34139 and 34097), again of construction superior to that of the narrow rampart, mark the western limit of the fortification reinforcement as well as the limit of the narrow rampart area. Further westward, the orientation of the architectural complex is changes radically.

To ascertain the date of the narrow rampart, Trench A was opened in 2015 in the south-east corner of the complex (**fig. 5**). The lowermost deposits in the excavated space (Room I), dating to the 1st century AD, appear contemporary with the construction of the narrow rampart and the walls enclosing Room I. The main occupational deposits, including beaten-earth floor, were dated to the late 1st/2nd century AD, and probably relate to the construction of the central/western part of the architectural complex, i.e., the Roman fort. During that time, Room I was an open space used for milling, food processing and cooking. Later (late 2nd-early 3rd century), Room I became a place of disposal of debris from adjacent rooms, evidenced by sherds broken *in situ*, quantities of food residues and by-products, and bones. The occupation in Room I did not continue beyond the later 3rd century.

### *The wide rampart, its towers and buttresses*

The wide rampart is evidently a new entity, associated with the construction of the Roman fort in Hegra. Although its course received different *locus* numbers (west to east: *loci* 34001, 34002 = 34200, 34203) these reflect the current condition and the fact that some stretches of the rampart are not visible, although clearly implied by the presence of buttresses (see fig. 1). In addition to a clear change of orientation, mentioned above, which begins where it abuts wall 34097, the wide rampart is at least 1.30–140 m wide and constructed of mostly dressed stones in regular courses.

The wide rampart continues for ca. 65 m on the southern edge of the plateau, from wall 34097 to the



**Fig. 6.** Area 34: the Roman fort. Top plan of the south-west corner tower (locus 34057) including the later added buttress 34026 (J. Humbert).





**Fig. 7.** Area 34: the Roman fort. The south-west corner tower (locus 34057). The later added buttress (locus 34026) in the lower left. View from the east.

south-west corner tower (*locus* 34057). Since at least some of these arrangements appear regular and/or symmetrical, it is instructive to convert some measurements to Roman *pes Monetalis*, i.e., 0.296 m (see Walthew 1981, and Millett 1982, for discussion), in order to ascertain if a rigorous planning was applied. Ca. 40 m west of wall 34097 there is a small gate (*locus* 34234), ca. 2.1 m (little over 7 p.M.) wide between the doorjamb projections. The gate is flanked by two solid rectangular towers or large buttresses<sup>1</sup> (*loci* 34019 and 34212), ca. 3.70 x 1.70 m and 4.20 x 1.70 m, respectively. Thus, the average for the towers is around 13 p.M. x exactly 6 p.M., and 6 Roman feet is exactly how much the twenty towers in the early 2nd century fort in Humayma, Jordan, project from the curtain wall (Oleson 2009:

540). Ca. 23 m west of the gate there is the south-west corner of the fort, marked by the corner tower (max. ca. 4.1 x 4.2 m = almost 14 x 14 p.M.), fully integrated in the corner formed by walls 34001 and 34059 (**fig. 6–7**). The tower is solid but only the foundations and the lowermost course are preserved. The tower projects outwards on the southern and western side by 1.7 m (6 p.M.), i.e. exactly as the corner towers at Humayma. Sometime later, an additional, trapezoid buttress (*locus* 34026; max 2.5 x 3 m) was built against the south-east corner of the tower, also abutting the westernmost part of wall 34001. Wall 34059 which fully integrates with the tower and the wide rampart, turns the right angle with the rampart and continues northwards. That wall, ca. 1.4 m wide, is of the same construction type as the wide rampart. Notably, while the stony plateau ends here, sharply dipping down into the surrounding sandy area, another wall (*locus* 34058), ca. 1.4 m wide, continues beyond the tower, on the same west-north-west–east-south-east line as the wide rampart. Aerial imagery seems to show another tower-like structure after ca. 20 m but this will have to be confirmed on the ground.

In addition to two rectangular towers flanking the gate in the wide rampart, there are also nine smaller buttresses (see **fig. 1**). These are roughly square but of slightly differing measurements, varying from ca. 1.30 x to ca. 1.60 x m (**fig. 8**). The two largest ones – *loci* 34092 and 34093 – are ca. 1.60 x 1.70 m and there might have been a postern gate (ca. 4 m wide) between these but speculation can only be confirmed by excavations (**fig. 9**). The distances between the other gates are irregular. Starting from the east and going westwards: wall 34097 – 1.40 m – buttress 34055 – 1.40 m – buttress 34094 – 4 m – buttress 34093 – 2.30 m – buttress 34092 – 2.90 m – buttress 34091 – 4.50 m – buttress 34090 – 5 m – (gate-flanking) tower 34019 – 2.70 m – buttress 34211 – 2.50 m – (gate-flanking) tower 34212 – 4 m – buttress 34056 – 4 m – buttress 34054 – 3.90 m – corner tower 34029. The last distance is reduced to



**Fig. 8.** Area 34: the Roman fort. Small buttress 34091. View from the south.

1 - The term tower/buttress is preferred here in contrast to bastion which usually denotes pentagonal fortification work projecting from the curtain wall and common in 16th–19th century Europe.





**Fig. 9.** Area 34: the Roman fort. Rampart 34003 in the center, buttress 34093 on the left, buttress 34092 on the right, uncleared collapse (locus 34099) between the buttresses. View from the north-west.

2.95 m by the later insertion of buttress 34026. Although none of the small buttresses were excavated, these appear to be solid constructions and apparently later in date than the perimeter wall, since buttress 34211 was built directly against the blocking of the gate (*infra*, Phase 3). For this reason, the conversion into Roman feet is perhaps superfluous here.

### *The eastern wing of rooms*

Although located in the eastern part of the fort, i.e., in the narrow rampart zone, and largely following the general orientation of structures there, the eastern wing of rooms (Rooms I–X) does not belong to the earliest, Nabataean, occupation in Area 34, as opposed to Rooms I and II. It is apparent that in this case, the wing followed the orientation of pre-existent structures, incorporated into the Roman fort, and, additionally, that such orientation reflects the inconvenience of the sloping ground (see fig. 5). The wing features two parallel rows abutting each other, and divided into units which are two-room deep (Rooms IV–X). Such arrangement resembles *contubernia* in Roman forts, e.g., of Davison Type B – rectangular front *arma* and rectangular rear *papilio* of roughly the same dimensions (Davison 1979: 4–5, 267, fig. A). The rooms at Hegra are 3.6 m wide and 5 m deep, i.e. 12 x 17 p.M., thus close to legionary *papiliones* (12 x 15 p.M.). For comparison, the *contubernia* in the fort at Humayma feature *arma* which are somewhat smaller (ca. 3.4–3.6 m x 3.8–4.6 m) than *papiliones*, which are ca. 3.6–3.9 m x 4.6–4.8 m (J.P. Oleson, pers. comm., 2015). Considering the presence of the auxiliary cavalry (or of legionary cavalry of the *III Cyrenaica*) in Hegra, it is tempting to interpret the eastern barracks as what has been termed as ‘stable-barracks’, i.e. the structures where horses were accommodated in the front rooms equipped with soakaway pits, and troopers in the back rooms (Sommer 1995), all rooms being rectangular and roughly of the same size, as in Hegra. Such barracks were found in the forts at Dormagen (the *limes* of Germania Superior; see Müller 1979), and in Wallsend and South Shields, both in Britain (Hodgson and Bidwell 2004: 123–127). This hypothesis is, however, highly speculative, awaiting confirmation through future excavations.

### *Other structures in Area 34*

Due to very shallow sandy deposits there (no more than 0.1 m above the bedrock) and significant slope erosion, the structural remains in the central part of the area (i.e. the interior of the fort) are scant. Only

by the highest point in the area (ca. 790 m asl), there are remains of some walls standing directly on the bedrock, and further east, two column drums (0.60 m in diameter) apparently *in situ*, and ca. 3.40 m from each other. Another drum and a worn pilaster-capital (or base?) lay nearby. The northern part of Area 34 is currently difficult to interpret as the plateau rapidly slopes down to the level of the settlement site and thus the erosion and the colluvial collapse must have been (and still are) considerable there during the rainfall seasons. Yet, it is expected that a northern, parallel counterpart of the wide rampart should be located somewhere on the slopes. The surface clearance and aerial imagery provided evidence of some north-south walls which might have abutted such curtain wall, forming room spaces. There might have been a gate or at least a sloping entryway located in the north-east part of the plateau, close to Hill B. Although the north-west slope of Hill B is steep, remains of walls were noted there, associated with large quantities of surface pottery, including two ceramic water pipes. Also there, a probable rock-cut cistern is located. To the north-west of the complex, there is a small structure, which appears functionally related to the complex, perhaps as a food preparation area, judging from a number of fragments of basalt milling stones. Generally, these basalt fragments (*infra*) are very numerous, especially on the northern slopes of Area 34.

### Phasing

The following section presents a detailed phasing of all strata and installations in Trench B excavated in 2016 (fig. 10–11). At this point of time, it is not advisable to have it fully combined with the phasing of Trench A excavated in 2015, although brief comparative statements are offered here. Also, wherever relevant and possible, the phasing information includes structures adjacent to Trench B or generally related to the central/western area of the fort, if their relative dating can be reasonably established. Only the entire western half



**Fig. 10.** Trench B. Room XI on the right, Room XII in upper left and Room XIII in lower left. View from the north.

of Trench B, between walls 34206 and 34203 was excavated down to the bedrock. The eastern part, east of wall 34203 was excavated down to ca. 1.2 m above the presumed bedrock there. Therefore the phasing of that part of Trench B is incomplete, meaning that while all phases are represented in the western half (= Room XI), only later phases can be identified in the eastern half (Rooms XII and XIII). For the clarity and greater interpretative resolution of this presentation, relatively 'momentous' events, such as

the construction of the rampart, towers and the gate, and the blocking of the gate are recognised here as phases separate from the occupation phases which directly preceded/followed them. Finally, for convenience, the wide rampart in the area of Trench B, being *locus* 34200, will be referred to as simply the rampart or wall 34200. The adjectives 'wide' and 'narrow' are preserved only when contrasting these two installations.

### Pre-Phasing

This time-period witnessed the beginning of occupation in Trench A, i.e. the creation of an enclosed space (Room I) against the narrow rampart. Although Hellenistic or even Iron Age sherds were found,



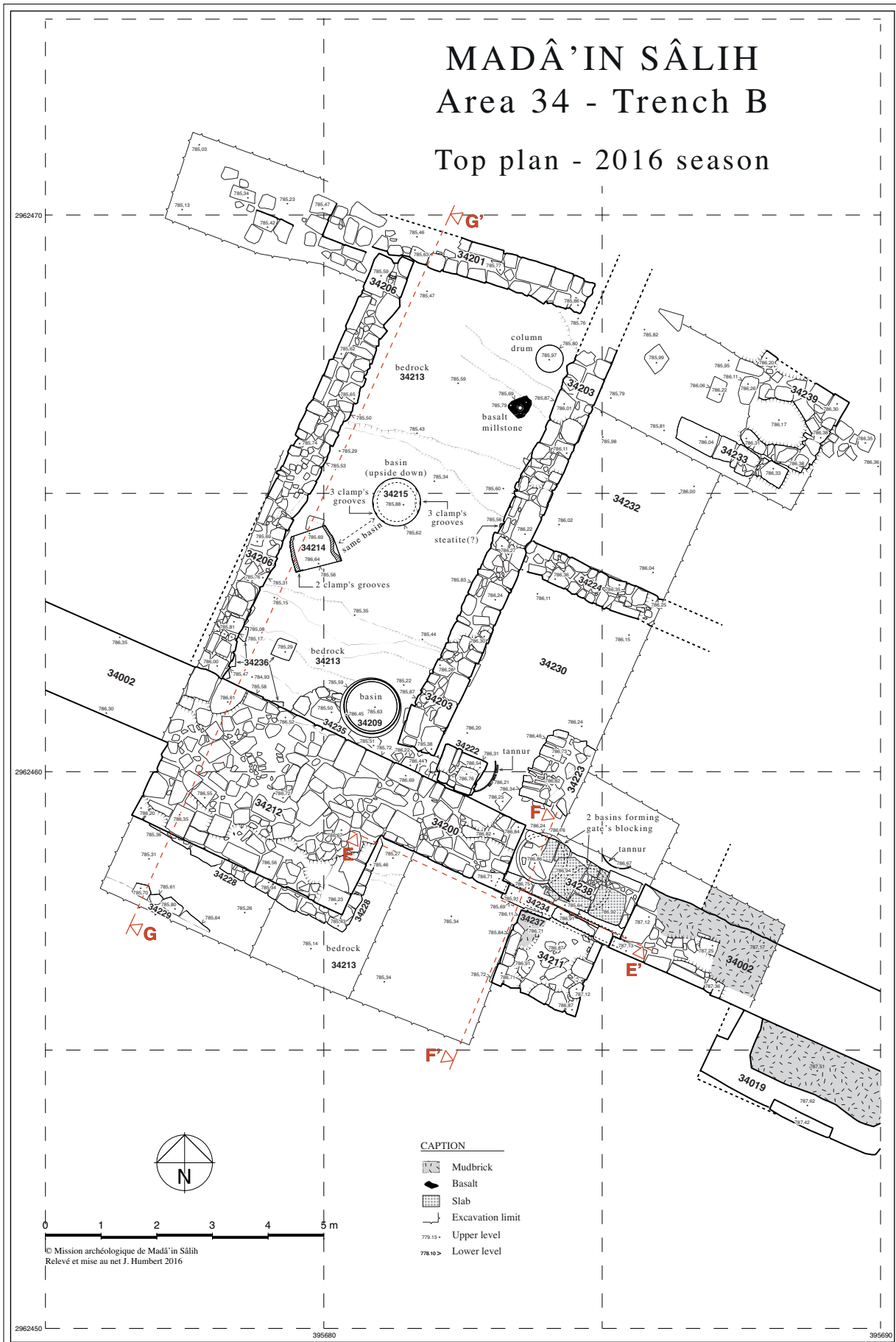


Fig. 11. Area 34: the Roman fort. Top plan of Trench B (J. Humbert).

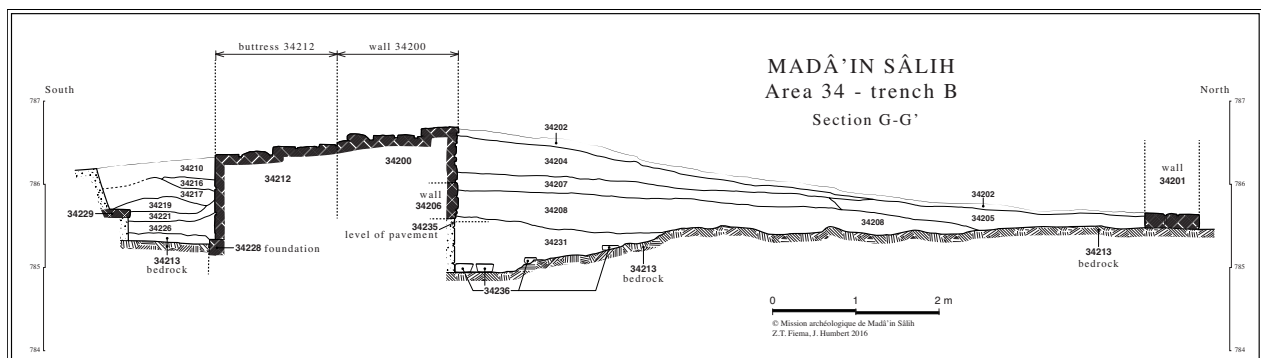
the lowermost deposits and the narrow rampart appear to be securely dated to the 1st century AD. No corresponding development was encountered in the area of Trench B. The lowermost stratum (*locus* 34226), directly on the bedrock (34013), is the sandy soil mixed with crushed top of the bedrock which is very soft in this area. In Phase 1, this thin layer was dug into in order to accommodate rampart 34200 and its towers, so these rested directly on the bedrock. *Locus* 34226 contains very few 1st century AD ceramics, some possibly extending in date to the 2nd century. Thus, there are no structural remains in this area preceding the rampart and only one deposit which may relate to the pre-Phase 1 period. This is a veritable enigma since it was assumed that the narrow rampart in Area 34 was a part of the mudbrick circuit fully enclosing the *entire* settlement of Hegra, and dating to the Nabataean period. There are two possible solutions to this problem and both relate to the activities in the following Phase 1. Either the narrow rampart was retained only in the easternmost part of the area of the planned fort, because it was built of stone and conveniently provided the connection with the steep bedrock slope of Hill B, while the rest of it (built of mudbrick?) was completely demolished in Phase 1 and replaced by the wide rampart. Or, less likely, the non-preserved course of the narrow rampart run further south, i.e, below the edge of the stony plateau.

### *Phase 1. Construction of the fort*

This phase witnessed the first and the most substantial development in Area 34 – the construction of the Roman fort. In Trench B, the new structures include the rampart (*locus* 34200), the gate (*locus* 34234), the western gate-flanking tower with its foundation platform (*loci* 34212 and 34228 respectively), the eastern gate-flanking tower (*locus* 34019) and the clayish deposit 34221 on the exterior. Inside the enclosure, the *loci* included the stone/soil buildup (34236) to even out the bedrock surface, the pavement (*locus* 34236), wall 34206, and possibly wall 34201. There is little doubt that all these entities came into being as components of a single plan.

#### *The rampart, the towers and the gate*

The rampart, *locus* 34200 (ca. 1.40 m wide, top at ca. 786.50–.80 m), was built directly upon the bedrock (34213) in a shallow foundation trench which cut through the soft, disintegrated bedrock-deposit 34226 (*supra*). The southern facade of the rampart features six courses of stones and is currently ca. 1.35 m high. The two foundation courses consist of smaller, less regular stones while the four wall courses have larger, rectangular ashhlars. The inner face of the wall is ca. 0.95 m high (five courses), with relatively regular ashhlars. As the top of the rampart is relatively flat, the reason for this discrepancy in height between the inner and outer faces is the economizing manner of construction as the bedrock in this area slopes down southward (**fig. 12**), being ca. 785.60 m in the northern half of the trench, ca. 784.90 in the southern half and ca. 785.20–.30 on the southern (external) side of the rampart. Thus, first the outer (southern) row of the rampart was built up to a level corresponding to the highest level of bedrock further north. Then the entire area north of that outer row was backfilled with the combined mass of soil (*locus* 34231) and stones



**Fig. 12.** Trench R. Section G-G' (see fig. 11 for location). (Z.T. Fiema and J. Humbert).



**Fig. 13.** Trench B. The western gate-flanking tower, locus 34212, with its foundation platform (locus 34228) below. Wall 34200 in the central-right. View from the south-east.

(locus 34236), being a buildup for the planned pavement (locus 34235). On the flattened top of that deposit, the inner row of the rampart was constructed, and the space between the two rows filled up with smaller stones. The large tower, locus 34212 (4.20 x 1.70 m, ca. 1.40 m high, five courses, top at ca. 786.70 m), is an integral part of the design as it fully bonds with wall 34200. Its masonry is very similar to the southern facade of that wall (fig. 13, see fig. 11). The tower stands on a curious structure (locus 34228) which appears more like a platform than a foundation course. This platform is 1–2 courses high (total of ca. 0.25 m high) and it is not parallel to the southern face of the tower. It projects ca. 0.35 m southward

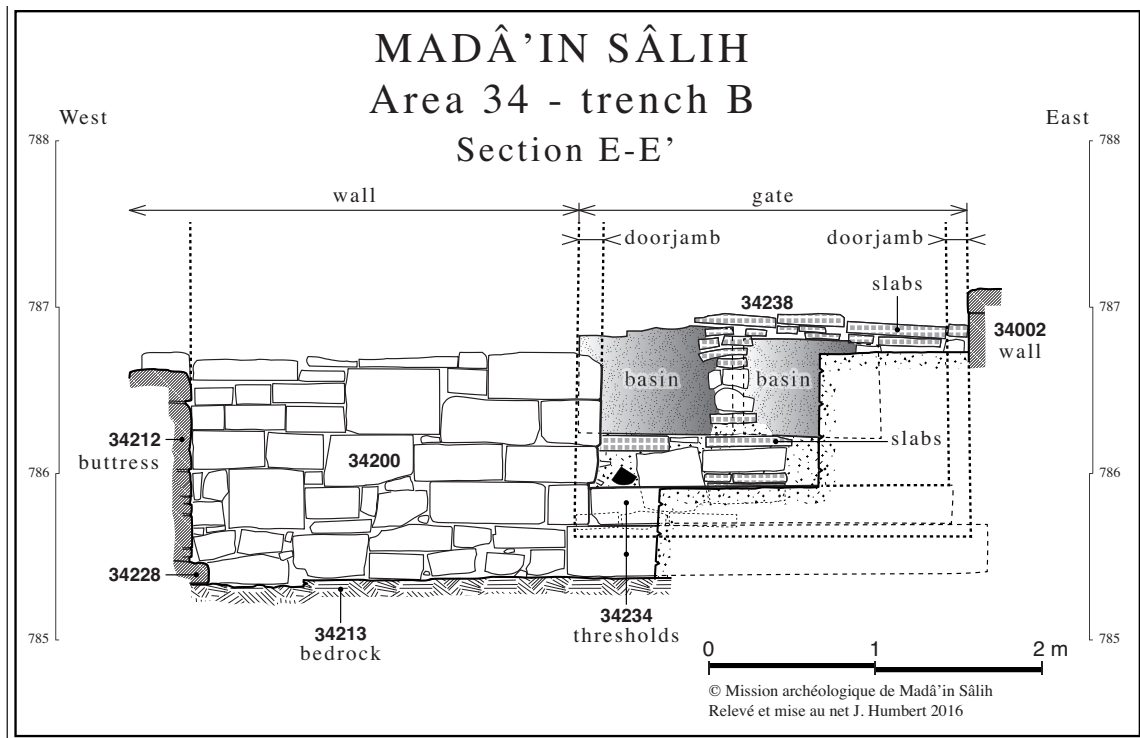
at the south-east corner of the tower while being entirely under its south-west corner. It would be too speculative to consider it as a pre-Phase 1 remains; its construction is similar to the tower and the rampart. Either some ground difficulties prevented to keep the line parallel to the planned tower, or it is a case of a careless execution of the original blueprint. At any rate, the platform was not visible as it was dug into the bedrock and locus 34226. Additionally, the entire lower part of the outer perimeter of the rampart and the tower is covered by a clayish silty deposit, locus 34221 (top at 785.52 m), which lips out on the rampart and the tower, completely covering the foundation courses of the former, as well as the platform and the lowermost course of the latter. This deposit appears intentional and perhaps, due to its dominant clay component, might have served to channel the rainwater flowing down on the walls away from the foundations. Additionally, ca. 1.4 m south of and parallel to the tower's facade, there is an enigmatic row of five flat slabs (locus 34229, ca. 1.60 m long, at ca. 785.50–.70 m) which rests directly on the surface of locus 34221. Its function is unknown; perhaps related to the outer defence installations of the fort?

The counterpart of tower 34212 is the not-excavated tower 34019 (3.70 x 1.70 m) which flanked the gate on the eastern side. The gate (locus 34234) is located in the center of the ca. 7.1 m long space between the towers (fig. 14), and since it is 2.10 m wide between doorjambs' projections



**Fig. 14.** Trench B. Gate 34234 in the center-right, buttress 34211 to the right, rampart 34200 in the center and tower 34212 on the left. The blocking 34238 and the upper threshold visible in the gateway. View from the south-west.





**Fig. 15.** Trench B. Section E-E' (see fig. 11 for location). View from the south (J. Humbert).

(2.40 inside), there are sections, ca. 2.60 m long, of the curtain wall on either side of the gate. This is a very symmetrical arrangement and implies the use of the Roman foot as the measuring standard since 7.10 m (2.10+2.40+2.60) equals exactly 24 p.M. while 2.10 equals little over ca. 7 p.M. Since the gate was blocked in Phase 3, and butress 34211 built directly in front of it, any detailed description of the gate's interior is not possible and must be restricted to its exterior appearance. The gate features two doorjamb sections (projection thickness ca. 0.20 m, recess ca. 0.15 m). There are currently two large monolithic stones between the doorjamb projections, set one upon the other (**fig. 15–16**). The upper one is ca. 1.40 m long, 0.28 m wide and 0.25 m high, with its top at 785.91 m. The lower one, laying directly on the bedrock, is at least 0.55 m long, ca. 0.23 m wide and ca. 0.30 m high (top at ca. 785.64 m). Considering that the level of the pavement (*infra*) north of the rampart is 785.51 m asl, it is reasonable to



**Fig. 16.** Trench B. The gate of the Roman fort. The upper threshold in the center; the blocking (locus 34238) to the right. View from the east.

assume that the lower monolith is the original threshold of the gate. The upper one might have been inserted in the space between the two doorjamb sections when the ground outside the gate rose to the corresponding level. This proposition might be supported by the fact that the upper monolith protrudes slightly beyond the southern limit of the gate and that the adjacent stone in the western doorjamb section appears to be chipped as if by the forceful insertion of the monolith. It is, however, apparent that the upper monolith is *not* a part of the gate blocking which took place in Phase 3.

#### Pavement and walls of the interior

Little is known about the area directly north of the rampart, except that it was paved. The pavement (*locus* 34235) was laid out on top of the backfilled dip in the bedrock (fig. 17, see fig. 12). It consists of flat slabs (the largest being ca. 0.60 x 0.50 x 0.05 m) and is preserved only against the inner face of wall 34200 and especially under the large round basin (*locus* 34209). Assuming that the level of the pavement there (at 785.50 m) was retained elsewhere in the interior, it means that in the northern half of the trench (Room XI in Phase 4) where the bedrock is at ca. 785.35–60 m, the



**Fig. 17.** Trench B. Wall 34200 in the center, basin 34209 in extreme left, pavement 34235 against the basin and the wall, backfilling deposit 34231 in lower right, under the wall. View from the north-west.

pavement was laid out directly on the bedrock, perhaps with a step up somewhere. Equally possible is that the northern half of the inner area was left unpaved, the bedrock being relatively flat there.

The western limit of the paved area was wall 34206, running north-east–south-west (see fig. 11–12). In the southern half of the trench, it runs directly on the combined soil/stone fill (*loci* 34231/34236) while further north, it runs on top of the bedrock (*locus* 34213). The wall is 8.20 m long and 0.75 m wide, featuring 2–4 courses, with its top at 786 (south) to 785.59 (north). Probably, wall 34201 (= 34005), seemingly abutted by wall 34206, also belong to this phase. It is an exceedingly poorly preserved construction of two parallel rows, one course high and ca. 0.70 m wide. It runs north-west–south-east, parallel to the rampart, and it appears to enclose the entire area in front of the gate. The area such defined might have been further subdivided into long rectangular rooms. However, since wall 34203, parallel to wall 34206, is better associated with Phase 3, this hypothesis is speculative.

#### Other structures in Area 34

In addition to the wide rampart, the gate, the flanking towers, the south-west corner tower as well as strata and installations extant in Trench B, Phase 1 would also include the formalisation of Rooms I and II (excavated in Trench A) as well as the offset connection between these (early) rooms and the eastern wing of rooms (Rooms III–X) which presumably were also built then. The somewhat awkward connection between the narrow and wide ramparts, featuring walls 34097 and 34143, must have also been effected in this phase, presumably in connection with the massive reinforcement of the narrow rampart by the addition by combined stone/mudbrick fortification in the front of this wall (*supra*). That reinforcement, however, might also have taken place in the later 2nd century (Phase 2) or even, although much less likely, in Phase 3.



## Dating

Two *loci* – 34221, 34231 – provided material dating the early structures in Trench B, and, in general, the entire fort. *Locus* 34221, associated with the construction of rampart 34200 and the western gate-flanking tower, provided ceramic material datable to the late 1st–2nd century. Particularly relevant is *locus* 34231, being a fill of the bedrock dip in preparation of laying out the the pavement. The time range provided by datable ceramics is (late 1st)/2nd century AD, with the closing date not including the late 2nd century. This indicates that the fort was presumably built not immediately after the annexation of Nabataea in 106 AD but rather a few decades afterwards, i.e. in the 1st half of the 2nd century.

## Phase 2. Continuing Occupation

Phase 1 is a relatively short event – the construction of the fort in Hegra – which might have lasted several months or even a few years. Phase 2 represents the early occupation of the fort until the blocking of the gate in Phase 3. There is relatively little evidence for this phase because all remains would have been obliterated by the removal of the stone pavement in the western half of the trench, and the excavations did not progress down enough in the eastern half to reveal relevant evidence (if any) there. The main evidence comes from the outside of rampart 34200.

### The exterior of rampart 34200

Of relevance here are *loci* 34219 and 34217. *Locus* 34219, a heterogeneous silty soil with some sand and gravel, did not produce any datable ceramics. Notable were, however, quantities of bones, as well as a unique find of an iron axe (or pickaxe). All these were probably thrown over the wall as organic debris or useless/broken implement. Much of such rubbish found its way outside the wall in the area of the gate, in *locus* 34217 (top at ca. 785.82–786 m). Among the finds in this *locus* was a Roman *tegula*, quantities of bones, many sherds of the local jars, cooking pots (including possible imports from Petra) and pithoi, datable to the late 2nd through the 3rd century, possibly later. It is evident, however, that *locus* 34217 was considerably disturbed in Phase 3 when the gate was blocked and buttress 34211 built atop *locus* 34217. Sherds datable possibly later than the 3rd century must, in fact, be intrusive, belonging to *locus* 34216 which accumulated in the area in the post-gate-blocking period. The so-called upper threshold, *locus* 34234, mentioned above, might have been inserted between the doorjamb projections and placed on the lower threshold sometime then, when the level of deposit 34217 reached and covered the top of the original (lower) threshold.

### The storage basins

Currently, there are four large stone storage basins in the area of Trench B. Two – *loci* 34209 and 34214/34215 in the western part of the trench (see fig. 10 and 11), and two other reused in the blocking of the gate in Phase 3 (*infra*). Basin 34209 is 0.92 m high, and ca. 0.80 m deep, with the diameter of ca. 0.95 and its rim at 786.45 m. The basin practically stands on top of pavement 34235 with only ca. 0.02 m of soft soil in between, apparently placed there to assure the right fit and the stability of this large basin. The second basin was found in two parts. The bottom part (*locus* 34215) is ca. 0.30 m high and ca. 0.82 m in diameter. The upper, half-cylindrical part (*locus* 34214) is of the same diameter and is ca. 0.84 m high. Undoubtedly, both parts originally formed a large basin and although it broken into two parts later on, it was then expertly repaired with the use of connecting lead clamps.

Large cylindrical stone basins, for storing water (and other fluid or loose commodity) are a well-known feature in Madâ'in Sâlih but, so far, were usually found in later, i.e. Early Byzantine context. The question here is how these stone basins can be dated in the context of the Roman fort in Area 34. The first relevant observation is that many broken fragments of such basins occur in relatively *late* phases in Area 34 (e.g., Phase 5 in Trench B), being reused as chinking stones, parts of simple enclosures and other installations. It is then highly probable that intact basins were used in earlier phases of occupation and it is suggested that both basins were brought to the area of Trench B already in Phase 2. Basin 34209 is located in the corner formed by the rampart and wall 34203 (the latter being of Phase 3/4 date, *infra*), where the original pavement is still preserved. Since the pavement was almost entirely removed in the following phase, it is reasonable to



assume that its preservation in that corner is due to the fact that basin 34209 was placed there already in Phase 2 and it remained functional in that place during Phases 3 and 4. Thus, the removal of pavement slabs from underneath of it was considered impractical (see fig. 17). Furthermore, soil *locus* 34208 (Phase 4), which covered most of the western half of Trench B, clearly hides the remains of the pavement as well as the lowermost part of the basin. Notably, the southernmost part of wall 34203, which was built in Phases 3/4, seems to be running over the remains of the pavement. As for basin 34214/34215, its location in Phase 2 is unknown but similarly, it was retained in the area after the removal of the pavement. For example, it might have broken into two pieces during the operations of Phase 3, the pavement under it was removed, but the basin was repaired with lead clamps and it remained in the area during the following phases.

### Dating

Considering the datable material associated with this but also with the following phases, it is suggested that Phase 2 must have lasted from ca. early-mid-2nd century until ca. early/mid-3rd century AD.

### Phase 3. The blocking of the gate

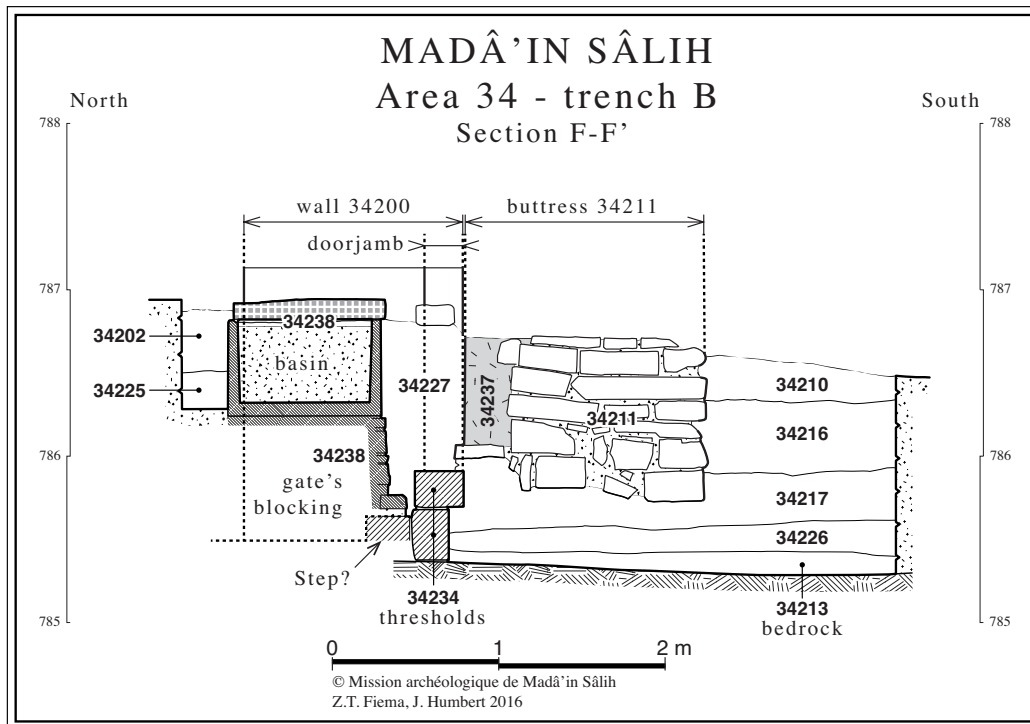
This phase is again a relatively ‘momentous’ event to be measured in weeks or months rather than in years. The activities included the removal of most of the pavement in the western half of the trench, the blocking (*locus* 34238) of the gate using the pavers and two smaller stone basins, and the construction of small buttress 34211 in front of the blocking. With the construction of new walls (34203 and 34224), the entire space excavated in Trench B was now subdivided into a well defined Room XI and Rooms XII and XIII, the eastern limit of the latter two being unknown.

The blocking of the gate, while solid and effective, appears also as a somewhat hasty affair. A proper action would expect the use of stone ashlars tightly deposited inside the gateway one upon the other and there was certainly no shortage of quality stone material at the site. Instead, the material used for blocking was apparently harnessed from the closest vicinity of the gate, i.e., the paving stones from the inner court beyond the gate and the basins presumably located nearby. All this may imply an immediate danger which faced the garrison and which required instant action, not only in the area of the gate but also all along the perimeter wall. After all, the construction of the buttress in front of the blocked gate appears as an element of the overall reinforcement of the rampart by adding eight other buttresses.

While this hypothesis is preferred, it is also not impossible that the blocking of the gate resulted from some sort of prior destruction, and thus the blocking could temporally relate to the hasty rebuilding of the south-east gate (Area 35), dated to the early 3rd century. Evidence from Area 34 for such destruction is enigmatic and restricted but needs to be mentioned in this context. During the clearance of extant walls located inside the south-west corner of the fort (i.e., north-east of the corner tower and east of wall 34059), a fragment of paved area, *locus* 34025 was exposed, which can reasonably be interpreted as the floor of one of spaces/rooms adjacent to the main western wall of the fort (fig. 18, for exact location, see fig. 1). The pavement



**Fig. 18.** Area 34: the Roman fort. Wall 34059 in the right, pavement 34025 in the center, the ash layer left and center above. View from the north.



**Fig. 19.** Trench B. Section F-F' (see fig. 11 for location) (Z.T. Fiema and J. Humbert).

was covered by ca. 0.20 m of soil on top of which there was a thin (ca. 0.02 m) but extensive and horizontal layer of pure ash. The ceramic material under the ash layer dated to the 2nd/early 3rd century AD, without any later dated sherds. Whether the ash layer originated from destruction, i.e., burning of some timber construction, or from any other cause, is virtually unknown. Also, the fact that the pavement in that part of the fort was already covered by soil by the early 3rd century pavement is not easy to explain without further excavations. The matter thus remains unresolved and the only destroyed (or removed) element would be the wooden doors of the gate (*infra*); the doorjamb sections and the thresholds of the gate appear to be in an undamaged and un-reconstructed condition. Thus if a surprising enemy raid managed to penetrate the interior of the fort, the damage was negligible in the area of Trench B, while the evidence from the area of pavement 34025 cannot be unequivocally interpreted. Therefore, at this point of explorations in Area 34, it can only be proposed that if such hostile action had indeed happened, it would rather result in an alarm and a need for instant reinforcement rather than in major material destruction.

### The gate-blocking

The following description is incomplete in detail as the blocking was only investigated from the front (southern side), without the benefit of dismantling it from the top down. The blocking, *locus* 34238, is a combined stone, mudbrick and soil installation (**fig. 19**). Starting from the bottom up, there is a layer of large, irregular but flattish stones, mixed with smaller broken ones placed directly on the northern edge of the lower threshold (but not the upper one) and presumably filling the entire space of the gateway. Following is the layer of large paving slabs carefully stacked up but interspersed with larger blocks where the basins were to be placed. The pavers are 0.05–0.07 m thick, exactly as those still *in situ* in the western half of Trench B, against the rampart. Then the basins, filled with soil, were placed in the gateway, side-by-side in an east-west line, the western one directly abutting the western doorjamb section (see fig. 15). The second basin was placed ca. 0.30 m away from the western one and the space in-between was carefully filled up with broken, stacked-up pavers (**fig. 20**). The western basin is ca. 0.60 m high, with a diameter of ca. 0.90 m. The eastern one is 0.62 m high and of undetermined diameter. The tops of the basins were covered by rectangular paving slabs (max. top at ca. 786.94 m), the largest being ca. 0.70 x 0.50 x 0.06 and





**Fig. 20.** Trench B. Closeup of gate 34234 with two threshold slabs. The left-side doorjamb section in the left, the blocking 34238 in the center, the mudbrick section (locus 34237) of buttress 34211 is in the right. View from the south-west.

0.58 x 0.57 x 0.06 m (**fig. 21**). The eastern one-fourth of the blocking is unknown but presumably consisted of stacked up pavers and other stones; there was no space left for a third basin. The entire construction features a multitude of broken pavers, smaller chinking stones and broken pieces of stone basins filling up the gaps and flattening the curvature of the basins.

Once the the blocking was completed, buttress 34211 was constructed but with the space of ca. 0.40 m between these two entities filled in a different manner (see fig. 19). Starting from the top of the upper threshold, this space was filled up with the clayish soil, *locus* 34227, mixed with some irregular broken stones and larger slabs and only at the top level of the basins, large slabs were placed. Deposit 34227 did not yield any datable ceramic material but it is notable that iron nails and fragments of iron bands were found there in notable quantities, possibly originally belonging to the wooden doors of the gate. No ash or charcoal were found in deposit 34227, thus the blocking of the gate as the result of a prior destruction/burning of the wooden wings of the gate is an unlikely proposition, at least at this point of time. Rather, it appears that the wings were dismantled (for fuel?) and metal parts discarded, a singularly peculiar waste.

Buttress 34211 is a solid square (ca. 1.40 m x), at least seven courses high (max 1 m high), made



**Fig. 21.** Trench B. The blocking (locus 34238) of the gate in the center, buttress 34211 in upper left, tower 34212 in the extreme right. View from the north.



of large, relatively regular stones, the largest being ca. 0.75 x 0.19 m (see fig. 11, 14, 19). The structure (max. top at 786.87 m) stands on top of *locus* 34217. Curiously, the north-west corner of the buttress is made of mudbricks, four courses high (ca. 0.90 m in height), partially leaning on top of the upper threshold and capped with a large monolithic slab. It is unknown whether the mudbrick section occupies only the corner, or the entire northern side of the buttress was mudbrick-made, or the buttress did not have a northern wall at all. This mudbrick section somewhat muddles the sequence of construction events which thus can be reconstructed in either of the following ways: 1/ either, as the walls of the buttress rose (including its mudbrick section), so did the clayish deposit 34227, being ‘sandwiched’ between the buttress and the gate blocking; 2/ or, after the blocking was completed, mudbrick section 34237 was built first, flush with the outer face of rampart 34200, followed by the buttress itself, and finally, the resulting space between the buttress/mudbrick section 34237 and the blocking was filled with clayish deposit 34227.

#### Walls 34203 and 34224

With the blocking of the gate and the removal of the pavement, the area behind wall 34200 was redefined (see fig. 11). Ca. 3.25–3.50 m east of wall 34206 a new, parallel, wall, *locus* 34203 was built. This wall is 8.30 m long, 0.60 m wide and 0.30–0.56 m high (2–4 courses high), with the average top at 786.20 m asl. It is not preserved in the north where it should turn the corner with the earlier wall 34201, and its relation to the rampart is unclear. Too much damage is currently visible in the corner between these two walls and where the pavement is still preserved, and it can only be assumed that wall 34203 abuts rampart 34200. Wall 34203 is narrower and of markedly inferior construction than its parallel counterpart – wall 34206. The southern part of wall 34203 seems to lay directly on the combined stone/soil fill 34231/34236, perhaps also on the remnants of the pavement. In the northern part, where the pavement was or was not in Phases 1–2, wall 34203 appears to lay on some lower part of soil 34208 (*infra*). At any rate, its lowermost course there is ca 0.20 m higher than the bedrock, in opposition to wall 34206 which practically rests on the bedrock in



**Fig. 22.** Trench B. Room XI with basin 34209 in the lower center; Rooms XII and XII in the upper center. Rampart 34200 and tower 34212 in the center-right. View from the west (photo M. Lefrançois).



its northern part. Wall 34224, running east-west, was built in the distance of 4.05 m north of the rampart. It is max. 2.25 m long, ca. 0.60 m wide and ca. 0.30 m high (two courses visible), with its top at ca. 786.35 m. It abuts wall 34203.

With the construction of the aforementioned walls, the entire space of Trench B was now subdivided into three rooms (**fig. 22**). Room XI (the western half of the trench), limited by walls 34200, 34201, 34206 and 34203, is ca. 8.40–8.50 m north-south and 3.25–3.50 m east-west. Rooms XII and XIII occupy the eastern half of the trench and their eastern limit is unknown. The southern room (XII), limited by walls 34200, 34203 and 34224 is ca. 4.05 m north-south and max. 2.60 m east-west. The northern room (XIII), limited by walls 34224 and 34203, is max 2.65 m north-south and max 2.60 m east-west. Its northern limit is unclear but it may be the 'wall' *locus* 34233 which runs east-west but further south from the line of the main northern wall 34201(= 34005). *Locus* 34233 is ca. 2.20 m long, only 0.40 m wide, and it features only one row of stones. Its function (a later enclosure?) and the phase assignation are undetermined.

The construction of walls 34203 and 34224 marks the last phase of additions of large structural elements (walls) in this area. Neither in this phase nor in Phases 1–2, was it possible to discern any roof-supporting elements in the space in Trench B. Admittedly, the north-south walls have only their lowermost courses preserved, and it is possible that the upper parts had pilasters for arches, although the superstructures were probably mudbrick-made, as attested by the clayish deposits in the uppermost strata. The interior did not yield any elements which might be interpreted as pillars, columns (except one small drum in *locus* 34205), voussoirs, nor any long beams supporting a flat roof. Therefore, it may need to be assumed that throughout its history, the space in Trench B was roofless, perhaps consistent with its assumed function as a storage area.

#### Other structures in the fort

In addition to eight small squarish buttresses, apparently built in the same time as buttress 34211, changes might also have occurred in the south-west corner of the complex where the corner tower (*locus* 34057) has been reinforced by a trapezoidal buttress, *locus* 34026. Judging from the roughly perceived stratigraphic position, some walls in that area (e.g., 34007 and 34053) might also have been built then, if not earlier. That, however, cannot be verified without formal excavations. Notably, wall 34006 was built almost directly upon the enigmatic ash layer in the area of pavement 34025.

#### Dating

No datable material has been recovered from *locus* 34227. On the basis of dating of soil deposits related to Phases 2 and 4, it may only be surmised that the blocking of the gate and the structural additions should be dated no later than mid-3rd century.

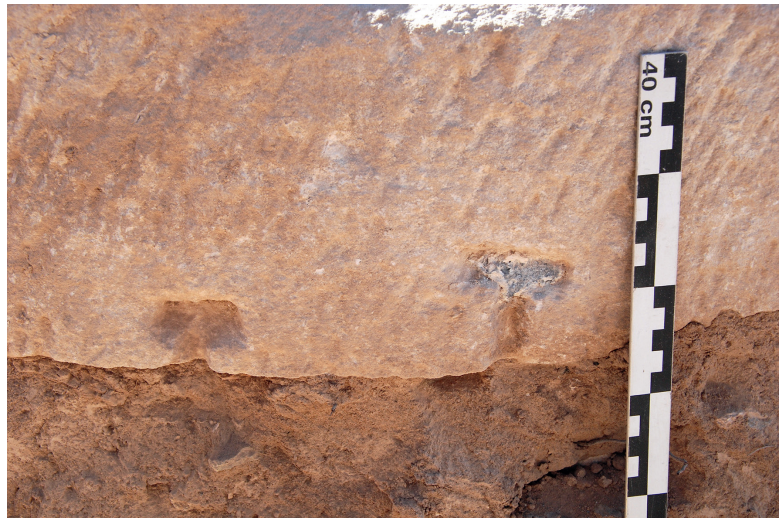
#### **Phase 4. Latest military occupation in Rooms XI, XII and XIII**

It is assumed that Phase 4 occupation is still related to the military presence in the fort in Area 34, mainly because of the buttresses built in the preceding phase. Characteristic for deposits related to Phase 4 is a large number of ceramics and other objects. Since the function of the space north of the rampart in Phase 2 is unknown, it is impossible to determine if its subdivision into three rooms had any impact on the function of this space in Phase 4. It may only be suggested that these rooms were probably serving as storage spaces, possibly associated with food processing.

#### Room XI

Once wall 34203 was constructed, the main deposit inside the room was *locus* 34208. This relatively thin (only ca. 0.20 m) and compact deposit is evenly distributed inside the room, with its top at at ca. 785.65 m asl. It might even be that some soil was carted into the interior to create a relatively flat surface throughout. More likely however, the depth originated through the natural accumulation reflecting an intensive occupation. The finds from this *locus* included quantities of cooking pots, storage jars and bowls, many animal bones as well as seven coins and several fragments of stone vessels.

While basin 34209 remained in its place (see fig. 11), basin 34214/34215 may have been moved around during the process of the pavement removal and was broken into two parts. Rather than being reused in the gate blocking, it was expertly repaired with lead clamps filling respective T-shaped grooves on the edges of the breakage (fig. 23). At least six of such grooves are located in the corresponding edges of both parts of the basin. The damage and repair must have happened before Phase 5, when the basin broke again, was never repaired, and the two parts were reused for different function (*infra*). Judging from the large concentric impression discerned during the excavations of the central-western part of *locus* 34208, there might have been yet another basin in Room XI, much larger than all mentioned so far (diameter of ca. 1.20 m).



**Fig. 23.** Trench B. The edge of basin 34215 featuring T-shaped grooves for lead clamps

### Rooms XII, and XIII

Lowermost deposits in Rooms XII and XIII are *loci* 34230 and 34232 respectively. Their phase designation is uncertain as only their surfaces were uncovered. The occupational strata associated with Phase 4 are *locus* 34220 (Room XII) and *locus* 34225 (Room XIII), the former with its top at ca. 786.10 m and the latter at ca. 786 m. Both these *loci* are higher than the temporally relevant *locus* 34208 in Room XI. However, it is virtually unknown what arrangements were made in Rooms XII and XIII when the gate was blocked. Perhaps the occupational level was raised there just after wall 34203 was constructed. However, it is symptomatic that the contents of *loci* 34220 and 34225 are very similar to that of *locus* 34208 in Room XI and thus their assignment to Phase 4 is reasonable. Again, ceramics included quantities of jars, cooking pots, casseroles as well as many bones. Furthermore, the circular outline made of burnt clay and visible on the surface of *locus* 34230 is possibly a *tannûr*. If so, there might have been bread-baking installation there, currently mostly under installation 34222 (Phase 5).

### Other structures in the fort

During the time-period recognized here as Phase 2, Room I in Trench A was an open space used for milling, food processing and cooking. But by the 3rd century, the space of that room became a place for disposal of debris from adjacent rooms, including broken sherds and bones. The occupation in that room is not evidenced beyond later 3rd century, thus during Phase 4 in Trench B, according to the dating presented below.

### Dating

The datable ceramic material from *locus* 34208 basically represents the 3rd century, with the closing date sometime in the second half of that century. *Loc*i 34220 and 34225 again represent the 3rd century occupation with a possible (but not necessary) extension into the early 4th. Among the seven coins found in *locus* 34208 are the silver drachma of Trajan (Petra or Bostra mint, AD 112–113) and silver tetradrachma of Estruscilla (minted in Antioch, AD 249–251). It is thus reasonable to assume that the occupation in Phase 4 lasted between ca. mid-3rd century until sometime toward the end of that century.



### Phase 5. Limited occupation (?)

Although the ceramics and bones are still relatively abundant, there is a marked difference in the deposits from Phase 5 (and later) as compared with the deposits of Phase 4 (and earlier). Objects and some installations (broken basin, column drum) associated with Phase 5, appear as a haphazard collection of previously discarded items being now collected for reuse and located in spots without any meaningful reason. For example, metal objects which might or might not have been parts of military equipment/horse harness are most abundant in the Phase 5 deposits, comparing with other phases, but these seem to be scraps of broken and discarded items. It seems distinctly probable that Phase 4 was the last period when the fort was still occupied by the military and Phase 5 represents only a limited occupation, perhaps by the civilian population of the settlement in Hegra, which moved into the abandoned fort.

#### Room XI

*Locus* 34207 in the southern and central part of the room and *locus* 34205 in the north-eastern part represent the Phase 5 occupation (fig. 24). The clayish *locus* 34207, with the top at ca. 785.85 m, is ca. 0.25 m thick and relatively homogeneous in compaction, i.e. deprived of pockets of windblown material, which characterise the uppermost strata. It contained quantities of ceramics and bones, two coins, and the largest number of metal objects, mostly Cu/Cu alloy, comparing with any other *locus* in Trench B. *Locus* 34205, at ca. 785.65–.70 m, appears to be partially intrusive. In addition to clayish silt, there were also large pockets of sand. Perhaps the northern part of wall 34203 had collapsed by now, allowing the accumulation of windblown material.

Basin 34214/34215 must have got broken by now, and was not repaired. Yet both parts were retained for other use. Both parts lay very slightly embedded in the surface of *locus* 34208 (Phase 4) while being partially covered by *locus* 34207. They were apparently in use in Phase 5: the round bottom (34215) was turned upside down and placed in the center of the room; it might have served as a convenient pedestal, food-preparation platform or the like. No reasonable function for *locus* 34214 can be proposed. Currently, it is a half-cylinder which is laying on its side. Other, small pieces of stone basin(s) were found in this *locus* and above. Other objects include a column drum (diameter ca. 0.40 m) within *locus* 34205 in the north-east corner of the room and an upper part of a small basalt hand-mill.



**Fig. 24.** Trench B, Room XI. Occupation of Phase 5 on top of *locus* 34208. Basin 34209 in upper left, basin 34214/34215 in the center; other objects (column drum, part of basalt handmill) in the lower left. View from the north.



**Fig. 25.** Trench B. Installation 34222. Rampart 34200 in the background, remains of wall 34203 to the right. View from the north.

## Room XII

The stratigraphic determination in the southern area of this room was difficult due to the very poorly preserved remains of two installations – *loci* 34222 and 34223 (see fig. 11) – and the considerable disturbance of strata there. It appears that both installations were partially dug in stratum 34220 but both are covered by the soil *locus* 34202. Their phase assignment is difficult but it relates more reasonably to Phase 5 than to Phase 4. Installation 34222 is roughly rectangular (ca. 0.76 x 0.70 m, ca. 0.40 m high), consisting of one very large stone block (ca. 0.50 x 0.40 x 0.25) and several smaller ones placed around and on top of the large block (**fig. 25**). The installation, with top at ca. 786.76 m, abuts rampart 34200 and probably was originally abutting wall 34203 as well, but currently there is a gap there. At any rate, it was more or less in the corner formed by these walls. Its function is undetermined; it could have served as a structural support of the walls, some kind of a pedestal/platform, or even as a support of some kind of makeshift roof arrangement.

Only the western part of installation 34223 was uncovered and what is visible is a very rough rectangle (ca. 1.30 m x 0.70 m) with its top at 786.73 m asl. This is a very simple and somewhat haphazard arrangement of stones of different sizes, some laying flat, other standing upright. The external stones appear in some kind of coursing but very ill-fitting and reinforced by many chinking stones. The southern edge of *locus* 34223 is only 0.5 m north of the northern face of rampart 34200. It may originally have abutted that wall. Currently, some larger stones, without any pattern, were found thrown into this gap. It may be that installation 34223 has something to do with the reinforcement of the inner face of the upper part of the gate-blocking, also because *locus* 34223 seems to continue eastward. The relationship between *loci* 34222 and 34223 cannot be discerned, even if they are only ca. 0.75 m away from each other.

## Dating

The dating of the ceramic material from *locus* 34207 indicates a general (Early) Byzantine date, i.e. the 4th century, with the possible extension into the early 5th. However, the corpus of ceramics from that *locus* does not reflect the ‘latest occupational phase’ at Madâ’in Sâlih, as, for example that from Area I. Two coins were found in *locus* 34208, one being a silvered tetrachma of Hostilian, son of Trajanus Decius (minted in Antioch, 250–251). *Locus* 34216, evidently deposited outside rampart 34200 after the gate-blocking, also yielded ceramics datable to the Early Byzantine period; it might already have originated in Phase 4. Generally, Phase 5 should be tentatively dated to the time-period between the end of the 3rd century until sometime late in the 4th century.



## Phase 6. Abandonment and natural deposition

Trench B area was evidently abandoned in this phase. No traces of any further active occupation can be discerned. *Locus* 34204, top at ca. 786.20 m, covered *locus* 34207 inside Room XI while *locus* 34202, top at ca. 786.40–.65 is the uppermost deposit throughout the trench, covering all remains there except for rampart 34200 and some parts of walls 34206 and 34203. Both soil strata are very heterogeneous in color and compaction, consisting of large deposits of very clayish soil mixed with equally large pockets of soft sand. Seemingly, these represent the collapsed mudbrick superstructures of the walls as well as windblown material.

### Dating

In addition to few usual, residual Nabataean sherds, *locus* 34204 contained quantities of ceramics but only few diagnostics which ranged from the 1st century AD until and including the 4th century, perhaps later (early 5th?). Similar date was provided by the diagnostics from *locus* 34202. Thus the cessation of occupation in Trench B area and the subsequent natural decay and deterioration of its structures, coupled with natural deposition should have started sometime toward the end of the 4th century, perhaps later.

## Finds

### Ceramics

In addition to ceramics mentioned in the context of soil *loci* in Trench B, large quantities of pottery were collected during the surface clearance of Area 34. While the detailed presentation of ceramics from Area 34 is offered elsewhere, a very general spatial and temporal information based on the diagnostics only is provided here.

**Western area:** *locus* 34013 – Nabataean to Byzantine period, including some Late Roman sherds (Kapitän amphorae);

**Northern area** (excluding the northern slope): *locus* 34010 – later 1st/2nd century, possibly 3rd; *locus* 34020 – 1st century BC – 1st century AD;

**Northern slope area:** *locus* 34064 – 2nd–4th century AD, with a majority of the 4th century/Early Byzantine elements (closing date in the 4th century AD);

**North-western area:** *locus* 34014 – overwhelmingly 2nd–3rd century material, with some Late Hellenistic and few Early Byzantine sherds;

**Southern area:** *locus* 34006 – mostly Late Roman; 2nd half of the 2nd–early 3rd century;

**Eastern area:** *locus* 34051 – majority Roman (2nd century into the 3rd century AD), very prominent being Kapitän II-amphorae; a few earlier and later items (Early Byzantine at the latest).

### Metal objects

Metal objects found in Area 34, although mostly fragmentary, should be considered as one of the most important categories of material found in Madâ'in Sâlih. Most of these are Cu/Cu alloy objects. Iron objects are rare and much less preserved. Undoubtedly, this unique corpus of material, which must reflect the nature of occupation in Area 34, will need to be thoroughly studied. Some objects were found during the excavations in Trench B, especially in *locus* 24207 which represents seemingly post-military, limited occupation (Phase 5), but even larger quantities were collected from the surface. While the exact recognition of these objects must await the completion of their conservation, it appears that at least some must relate to specialised equipment, e.g. horse harness and/or bronze armor. Among preliminarily recognised objects are mostly fragmentary tie-hooks, binding elements, small plates, metal straps/bands, rings for buckles and fasteners, and strap-junctions and terminals (see, e.g., Dixon and Southern 1992: 61–70 for general cavalry equipment; James 2004: 76–77, e.g., no. 42–45, 86–87, for similar objects from Dura Europos; also Allason-Jones and Bishop 1988: 75–79, for similar 1st–2nd century AD objects from Corbridge).

Among few objects briefly presented here is the openwork baldric (sword belt) fastener 34024\_M01

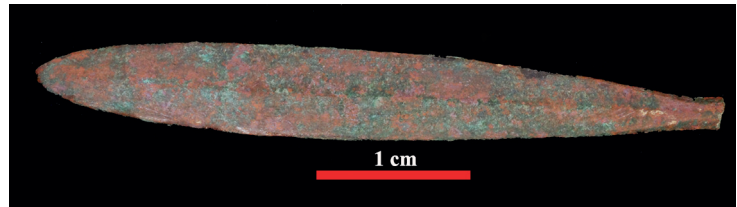


**Fig. 26.** The openwork baldric fastener 34024\_M01.



**Fig. 27.** Possible scale from *lorica squamata*, 34006\_M02.

(fig. 26) which finds good 2nd–3rd century rounded or oval parallels from Dura Europos (James 2004: 52, 62, 74–75, no. 18–20). Several bronze plates feature series of punched holes. These might be scales of *lorica squamata* but since none have patterned holes for both vertical and horizontal stitching, these might perhaps be local repairs, field replacements, or segments of horse armor. Object 34006\_M02 (fig. 27) somewhat resembles the piece from Dura (James 2004: 136–137: no. 502, and p. 120–139, for all examples) although having only a pair of horizontal holes toward the top, and without loopholes. Generally, it resembles pre-Antonine scale wired only horizontally and attached to flexible backing (Bishop and Coulston 1993: 117; see also *ibidem*, p. 88, fig 51.i, for an example with two pairs of top horizontal holes from Carnuntum).



**Fig. 28.** Possible arrowhead, 34013\_M02.

The object from *locus* 34006 might also be



**Fig. 29.** Iron axe 34219\_M01.

interpreted as a segment of a lamellar armor used by some Eastern auxiliaries, rather than typical scale (Travis and Travis 2011: 113–114) and, in fact, it resembles bone scale armor found in Pompeii, which has only a horizontal pair of holes in the upper part (D’Amato and Sumner 2009: 141–142, fig. 187). Object 34013\_M02 (fig. 28) resembles leaf-shaped, two-bladed tanged copper alloy arrowhead (e.g., James 2004: 200–2001, no. 659) as it features central ridge but the tang is missing. It might also be just a part of a spatula. Other bronze objects which still await full examination include a female statuette, a Roman fibula, an oversized finger of a statue, and a hind leg of a bull statuette. The latter might be of particular interest as representations of bull are often found in the Roman military context, being either popular symbols/emblems of units (see Le Bohec 1994: 246–247 for bull being an emblem of several legions), or related to the Mithraic rites. Iron objects were rare but included an axe or pickaxe (34219\_M01, fig. 29) of type often found in Roman contexts (e.g., Hänggi *et al.* 1994: 300–302, Abb. 212b, no. E141, E142, from *castellum/vicus* at Tenedo-Zurzach).





**Fig. 30.** Fragment of a stone vessel with solid handle, 34225\_M01.



**Fig. 31.** Two fragments of catilli from Pompeiian rotary mill found in north-west part of Area 34.

### Coins and other objects

Altogether forty-nine coins were found in Area 34 during the 2016 season, fourteen from the contexts in Trench B. Many were Nabataean or probably local (the so-called “Athena/owl” type, presumably dated to the 2nd–1st century BC), but Roman coins of the 1st–3rd century AD are also well-represented. Among recognizable types, none was later than the 3rd century. Stone objects mostly included fragments of vessels (**fig. 30**) and were most abundant in *locus* 34208 (Phase 4, the latest military occupation). Of particular interest are the basalt millstones. Large quantities of fragments were found especially on the northern slopes of the fort and in the small area located north-west of it. These belonged to large Pompeiian-type hourglass mills (fragments of both *catilli* and *metae* were found, **fig. 31**) as well as smaller querns and rotary hand-mills (for typology and examples, see Moritz 1958: 74–97, 103–122). These finds confirm that such objects were probably in use in the fort or its vicinity, as is often evidenced in the Roman military establishments.

### Archaeozoological finds

Again, a full specialised report is presented elsewhere but to complete the information in this report, one remark is warranted here. Trench B excavations provided interesting archaeozoological evidence, mirrored by the finds from Trench A, which clearly sets Area 34 apart from all other areas in Madâ'in Sâlih. The unique nature and pattern of habitation in the camp is reinforced by the preference in consumption of large mammals, mainly camel. Sheep and goat, while more common elsewhere in Hegra, were also present although represented by adults.

### Preliminary Assessment

With mounting epigraphic information which clearly indicates that the Roman military occupation in Hegra was far from ephemeral, the excavations in Area 34 provide a tangible and unambiguous archaeological support for this notion.

Area 34 is probably the best place in the otherwise largely featureless terrain of the settlement in Madâ'in Sâlih where a military establishment should be located. It occupies a superb tactical location with all-round visibility, while the citadel on top of Hill B provides an excellent vantage observation point, particularly suitable for monitoring the town of Hegra. Such dominance of Area 34 must have been easily recognised by the Roman occupation forces tasked with closely overseeing of activities in the conquered city and defending it from a potential external foe.

### *Nabataean period*

By the 1st century AD, the Nabataean settlement of Hegra was surrounded by the rampart, built mostly of mudbrick. The circuit was continuous, including Area 34. There, however, the section of the rampart on the steep western slope of Hill B (i.e. the narrow rampart) was built of stone and directly on the bedrock, presumably in order to achieve a better connection with the stone-built citadel on top of the hill. Also, stone construction was preferable there as it would be more durable standing on the bedrock and more resistant to periodic landslides caused by rainfall. The continuation of the Nabataean narrow rampart westward might have been mudbrick-built. If so, and if its line did not conform with the ground plan of the subsequent Roman fort, it would apparently have been completely demolished by the Romans after their takeover of Hegra. The Nabataean-period remains in Area 34 include the narrow rampart and some walls surrounding Room I. Although their construction is markedly different than most of the major walls in the area, these were all incorporated in the structure of the Roman fort.

### *Roman Period*

The epigraphic record indicates that during the early period, following the annexation of the Nabataean Kingdom by Trajan in AD 106, major cities, such as Bostra, Gadara, and Philadelphia, were garrisoned by the army units (Freeman 1996: 101, 105–107). For example, a detachment of *legio VI Ferrata* is attested in Gerasa (Jerash) in AD 118–119 (Kennedy 1980: 297–299). Some urban garrisons might have utilised civilian billeting but in the Nabataean settlement of Hawara (Humayma in southern Jordan), a fort was constructed in the early 2nd century (Oleson 2009; Oleson *et al.* 2008). Probably soon after the annexation, the Romans occupied Hegra and the garrison was established there. The fort in Area 34 should be dated to the early/mid-2nd century and thus it is probably, after Humayma, the second earliest Roman military structure in Arabia. Not surprisingly, the fort at Humayma provides the closest temporal and the best structural parallels for the Hegra fort, a fact already stressed throughout this report.

Admittedly, and as opposed to the traditional layout of Roman forts, the eastern part of the fort at Hegra was irregular because the integration with Hill B, i.e. the citadel, offered definite tactical advantage, and thus the incorporation of the narrow rampart and its adjacent structures was inevitable. The central and western parts of the stony plateau allowed the imposition of a more regular quadrangular plan, featuring, among other elements, the southern perimeter wall, i.e. the wide rampart. The use of the modular system based on Roman feet, well attested in Humayma (Oleson 2009: 537), is also evidenced in Hegra, clearly implying the planning by Roman engineers.

Particularly interesting is the presence of twenty rectangular projecting towers along the curtain walls in Humayma, a feature which so far was usually associated with the Severan period (e.g., the fort in ‘Ain Sinu, Mesopotamia, see Lander 1984: 132–134). The fort in Hegra features two projecting towers flanking the gate and a projecting corner tower, of dimensions similar to those at Humayma. Furthermore, both Humayma and Hegra forts feature angles which are not curved (as in ‘playing-card’ forts) but squared off, a feature which again is generally evidenced only in the 3rd century (*vide* ‘Ain Sinu fort). Thus the excavations of the fort in Hegra lend further support to the notion that such arrangements were already present in the Roman military architecture of the 2nd century and that the fort at Humayma should not be considered an unusual exception.

In addition to the gate, flanking towers and a corner tower, the earliest phase of the Hegra fort presumably also included some inner structures. The eastern wing of rooms is the best candidate for such as it bears indelible impression of Roman barracks, while other barracks or service rooms might have been built against the inner face of the wide rampart. Generally, barracks built against fort’s circuit wall is a well-known feature in the late 3rd-early 4th century in the East, but such feature also occurs in smaller fortifications in Africa and in the East already in the 2nd–3rd centuries. So such belong the forts at Tisavar in Africa (Lander 1984: 102–104) and Hallabat, ‘Uweinid and Aseikhin in Jordan (Lander 1984: 136–143; Kennedy 2004: 62–68).

The exact date of the reinforcement of the south-east part of the fort, which featured the incorporated Nabataean narrow rampart, is less certain. It might already have happened in the early/mid-2nd century (Phase 1 in Trench B) or somewhat later (Phase 2) but apparently still in the 2nd century. The narrow rampart was substantially reinforced by the addition of the casemate space, the wall with the stone revetment,





**Fig. 32.** *The entire southern perimeter wall of the Roman fort in Hegra. The south-west corner on the extreme left, the gate and the flanking towers in the center; the narrow rampart in the right against the background of Hill B. View from the south.*

the cross-walls and the ‘*glacis*’. Whether or not in response to a potential threat, this reinforcement was probably a practical measure applied to a relatively weak and ‘ageing’ narrow rampart. Elsewhere in the empire, the widening of original timber/mudbrick fortifications by adding stone wall (or revetment) is attested during the early Antonine period (Lander 1984: 43–46). Perhaps, the strengthening of the narrow rampart might reflect the information from the Latin inscription of AD 175–177 found in Hegra (al-Talhi and al-Daire 2005) which implies the restoration of an “old wall” with the technical assistance of Roman officers. Furthermore, the strengthening of the narrow rampart in Hegra might have been but an element in a major overall bolstering of Hegra’s fortifications in the 2nd century. The investigations of the towers along the circuit indicates that these are later in date than the Nabataean curtain wall (*supra*). Since the distance between the towers is ca. 35 m, undoubtedly 120 p.M. was intended, equalling one *actus*, a standard module in use by Roman engineers.

At any rate, such major reinforcement – towers, casemate wall, *glacis* – may appear excessive. After all, it was rather unlikely that Hegra would be invested by enemy equipped with battering rams and siege engines. However, the location of the garrison of the town may have deemed it necessary to fortify it with disproportionate defenses against any real or imaginary foe. Such massive fortification was probably meant as a formidable deterrent and to strengthen the Roman prestige in the region and impress travellers, particularly those coming from the South (fig. 32). On the other hand, sometime in the early-to-mid-3rd century, the southern gate of the fort was blocked and nine small buttresses were built against the curtain wall. While these are not necessarily desperate measures, they probably indicate that some kind of potential threat did exist and required fast remedies.

The abandonment of the fort in Hegra must have happened sometime toward the end of the 3rd century. This may well correspond with the lack of historical information confirming the presence of Roman garrisons in north-west Hijâz after the 3rd century (Fiema and Nehmé 2015). Subsequently, it appears that the fort, or parts of it, was reoccupied by civilian population of Hegra, which apparently enjoyed the relative security provided by its still standing walls. This occupation might have continued throughout the 4th century but the exact date of the cessation of occupation in that part of Hegra cannot, so far, be established.

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## AREA 6, IGN 132 EAST AND SOUTH-EAST

Damien Gazagne (Éveha) & Laïla Nehmé (CNRS – UMR 8167)

Since 2010, the area containing the sandstone outcrop no. IGN 132, located in the north-eastern part of the residential area, has been the subject of excavations led by several teams of the Madâ'in Sâlih Archaeological Project (fig. 1). Apart from the complete excavation of the platform on the summit, on which stood a small tetrapylon surrounded by a low wall, and the clearing of part of the terrace which extends to the north of the mound, where two walls have been identified as a double temenos wall, discontinuous soundings were opened in the south-west, south, and south-east of the platform. In the west, excavation of a vast residential complex was led by the Saudi members of the project (areas 64 and 65); in the south, a sounding was opened at the foot of the rocky outcrop in 2014 and 2015 by Laurent Tholbecq (area 63); finally, in the east, at the foot and along the eastern side of the outcrop, a north–south sounding was opened, measuring c. 25 m long and between 1.80 and 6.50 m wide. This sounding exposed several structures, among which were: 1/ the remains of a Nabataean cistern dating to the end of the first century BC or the beginning of the first century AD; 2/ a well, probably dating to the same period; 3/ basins with a *terminus post quem* of AD 250; 4/ several walls.

The chronology obtained in these different sectors is as follows (see fig. 1):

- at the summit, the tetrapylon, the courtyard to the south of which it stands, and the low wall which surrounds them were used from the end of the first century BC to the end of the first century AD, and were interpreted as a Nabataean shrine, possibly dedicated to the cult of the sun, identified with Dushara. Access to the sanctuary was from the west, passing through a monumental entrance flanked by two pillars, the restored bases of which were placed directly on the bedrock and preserved on a single course; then via a partly rock-built stairway, which was destroyed during the partial collapse of the roof of room IGN 132a, and later replaced by a ramp constructed with stone splinters;
- in the **south-west**, the chronology is still being established but it would appear that the area underwent two main occupation phases, the first during the Nabataean period and the second during the late Roman or Byzantine period;
- in the **south**, excavations led by L. Tholbecq have revealed three phases:<sup>1</sup>
  - 1/ the first phase's principal elements are the rock betyl niche IGN 132d; probably the rock niche-basin 63026, discovered less than 1 m to the right of and underneath the betyl niche in the same rock face; and finally, possibly the mudbrick structure 63063, the function of which is indeterminate but which might also be linked to the niche;
  - 2/ the principal element of the second phase is wall 63001, which at this location follows the outline of the rocky overhang and the construction of which had completely hidden the niches, possibly deliberately;
  - 3/ this phase is characterized by the – probably deliberate – dismantling of wall 63001, the stone blocks of which (part of the elevation of the wall was made of mud brick) were reused to create a compact backfill between what remains of the wall and the rock face of IGN 132. At the same time or after the wall was dismantled, walls 63016 and 63008, conjoined to each other and therefore contemporaneous, were built. Wall 63016, which abuts the external face of wall 63001, is obviously of a later date and therefore wall 63008 must also be later than 63001. Wall 63001 has a *terminus ante quem* of the end of the first century BC but in the present state of the study of the pottery, it is difficult to know by how much walls 63008 and 63016 are of a later date. To date, the only available dating is partly provided by the layers of use in the space formed by these three walls (pit fill, first-century sherds especially but also sherds from the beginning of the Byzantine period) and the destruction layers of the three walls (63056, 63041 = 63051, with an

1 - See the report by L. Tholbecq in the 2015 mission report, p. 45–49 of the online version: <https://halshs.archives-ouvertes.fr/halshs-01311865>.

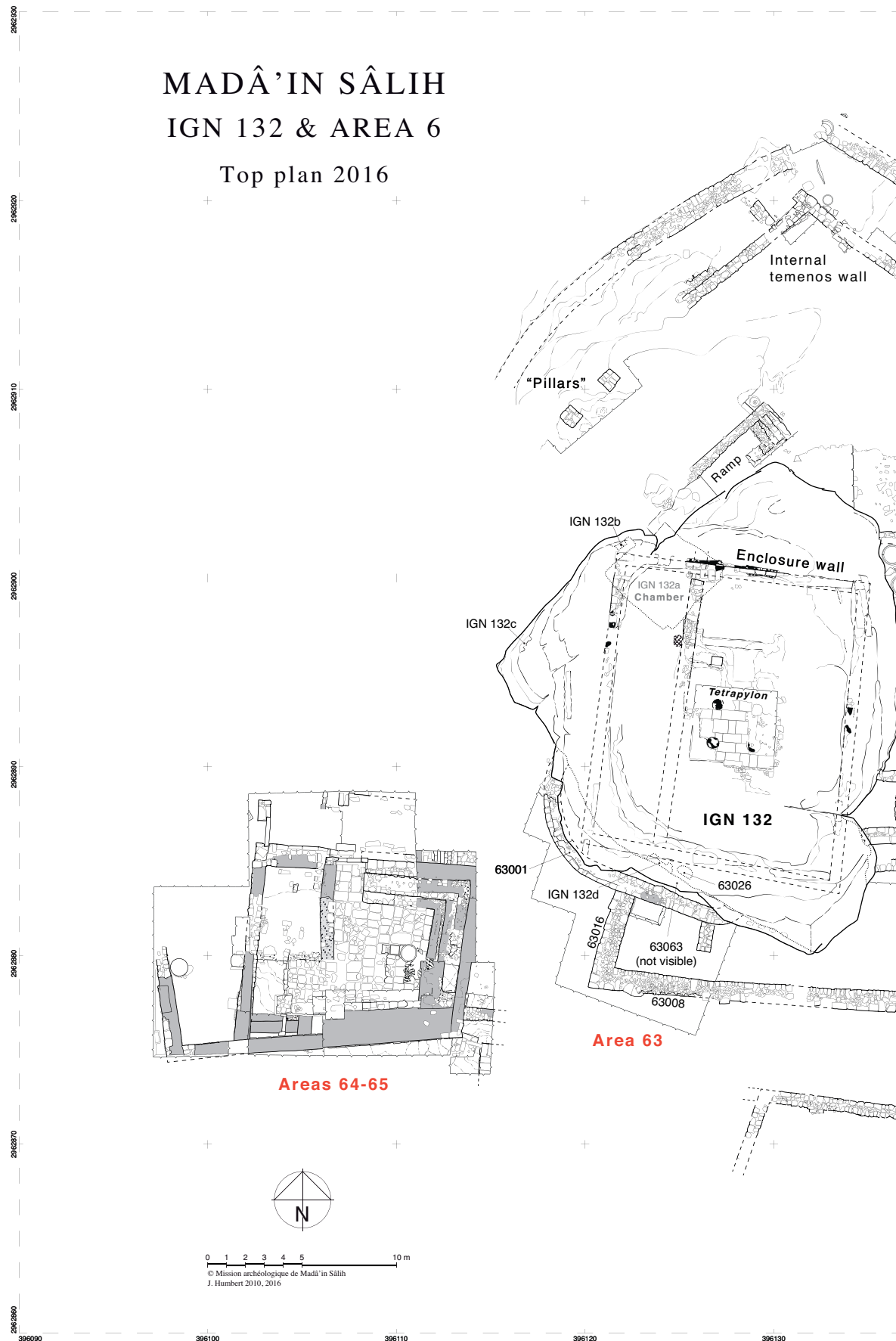
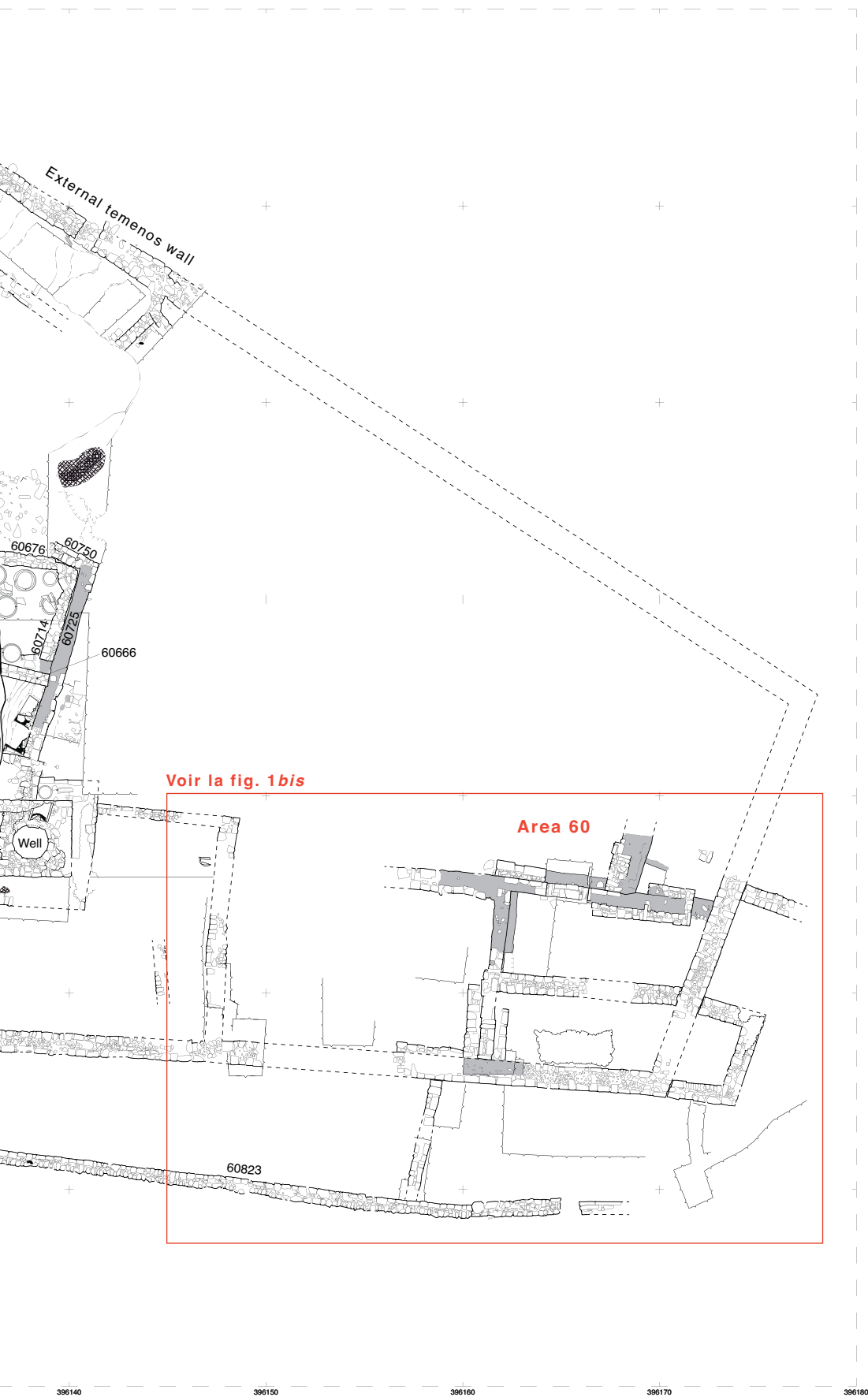


Fig. 1. Ground plan of the areas excavated on and around IGN 132.





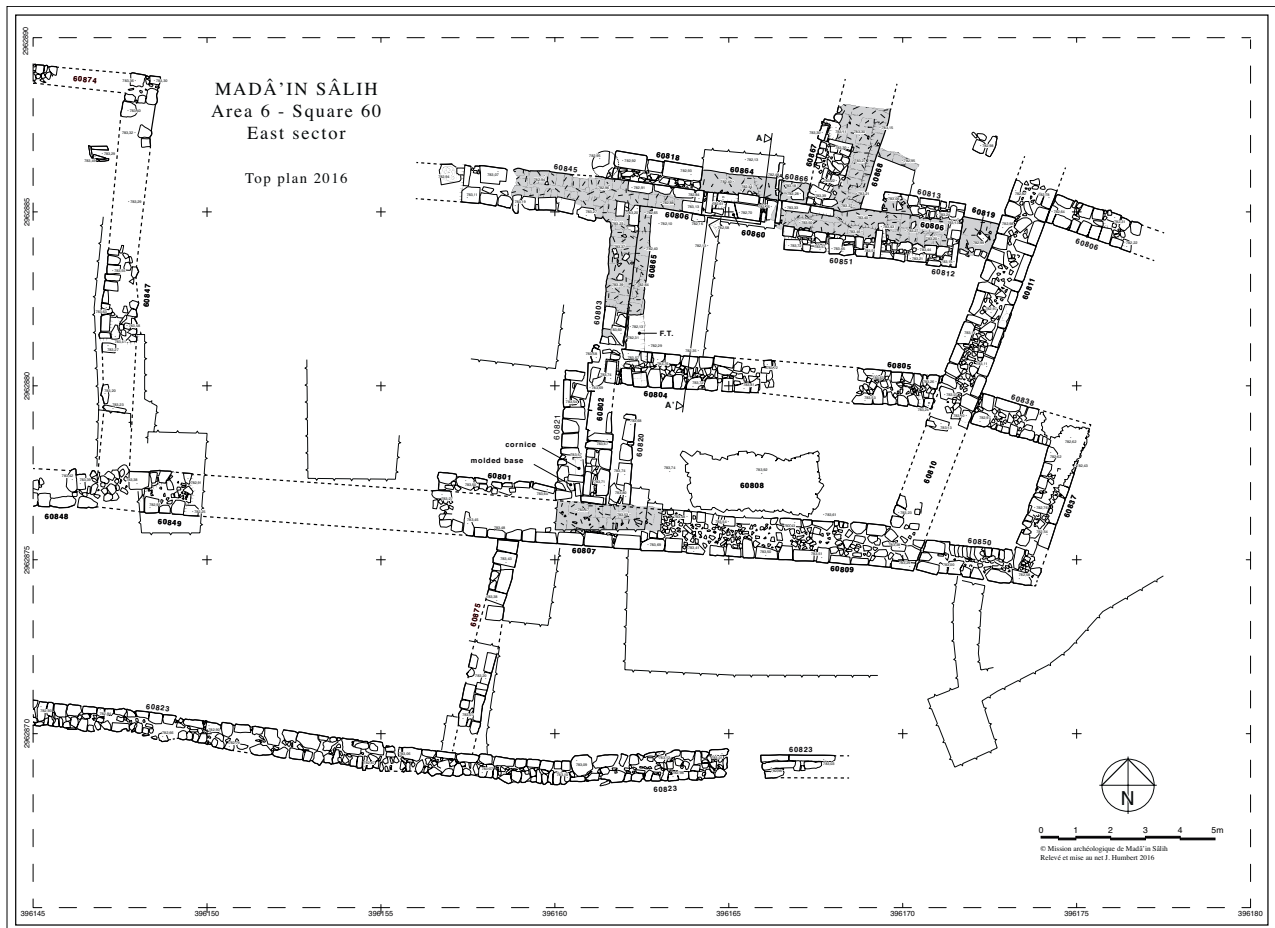


Fig. 1a. Ground plan of the area excavated in 2016, south-east of outcrop IGN 132.

identical assemblage). The niches thus have a *terminus ante quem* of the end of the first century BC. In sum, there are at least two Nabataean phases in the area, and perhaps a late Roman or Byzantine phase, with a hiatus between the two;

– finally, in the **east**, at the foot of the rocky outcrop, the excavation, which reached the bedrock, has shown that the first phase of occupation is represented by the installation of a Nabataean cistern, possibly contemporaneous with the sanctuary at the top, while the last phase is represented by the installation and use of basins, which have a *terminus post quem* of AD 250. The latter are evidence of a domestic or craft activity requiring large amounts of water. Between the two is a series of intermediary phases, characterized by a well or well/cistern and several walls, some of which are associated with the basins (60676, 60714, and possibly 60666), while others, the function of which is unknown, date from before the phase beginning in AD 250 (60724, 60725, and 60750).

In the huge area covered by IGN 132 and its surroundings, it is thus necessary to distinguish between the elements that belong to the Nabataean sanctuary; those that belong to associated or neighbouring structures (the northern terrace, the access points, rock-cut chamber IGN 132a, probably the well, the rock-cut niches at the foot of the south face, etc.); those that belong to the huge building located in the south-west – a large house built around a courtyard or a public building; and finally, those that belong to later structures, the function of which is probably domestic or related to crafts.

The excavation strategy for the 2016 season was dictated by the results obtained so far and by the nature of the terrain. Evidence of the existence of Nabataean phases right at the foot of outcrop IGN 132 was obtained through excavations made in soundings in the east and south. Determining their extent and their overall layout would have required to extend the excavation considerably, a difficult task in view of the existence of very dense destruction layers heavily packed with stones, the removal of which would have





**Fig. 2.** General view of the excavated area and sounding (viewed from the top of IGN 132).

taken much time and labour. It was therefore decided to return to the method chosen in 2010 of extensive scraping, particularly over the whole area south-east of the outcrop, in order to expose a potential temenos wall on this side also (there is one in the north).<sup>2</sup> Scraping was to be complemented by soundings in order to obtain a stratigraphy of this area, which is located further from the outcrop and is therefore less affected by the destruction of the monument that stood on the summit. The objective was to determine whether the Nabataean sanctuary was installed only on top of IG 132 or whether there was an ‘upper’ sanctuary/temple and a ‘lower’ one in this part of the residential area.

The beginning of the 2016 season, which lasted six weeks, started with the clearing of the southern temenos wall followed by extensive scraping, over an area measuring 380 m<sup>2</sup>, of a small ‘hill’ created by the accumulation of archaeological sediment in what must have formed the south-eastern corner of the sanctuary area (fig. 1a–2). After surface scraping, which lasted a month and required the removal of the excavation dump from previous seasons, a 15 m<sup>2</sup> archaeological sounding was opened during the last two weeks of the season in the structure exposed at the top of the hill, in order to determine its chronology and attempt to identify its function.

## 1. The sounding (fig. 1a–2)

### 1.1. Phase 1: construction (second half of first century AD)

Figure 3 is a north–south stratigraphic section drawing showing the distribution of pottery finds by *locus* and by century (see also stratigraphic diagram, fig. 4, as well as the photograph and drawing of the section, fig. 5–6). It should be noted from the outset that the first phase of occupation of the sector (first century AD), is not associated with any archaeological level outside *locus* 60831, which nevertheless belongs stratigraphically to a much later phase (see below).

2 - L. Tholbecq proposed the hypothesis of this wall at the end of the 2015 season.

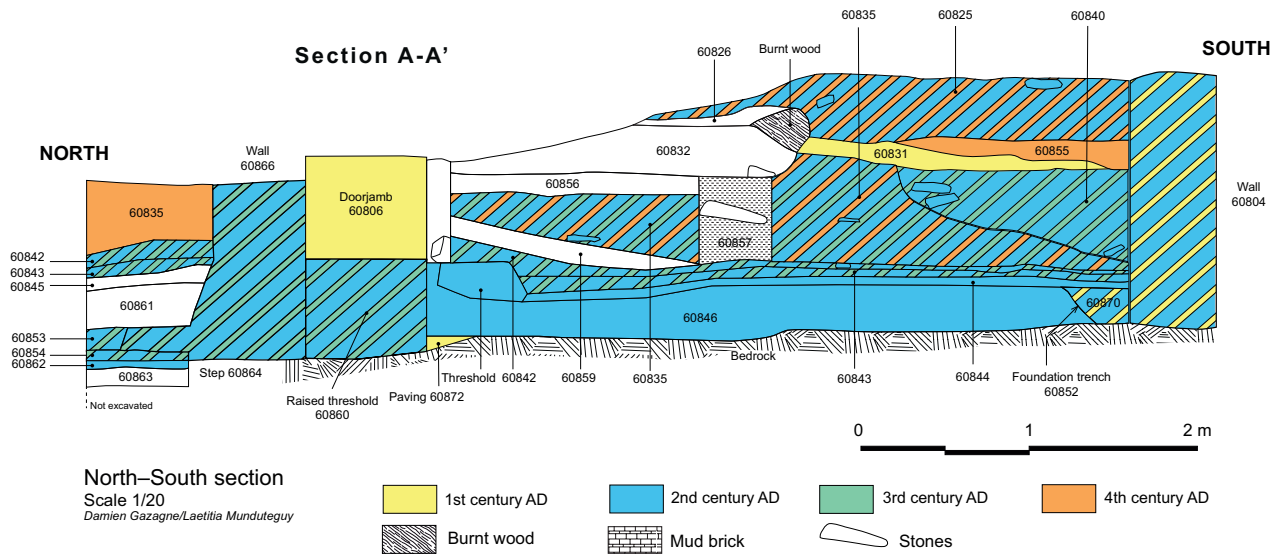


Fig. 3. North-south stratigraphic section showing the distribution of pottery finds by locus and by century.

PHASES	INTERPRETATION	LOCI	DATING
PHASE 5	Abandonment	60824 60825	4th century
PHASE 4	Occasional reoccupation	60855, 60826 60831	4th century
PHASE 3b	Abandonment	60832 60840, 60856 60835	3rd/4th century
PHASE 3a	Building?	60857 60859	3rd century
PHASE 2d	Rebuilding	60842	End of 2nd- beginning of the 3rd century
PHASE 2c	Occupation	60843	2nd century
PHASE 2a PHASE 2b	Floor level	60845 = 60844	
	Building	60870, 60804, 60852, 60846	
	(Backfill)	60861, 60853	
PHASE 1	Building	60866, 60864, 60860, 60854	
		M 60806, 60872	
		60862, 60863	
		Bedrock	

Fig. 4. Stratigraphic diagram of the sounding.



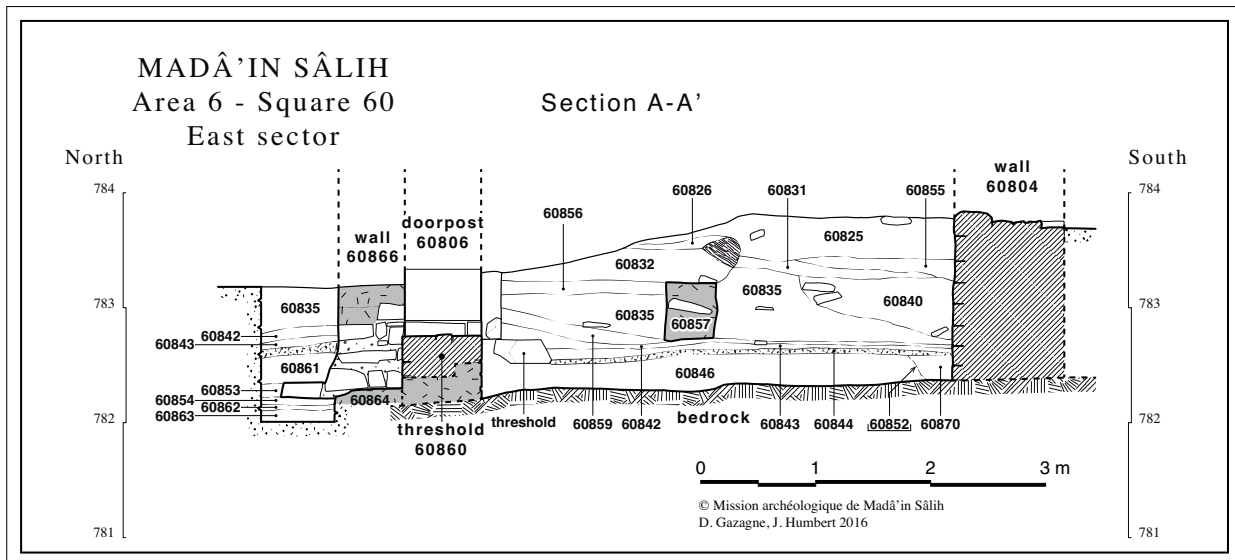


Fig. 5. Stratigraphic section of the sounding, drawing.

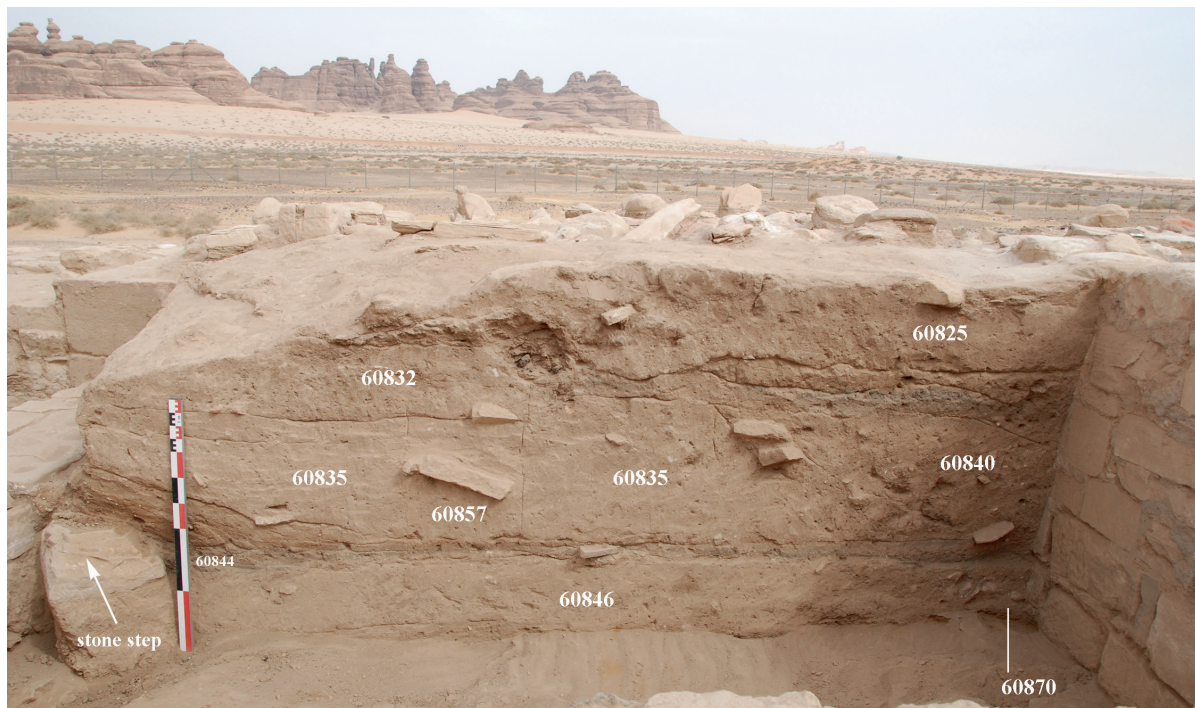


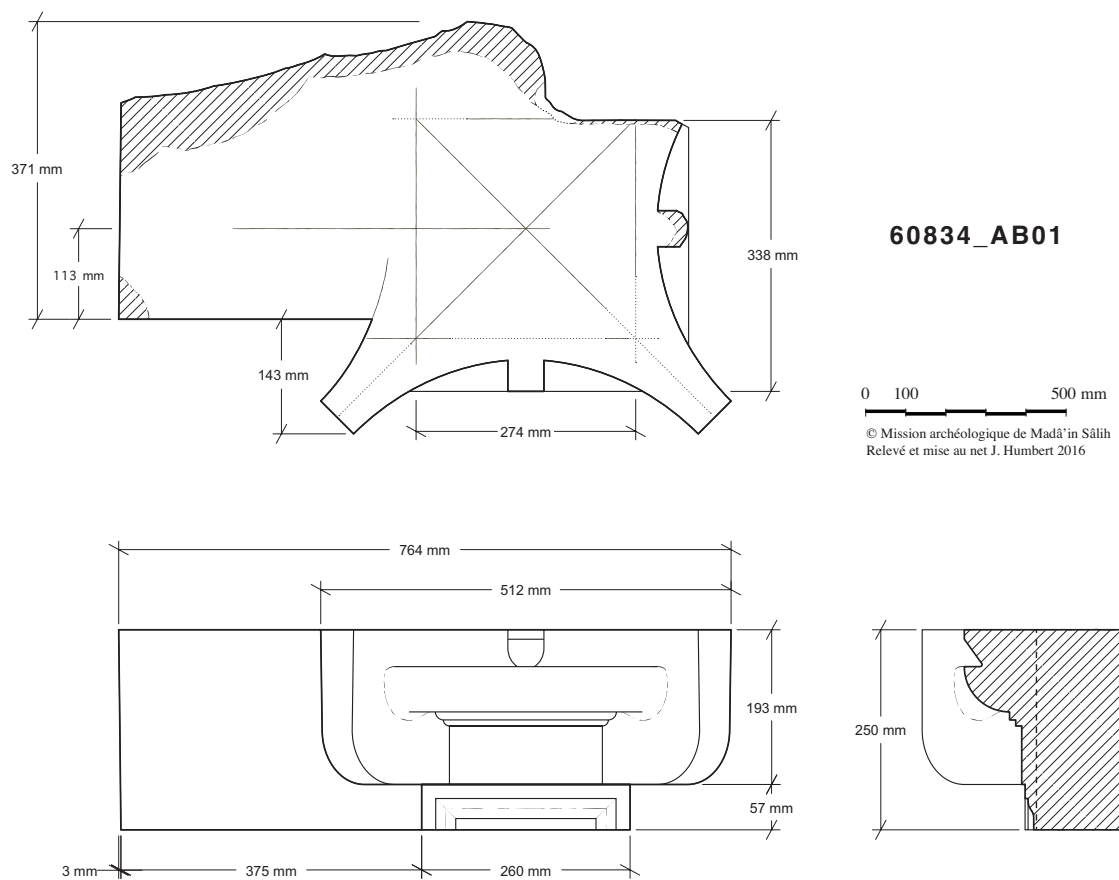
Fig. 6. Stratigraphic section of the sounding, photograph.

Strictly speaking, therefore, there is no archaeological level dated to the first century, but numerous Nabataean sherds were found in later (Roman) levels. The large numbers of Nabataean sherds do not appear to be residual, they seem to echo a first-century occupation. This is explained by the fact that in the second century, the Nabataean levels were removed and systematically reused. The only element that allows us to date the original masonry is an Ionic capital found lying in the only securely identified threshold, 60860 (fig. 7–7a). It is a jamb capital of very fine quality, with a decorated inner face. It bears finely incised construction marks on the upper face.<sup>3</sup> The top of the moulded jamb panels is visible under the capital (ogee, listel). Under the echinus, the astragal is composed of two superimposed fillets. There are only three other

3 - The authors thank Jacqueline Dentzer-Feydy for her help with the description of this capital.



**Fig. 7.** Nabataean jamb capital 60834\_AB01, lying on the threshold of the doorway in wall 60806.



**Fig. 7a.** Drawing of capital 60834\_AB-01.



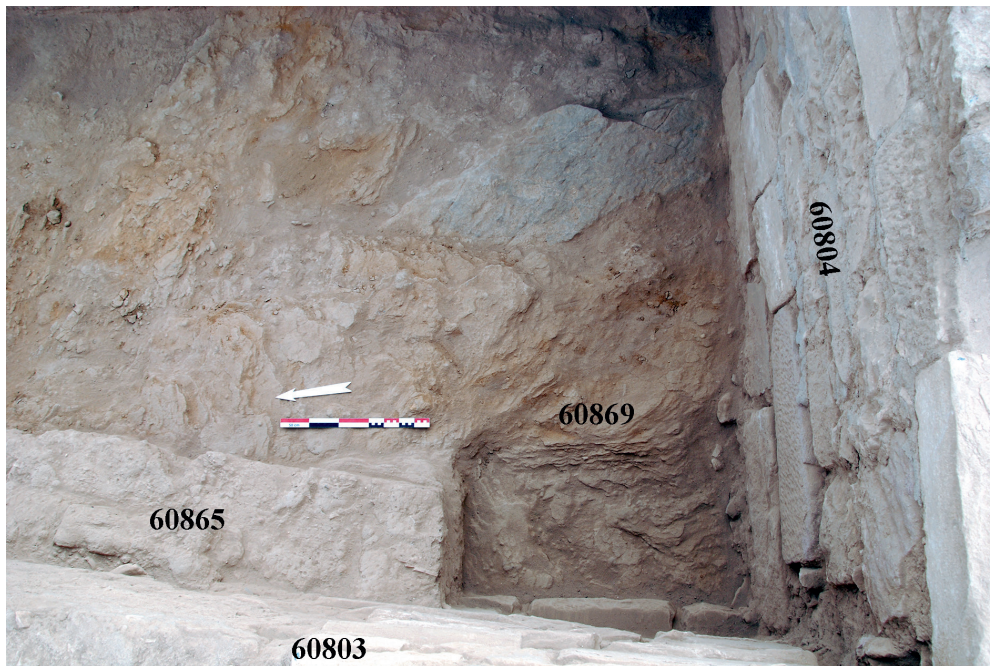


Fig. 8. Foundation trench 60869 of wall 60803.

Ionic capitals at Hegra,<sup>4</sup> two of which were found on tombs of the proto-Hegra type, IGN 53 and IGN 97, where they adorned the pilasters on either side of the doorway. The third is a small capital discovered in 2003, not *in situ*, in the residential area located south-west of IGN 132.<sup>5</sup> This capital, most comparable to the example excavated in 2016 but smaller (max. width 41 cm compared to 52 cm for this year's), is also carved in very hard good-quality white sandstone. A study of Ionic capitals found in Nabataea – much less frequent than Corinthian capitals – together with the stylistic analysis of the monuments of which they are part, has enabled J. McKenzie to suggest a date around AD 75 for the tomb facades IGN 53 and 97.<sup>6</sup> J. Dentzer-Feydy, however, suggests an earlier date in the middle of the first century AD, as both these facades show characteristics associated with the work of two stone carvers: 'Aptaḥ, who carved tombs from AD 26 to 37, and 'Abd'ubdat, who carved tombs from AD 31 to 50.<sup>7</sup> The two rock-cut tombs were thus built either between AD 25 and 50 or between AD 25 and 75, and the same probably goes for the monuments built in masonry.

It is possible that this capital comes from the jamb of the original doorway of wall 60806. Looking at the doorway from the outside, it is the left doorjamb. If this is the case, this would enable a dating of wall 60806 within the AD 25–75 range. At its western end, wall 60806 is conjoined to wall 60803, thus making it part of the same construction phase. The foundation trench of the latter (*locus* 60869) has cut through the natural bedrock 50 cm along the width and 15 cm in depth (**fig. 8**). It has not, however, yielded any finds although it was excavated along a 1 m length. Walls 60806 and 60803 show the same construction technique combining mudbrick and sandstone blocks of medium size. Wall 60806 rests on a sandstone foundation plate. Its internal facing is built entirely of mudbrick (**fig. 9**) and its exterior facing is composed

4 - Dentzer-Feydy 2015: 287–289.

5 - Saudi excavations, SQ: U1–29, not far from the Latin inscription dated AD 175–177. The capital is published in al-Talhi *et al.* 2010: pl. 1.13b, see also p. 25. Also in Nehmé, al-Talhi and Villeneuve 2010: 307, no. 126, Nabataean capital (al-'Ulâ Museum 37/U129); and Dentzer-Feydy 2015: fig. 5.58 p. 288.

6 - McKenzie 1990: 22.

7 - Dentzer-Feydy 2015: 393 and 402.



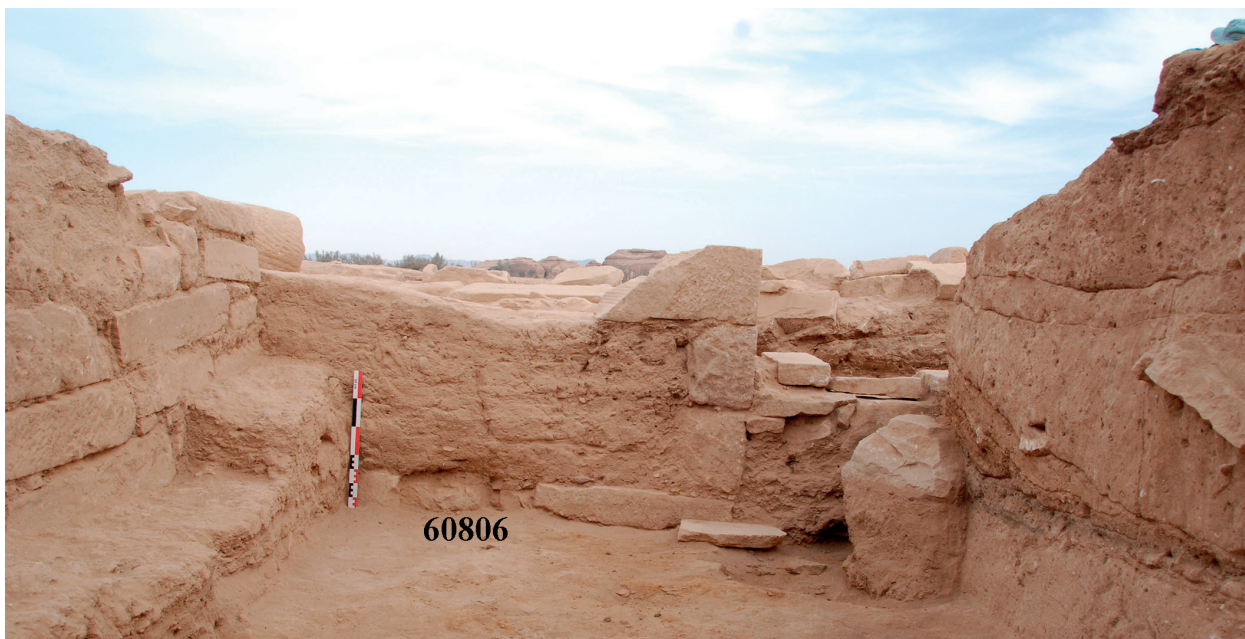


Fig. 9. Interior facing of wall 60806.

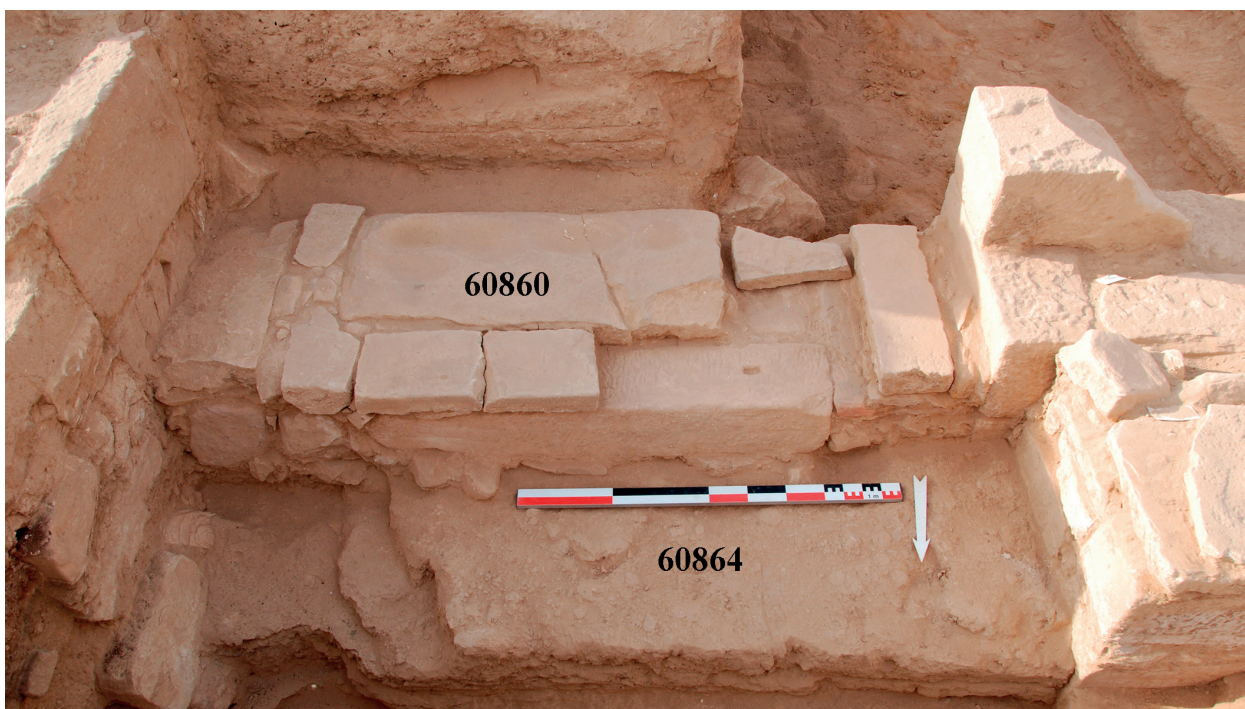


Fig. 10. Doorway installed in wall 60806 and the later threshold (60860).

of two regular courses of well-carved sandstone blocks of medium size topped with mudbricks. It is pierced by a doorway measuring 2.15 m wide, which was entirely cleared. The doorjambs are built of well-carved sandstone flags which are set on edge (fig. 10), following a technique frequently employed at Hegra, for example in area 1.<sup>8</sup> As for wall 60803, it is positioned in a large foundation trench (*locus* 60869), which has cut into the bedrock *in situ*. It rests on a projecting foundation plate composed of sandstone blocks of

8 - See the project's 2011 report, fig. 11, p. 40, online: <http://halshs.archives-ouvertes.fr/halshs-00671451>.





**Fig. 11.** Interior facing of wall 60803.



**Fig. 12.** Wall 60806 and paving 60872 against the doorjamb, viewed from the south.

stretchers and headers (**fig. 11**). The second course of this plate is made of mudbrick and the rest of the internal face of the wall is refurbished with reused blocks (see phase 2).

Finally, a sandstone flag (60872) is associated with this construction phase (**fig. 12**). It was found *in situ* inside the room, at the base of the left-hand doorjamb of wall 60806 with which it is connected. It was laid directly on the natural bedrock and very probably belongs to a paving which was systematically removed for reuse elsewhere.

## 1.2. Phase 2 (second–third centuries)

### Phase 2a: construction (second century)

After the Nabataean levels were removed, the interior of the room defined by walls 60803 and 60806 was raised by 30 cm with a homogeneous and carefully levelled backfill of a dark beige colour (*locus* 60846, see section drawing and photograph, **fig. 5–6**) which contains neither rubble nor construction debris. This backfill is therefore part of the levelling works undertaken before the refurbishment of pre-existing structure. The backfill has yielded a large number of very homogeneous sherds (290) dating from the second century AD, thus providing a *terminus ante quem* for the lower levels. During this phase, the pre-existing building was altered by the construction of wall 60804 – 4 m to the south of wall 60806 – in order to divide the original room. Its foundation trench (*locus* 60852) was dug into backfill 60846. The fill of the foundation trench (*locus* 60870) has yielded material dating to the first and second centuries, which provides wall 60804 with a *terminus post quem* of the beginning of the second century AD (?). Wall 60804 is preserved on six irregular courses, composed of sandstone blocks of medium size laid as stretchers, of



**Fig. 13.** North facing of wall 60804.

which many are reused (**fig. 13**). The joints between the blocks are bound with earth and covered, on the northern face, with an ashy grey mortar.<sup>9</sup> At the foundation level, the joints between the two blocks are simply bound with earth.

By raising the level of the room (backfill 60846) it is clear that the aim was to alter the pre-existing building quite radically, particularly by building new walls (60804) and installing the threshold 60860 (see below). When the bedrock is proximate, it is more practical and safer to erect new walls by building them over a 30 to 40 cm thick foundation backfill, especially where there are existing structures (the other solution is to dig foundations into the bedrock). This operation is sealed with a floor level (*locus* 60844) of well-compacted dark brown beaten earth.

During this phase, the threshold of the original doorway was also raised by 55 cm (**fig. 10**). The new threshold, which partially blocks the original doorway associated with wall 60806, comprises three mudbrick courses and one course of reused sandstone blocks. Evidence that the two structures functioned together<sup>10</sup> is attested by the stone step that was installed against threshold 60860 and on floor level 60844.

#### Phase 2b: construction (second century)

At the northern end of the sounding (to the north of wall 60806), the stratigraphy shows a continuation of, and coherence with, the southern half (**fig. 5** and **14**). Gaining an understanding of the stratigraphy is however rendered somewhat more complicated by the small size of the sounding north of wall 60806 (1 m) and by the fact that it was not completed in 2016. In addition, the finds recovered in the lowest levels reached (contexts 60853 and 60854) lead us to nuance the conclusions. Indeed, these levels have yielded a small amount of finds (fourteen undiagnostic sherds) dated to the second/third century, while the southern part of the sounding, to the south of wall 60846, has exposed contemporaneous or slightly later levels (*locus* 60846) that have yielded a considerable number of homogeneous sherds (290, of which 9 are diagnostic) dated to the second century. The second century was thus the date retained for all these levels.

*Note:* the distinction between phases 2a and 2b – the latter relating to the northern part of the sounding, while stratigraphically there is no difference between the north and south of wall 60806 – is explained by

9 - It should be noted that many of the blocks utilized to fill the space between wall 63001 and outcrop IGN 132 show traces of an ashy grey mortar on the faces (L. Tholbecq, in the 2015 report, p. 46).

10 - Threshold 60860, wall 60804 + floor levels above, 60844.





Fig. 14. Stratigraphy of the northern end of the sounding.

the differences in the dating of the pottery: fill 60846 is dated by material from the second century, while floor level 60854, stratigraphically earlier, by material from the second and third centuries.

The three floor levels of beaten and carefully packed soil (*loci* 60854, 60852, 60863) associated with a level of abandonment (*locus* 60853) which were excavated north of 69664 possibly belong to a phase pre-dating the second century AD, but it is difficult to associate them with the sandstone flag 60872 in phase 1.

In the northern area of the sounding, phase 2 corresponds with the construction of wall 60866 and with backfill 60861 (equivalent to backfill 60846). Floor level 60845 (= 60844) was installed subsequently.



Fig. 15. Occupation level 60843.



**Phase 2c: occupation (second to end of second/beginning of third century)**

After floor level 60844/60845 was installed, the joints between the blocks of wall 60804 were covered in a light-grey coating. The level where these mortared joints appear coincides with floor level 60844/60845. The latter is overlaid with occupation level 60843, which yielded finds dating to the end of the second or beginning of the third century (**fig. 15**). This brown, sandy and powdery level is extensively anthropized and contained charcoal, ash, and numerous faunal remains, probably attesting to domestic activity.

**Phase 2d: rebuilding (third century)**

This occupation level is overlaid with a new floor level (60842) of dark-brown beaten earth, varying in thickness (5 to 10 cm) but well levelled. This small level has yielded finds dated to the third century. It is stratigraphically associated with several internal alterations of the room attesting to its domestic function (**fig. 16**):

- a reused hollowed-out column shaft (60814), was installed in the north-west corner of the room and used as a mortar (for grinding cereals). The mortar still contained the stone pestle as well as pottery finds trapped inside. These finds are not earlier than the third century.

It was probably during this period that wall 60803 was restored with sandstone blocks, a good number of them reused, as is attested by the use of a small column shaft, the unequal size of the blocks (medium-sized rubble stones), and differences in the surface treatment of the latter (**fig. 11**).

- a small platform was installed in the south-west corner of the room, against walls 60803 and 60804 for



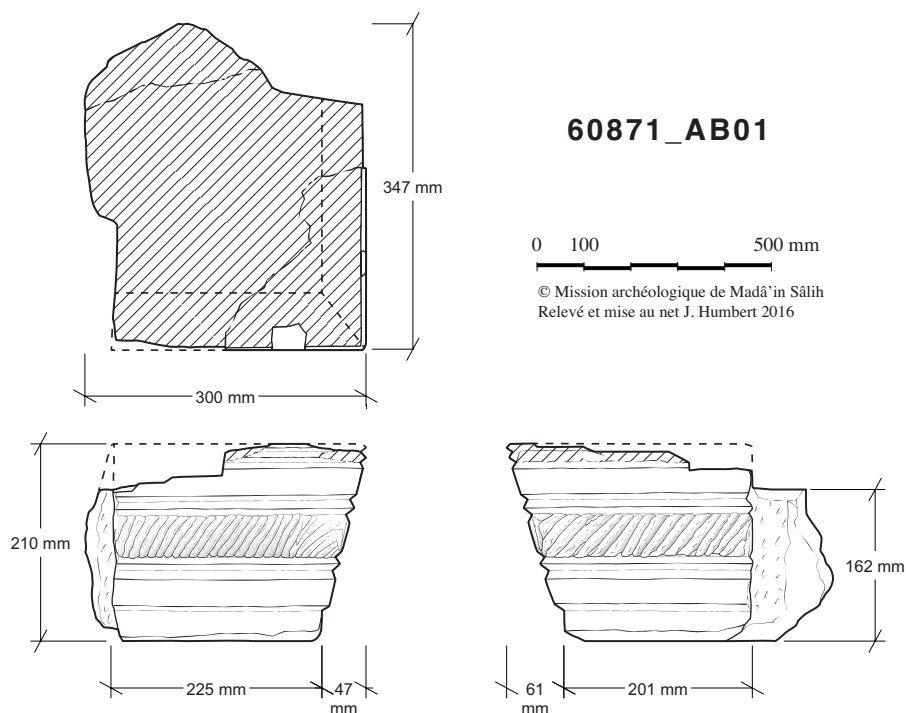
**Fig. 16.** Floor level 60842.



**Fig. 17.** Frieze block 60871\_AB01.

a stone basin (60836). This small basin could hold enough drinking water for domestic use for a day. On floor level 60843 several elements were found attesting to the final abandonment of the room, at the end of the late Roman period: a rectangular stone basin (60841), associated with basin 60836, a decorated block (60871\_AB01, **fig. 17–17a**), and numerous scattered sandstone blocks. J. Dentzer-Feydy has proposed that block 60871\_AB01 is a cornerstone. It is decorated with oblique striations in a rustic style that is difficult to date. There is no such decoration attested in Nabataea and S. Antonini has confirmed that nothing similar exists in ancient Arabia. Finally, J. Dentzer-Feydy and R. Parapetti have stated that this is a locally made moulding,





**Fig. 17a.** Drawing of frieze block 60871\_AB01.

which has no direct parallels in classical architectural decoration.<sup>11</sup> Given that this block was abandoned on a floor dating to the late Roman period (third century?), there are no regional parallels for this period. Whatever the origin of this decoration, this block attests to the existence of Roman-period monumental architecture at Hegra.

The sounding has shown that the room was finally abandoned at the end of the Roman period and later only occasionally reoccupied (phase 3, see below) (**fig. 18**).



**Fig. 18.** Level of abandonment of the room.

11 - We thank J. Dentzer-Feydy, S. Antonini, and R. Parapetti for their help in identifying this block and block 60821\_AB01.

### 1.3. Phase 3 (third–fourth century)

This sequence is dominated by the presence of a substantial fill (*locus* 60835) covering the whole area of the sounding (phase 3b). The fill is made up of very homogeneous sandy clay, light beige in colour. It is too compact to be evidence of a phase of abandonment, which would be characterized by layers of much less compact aeolian sand. Neither is it man-made backfill as the layer is very homogeneous and devoid of construction remains. We are more persuaded that it resulted from the collapse of part of the mudbrick walls inside the room. During excavation of level 60835, traces of joints between mudbricks were observed, but no mudbrick masonry was actually identified.

#### Wall 60857 (?) (phase 3a)

In the centre of the room, we observed the presence of an earthen linear ‘structure’ (60857, see **fig. 3**, centre), orientated east–west and much more compact than the rest of fill 60835. Detailed excavation of this area has not revealed evidence of joints between mudbricks. It was therefore decided to excavate this ‘wall’ in order to see it in section. In section, it is only visible because it is denser than the rest of backfill 60835, no bricks were observed. If it is a wall, it is orientated east–west and it must be connected to floor level 60843 (phase 2d) on which it was built.

From an architectural point of view, it is difficult to determine the purpose of ‘wall’ 60857. In relation to the rest of the construction, it belongs to phases 1 and 2, and it is in the centre of a room of appropriate dimensions (4 m) to bear the load of the roof, but at the same time it is only 1.3 m from the main doorway, in wall 60806, which would obstruct access.

### 1.4. Phase 4 (fourth century)

Long after the area was abandoned, corresponding to the end of phase 2d, the room was occasionally reoccupied in the fourth century (contexts 60831<sup>12</sup> and 60855). The occupation was both basic and temporary. It is first characterized by a very ashy layer containing large fragments of burnt wood (level 60831) corresponding to a hearth or to a possible (house) fire (?). Above (context 60855), three reused column shafts (60827, 60828, and 60829) were placed in the centre of the room, on a north–south axis. This small arrangement might have functioned as a support for benches (**fig. 19**).



**Fig. 19.** Three reused column shafts.

### 1.5. Phase 5: final abandonment (fourth century)

At the beginning of the Byzantine period, this temporary occupation was sealed by 50 cm of backfill (contexts 60824 and 60825), which indicates the building’s final abandonment. These fills have yielded finds dated between the second and fourth centuries AD.

## Conclusion

The archaeological sounding has allowed us to determine the chronology of the room located in the north-east corner of the series of built structures exposed in 2016 on the ‘hill’ south-east of IGN 132. The two

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12 - On **figure 3**, *locus* 60831 (backfill), is shown in yellow because it has yielded a small number of Nabataean sherds. The stratigraphy clearly shows that it is a very late layer and the fact that it contained three or four Nabataean sherds can be considered an anomaly.



main construction and occupation phases, phases 1 and 2, associated with masonry, cover the time span between the first half of the first and the end of the third century AD.

Three types of masonry were identified, each corresponding to a particular period:

Type 1 relates to wall 60806 and the foundation of wall 60803. This is good-quality masonry combining sandstone and mudbrick. Wall 60806 appears to be representative of first-century construction techniques: it consists of a stone foundation, an exterior facing of well-carved and well-laid sandstone blocks of medium size, and an interior facing of mudbrick.

Type 2 (wall 60804) is built entirely of stone and the joints are covered in mortar. The blocks are of variable dimensions (a mixture of small and medium sizes) and the courses are irregular. The carving techniques also differ widely as some blocks are simply squared while other, medium-sized, blocks are carefully cut. All these characteristics indicate that at least some of the blocks were reused.

Type 3 is represented by the rebuilding of wall 60803: it was reconstructed using sandstone blocks, the majority of which were reused. They are of varying dimensions and show different carving techniques. The courses are irregular, contain plugs, and there is no mortar in the joints. A small column shaft was observed in the wall.<sup>13</sup>

## **2. The temenos wall 60823**

Wall 60823, which was discovered in 2015, was cleared and was followed starting from area 63, directly to the south of IGN 132, excavated by L. Tholbecq (see **fig. 1**). The wall is oriented east–west and at the end of the 2016 season, the cleared section had reached 38 m in length (**fig. 20**). It is a double-faced wall with a packing of sandstone blocks. Its western and central sections are 0.7 m wide and are well oriented east–west. At its eastern end, it turns slightly west–north-west and its width increases significantly (0.8 m). The change in orientation is explained by the fact that the wall follows the bottom of the ‘hill’ on which the Nabataean-period building was built. Still on its eastern end, long sandstone paving stones could indicate a threshold (?). To the east of the paving stones, the wall disappears and trenches opened in several places along its supposed path could not relocate it. The trenches, however, showed that at this point the natural bedrock is only 40 cm deep. It would thus appear that wall 60823 was destroyed in the area that corresponds to the south-east corner of the ‘hill’ and also to its lowest section. Over time it may have been swept away by rainwater, which creates powerful currents when it floods.

Surface scraping did not yield anything to date this wall, but excavation will have to determine whether it belongs to the same construction phase as wall 63008.<sup>14</sup> The problem lies with the identification of this wall: is it a temenos wall for the Nabataean sanctuary built at the top of IGN 132, with possible annexes below (phase 1), or a later wall built around other structures with a different function?

## **3. The structures at the south-east corner of the sanctuary (area 60800)**

Extensive scraping of the sector located to the south-east of IGN 132 has exposed elements of a built structures. It is difficult to determine the different construction phases of these elements solely from surface scraping, but it is possible to establish a preliminary sequence of phases from the construction techniques (stone, mudbrick, reuse), ‘sabre cuts’ in the masonry, general orientations, and comparison of these elements with masonry identified in the sounding (**fig. 21**).

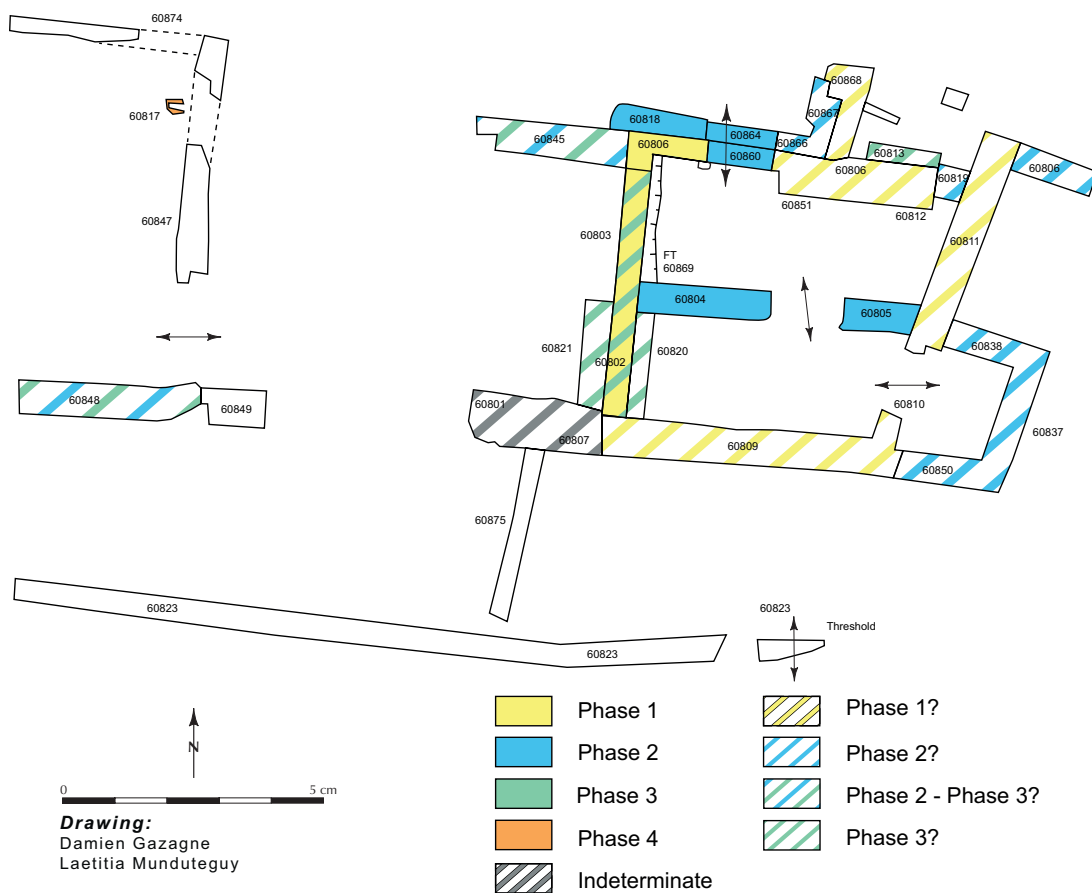
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13 - At first sight it would appear that the only difference between types 2 and 3 is the mortar in the joints. In fact, the courses of type 3 are more irregular and thus required more plugs. Moreover, type 3 reuses a column shaft, while type 2 only reuses well-carved blocks, which suggests that they were sorted before reuse. Furthermore, they are not of the same width: type 2 measures 1 m; type 3, 0.68 m. Finally, when seen in plan, it is clear that type 2 (60804) is a double-faced wall with a packing of small sandstone blocks, while type 3 (60803) is a double-faced wall with no packing.

14 - The construction date for walls 63008 and 63016 is not certain. In his 2014 report L. Tholbecq suggests a late Roman and Byzantine date, based on a preliminary study of the pottery.



**Fig. 20.** The external wall of the temenos (60823) (right of photograph) viewed from the top of IGN 132.



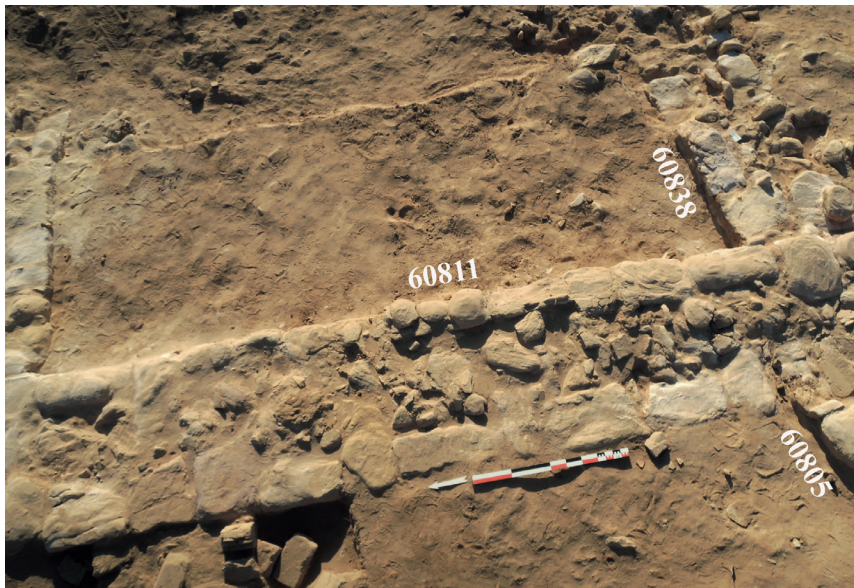
**Fig. 21.** Preliminary plan showing the phases of the built structures on the 'hill'.



### ***Phase 1***

Walls 60809, 60810, and 60811 belong to the same – i.e. the oldest – phase since all the other walls rest against them. They are very thick (1.2 m) double-faced walls (**fig. 22**). Their packing consists of small sandstone blocks. It is possible that wall 60811 delineates the internal part of the original Nabataean monument. The masonry of this phase is distinguished by the use of a mixture of mudbricks and stones, most frequently medium-sized well-carved and well-laid sandstone blocks. This type of construction is found in several places:

- in walls 60868 and 60806, to which should be added wall 60851 as it is conjoined to 60806 through blocks laid as headers (**fig. 23**);
- in the first state of wall 60803, which belongs to phase 1;
- possibly in the mudbrick section of wall 60815, which is a continuation to the west of wall 60806;
- at the western end of wall 60809.



**Fig. 22.** *Aerial view of wall 60811.*



**Fig. 23.** *Aerial view of wall 60806 conjoined to wall 60851.*





Fig. 24. Aerial view of wall 60837 conjoined to wall 60850.

### Phase 2

This phase includes walls built exclusively of stone. This masonry is 0.9 m wide, with medium-sized double facing and a packing consisting of small stones. They include the following:

- walls 60804 and 60805, which function together, wall 60805 also resting against wall 60811;
- the room formed by walls 60837, 60838, and 60850, which are conjoined to one another. Wall 60838 rests against wall 60811, and wall 60850 rests against wall 60809 (fig. 24);
- wall 60819, which rests against wall 60811.

### Phase 3

These walls are of late date, of lower quality, and contain many reused blocks, especially with architectural decoration. This phase concerns a few very localized areas:

- the rebuilding of wall 60803 (observed in the sounding);
- wall 60821, with a reused a column base and a frieze block (60821\_AB01, fig. 25), which rests against wall 60803. J. Dentzer-Feydy suggests that block 60821\_AB01 is a cornerstone with a rustic triangle decoration, even less ‘Hellenized’ than block 60871\_AB01. In view of the fact that the block was reused in wall 60821, which belongs to phase 3 of the built structure (third century?), it must belong to a monument that was obviously dismantled at the time of the construction of wall 60821. It is difficult to say whether it is the same monument as the one of which block 60871\_AB01 formed part, but they both appear to be locally or regionally made, by less able craftsmen than those who carved the Nabataean capital;



Fig. 25. Reused frieze block in wall 60821.



- wall 60820, which rests against walls 60803 and 60809;
- possibly wall 60813, which rests against wall 60806 (?).

From a chronological point of view, these three phases probably correspond to the three phases in the sounding, but it is important to bear in mind that at present the suggested dates have still to be confirmed by further excavation and examination of the finds. Phase 1 shown in **figure 21** might thus correspond to the first century, phase 2 to the second/third century (more likely the second century) and phase 3 to the second/third century (more likely the third century).

### Future work

In 2017, a sounding along wall 60823 will need to be opened in order to determine the date of the wall. Surface scraping will need to be extended to the north of the section that was surface-scraped in 2016, in order to try and reach the northern terrace wall (temenos wall?). In 2016, the removal of the heap of debris from previous years enables extensive scraping to be undertaken, combined with a sounding to confirm the chronology established in 2016. In the central area, between the 'hill' and rocky outcrop IGN 132, the possibility of a sounding or an extensive scraping will be examined *in situ*.

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## THE LARGE ARCHITECTURAL UNIT, SOUTH-WEST OF IGN 132

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### Introduction

This architectural unit is located to the north-east of the settlement area of ancient Hegra, which lies almost exactly in the centre of the site and is surrounded on all sides by sandstone outcrops (see Introduction, fig. 1). The settlement area is about 1 x 1 km. It is surrounded by a rampart which has five gates, two of which remain uncertain. The excavations took place near a small outcrop, known as IGN 132. At this point, the ground slopes from east to west, with the effect that when it rains, water flows rapidly and affects the walls, hence the need for some protection.

### Previous work undertaken in this area

Despite the fact that the site of ancient Hegra has been known since the English traveller Charles Doughty visited it in 1886, the archaeological excavations did not start there before 1986, when the Saudi Arabian Department of Antiquities launched an excavation programme (al-Talhi *et al.* 1988).

The most important discovery of these 1986 excavations was a residential unit which laid almost in the centre of the settlement area (Area 7). This unit has a 2.22 m wide entrance in its northern wall and it includes seven rooms. The latter vary in size from 3 x 3 m to 7 x 11 m. The walls are built of sandstone and mud mortar. Stones were semi-dressed and assembled with mud mortar and small stones to fill the gaps. Mudbricks were also used. The unit was interpreted as a domestic area since 38% of the finds were cooking pots. Parts of a glass bottle, probably for keeping perfume, and various kinds of beads, were found. An ivory hair pin and a spindle whorl were also discovered. The house was dated to the interval between the last quarter of the 1st century BC and the first quarter of the second century AD on the basis of the coins: ten coins were dated to the reign of Aretas IV (9 BC–AD 40) and two coins to that of Rabbel II (AD 70–106) (al-Talhi *et al.* 1988).

In 2003, the excavations shifted to another location, which is also where the 2016 excavations took place, i.e. at the foot of a small sandstone outcrop on the western side of which is dug a rock-cut chamber, IGN 132. To the west of the outcrop, there is a large tell showing on the surface stone wall foundations, column drums, stone basins and a lot of pottery. The first excavations undertaken there in 2003 were encouraging, and the most important discovery was the now well-known AD 175–177 Latin inscription which mentions some restoration work undertaken by a man called 'Amr son of Hayyân, the leader of ancient Hegra (al-Talhi *et al.* 2010).

The Saudi-French project started its excavation programme in 2008 (Nehmé *et al.* 2010) in various locations of ancient Hegra: the settlement area, Jabal Ithlib, the Nabataean monumental tombs and the *tumuli* area west of the site. In 2011, the area around and on top of IGN 132 witnessed archaeological excavations which revealed a religious monumental complex as well as hydraulic installations, the latter located at the foot and on the eastern side of IGN 132. The discoveries include a tetrapylon with a paved platform (4.5 x 4.5 m), built on top of IGN 132 and dated to the end of the 1st century BC / beginning of the 1st century AD (Nehmé 2011 : 102–113). The excavations also revealed the existence, west of IGN 132, of a large architectural unit.

### The aims of the 2016 season

The aims of this year's excavations were the following:

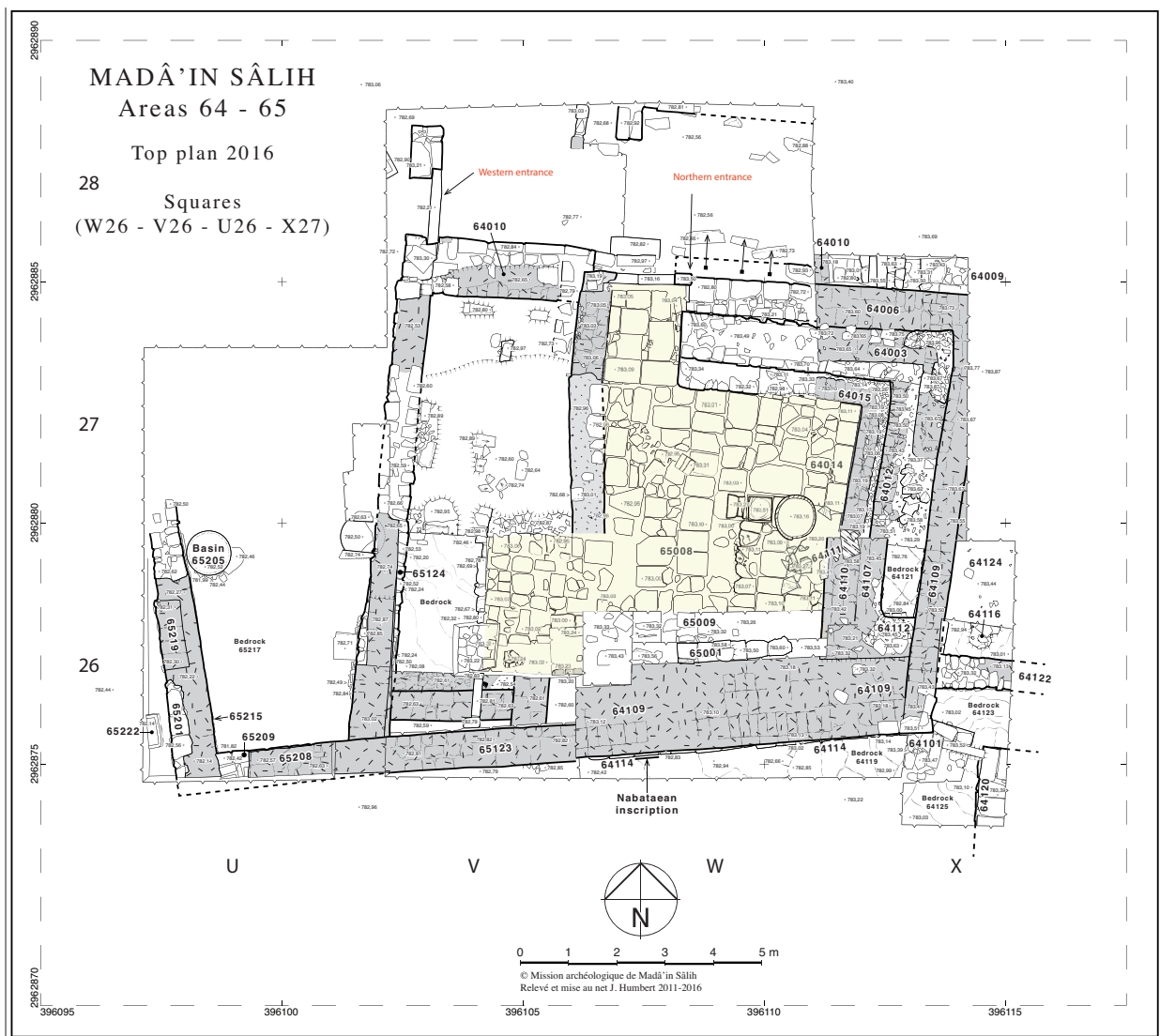
– uncover the architectural unit revealed during the 2003 excavations. This meant excavating on its western side and removing some of the baulks which had been left between the squares excavated during the previous seasons;



- determine the function and the date of this unit;
- start the restoration work in selected areas of this large complex.

### The excavations

Major parts of this unit were excavated already in 2003, during which season various walls were discovered as well as a paved floor showing sandstone slabs nicely put together (**fig. 1**). Large quantities of potsherds were found, as well as a complete small lamp with traces of burning, some beads, fragments of glass, and finally a golden bar which may have been used as a hair pin (al-Talhi 2010 *et al.*: 29).



**Fig. 1.** General plan of the architectural unit after the 2016 excavations (J. Humbert).

It was decided, in 2016, to remove the balks between the trenches. Their removal, which was a relatively long process because it was also used as a training for the younger archaeologists working at the site, revealed a unit which is rectangular in shape (11 x 10 m) (**fig. 1–2**). This unit can be reached from the north, from a 2 m wide street heading east-west, through an entrance door (“northern entrance” on fig. 1). The door is 3.3 m wide and it opens almost exactly in the middle of the northern wall of the unit. The surface ultimately uncovered by the excavations includes a large hall, which occupies most the surface (in yellow on fig. 1), as well as parts of the rooms/units which surround it. The floor of the hall is covered



**Fig. 2.** Top view of the southern part of the unit, with the paved courtyard in the centre.

with sandstone slabs and it is surrounded by stone and mudbrick walls. The slabs were cut of white fragile sandstone and their size varies from 0.3 to 0.8 m. It should be noted that there are no tiles on the western part of the hall, where the floor was probably broken.

Wall 64010, in the north, has two parts: the first part, which is east of the northern entrance, and the second part, which is west of the entrance. On the eastern side of the door, the stone wall is coupled with a mudbrick wall, 0.80 m wide, which bears *locus* number 64006. The stone-built side is made of two rows of undressed sandstones (ca. 0.70 m wide), the space between the two rows being filled with smaller sandstones and mud mortar. As for the section of the wall west of the entrance, only one course of it is preserved and it was built with semi-dressed sandstones.

The southern wall, 65001+65009, consists of two rows of undressed sandstones and the space between them was filled with smaller stones and mud mortar.

The western wall, 65124, has a stone foundation the stones of which vary in size from small to medium. This wall is about 10 m long. Along its western side, on the outside, an oven was located at a depth of 782.51 m asl, with large amounts of ash



**Fig. 3.** Western baulk, thick layer of ash.



near it. This area also yielded a lot of animal bones, including fish bones, and about 30 date seeds. On this side of the wall, there are large amounts of ash and traces of burning (**fig. 3**). It is possible that the structures visible outside the unit, i.e. to the west of wall 65124, belonged to a different complex and may have served different purposes (domestic for instance).

The eastern wall, 64015, is built with two rows of undressed sandstone blocks, between which the space was filled with smaller stones and mud mortar.

A small trench revealed that the building work started from the original bedrock, which is yellowish. In order to level the ground and obtain a flat surface suitable for fixing the slabs, the builders used stones mixed with mud mortar. A squarish column base (0.4 m) lies above the tiled floor.

## Phases

Two building phases were identified in the area. The first (oldest) is represented by the tiled courtyard, the northern wall, the western wall and the entrance. According to the finds, especially the pottery, this phase may be dated to the first century AD (cf. 65104\_P13 and 65104\_P09).

The second (newest) phase is presented by mudbrick walls to the west and the south and may be dated to the 4th century AD according to the pottery sherds which were found in the relevant *loci*, 65103 and 64008. Some of the buildings techniques which have been used in this architectural unit are similar to the ones which have been used in the shrine built on top of IGN 132 and in the area excavated to the east of the architectural unit in 2014 and 2015 by Laurent Tholbecq (Area 63). It is therefore suggested that the unit formed by the large courtyard and the surrounding rooms may have had a religious function, possibly linked to the service of the nearby sanctuary installations.

## Restoration

The restoration work was undertaken in two places: first in the area of the western entrance to the complex and second in the area of the northern wall of the unit. The work was carried out by Ibrahim al-Sabhan, who is responsible for the restoration work at Madâ'in Sâlih. The western entrance had suffered some damage: some stones had fallen while others had been affected by weather and were badly worn. The damaged stones were removed and replaced by new ones, similar in shape and size. The mud mortar used in the restoration was made on site according to a traditional recipe.

The northern wall of the unit was also restored: some stones were replaced and the gaps in the mortar were refilled.

Finally, an attempt was made this year to protect the stone slabs of the courtyard, which are badly affected by water and heat and have already started to break apart. Two small tests were made: first an area about 1 square meter was covered by pure sand, the problem with this solution being that sand is a light material and can be blown away by the wind. Another 1 square meter area was covered with debris from the excavation, which are heavier than the sand. These two areas will be checked next year and one will see which solution is the best.

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## AREA 64100, SOUTH-EAST CORNER OF THE ARCHITECTURAL UNIT (SEE THE PRECEDING REPORT)

Maher al-Musa (SCTH, Riyadh)

### Introduction

Area 64100 is located south-east of the 2003 excavation – or south-west of IGN 132 – to the west of area 63000, and directly adjoins area 65000, which was excavated in 2014 (fig. 1). Excavation of area 64100, during the 2016 season, is therefore the continuation of work undertaken at the foot of IGN 132. Furthermore, the results add to those obtained in this area in 2003.

The reasons for choosing this area this year are as follows: 1/ to continue to expose the rest of the architectural remains exposed in areas 65000 and 64000, west and north of 64100 respectively; 2/ to try to obtain a better overall view of the whole area; 3/ to refine the area’s chronology and link it with that of the adjacent areas.

### Excavation in area 64100

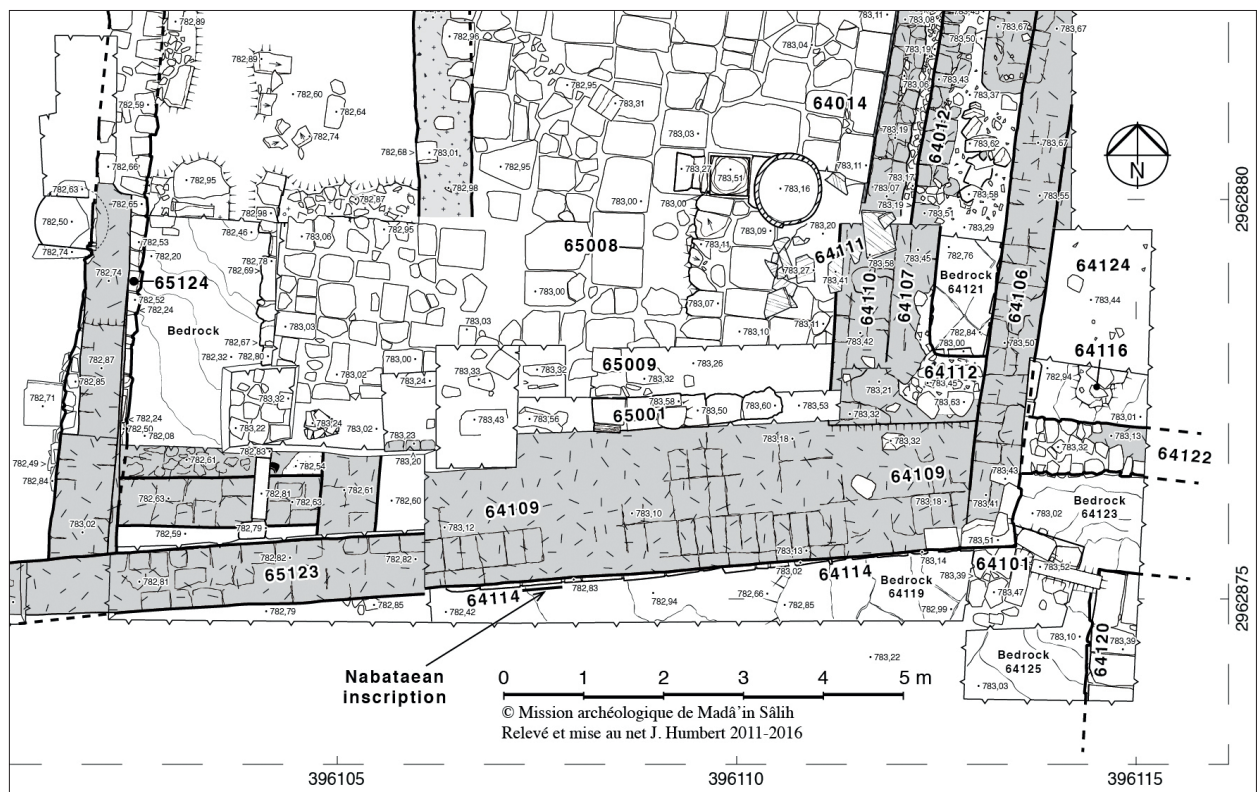


Fig. 1. General plan of the area at the end of the 2016 season.

Initially, area 64100 took the form of a sounding measuring 3 x 5 m, limited by area 65000 in the west and area 64000 in the north. This first sounding was then extended east along a 1 x 5 m strip and south along a 1 x 2.15 m strip. The final dimensions of the trench are thus 4 x 6 m. The decision to open these extensions was made in order to expose the built elements 64101, 64122, and 64120. Finally, the excavation was slightly extended to the south of area 65000, in order to expose elements 64109, 64113, 64114, and 64119, and to try and link them together (fig. 2). During the season, 28 *loci* were recorded, 15 of which are built elements, while the others are occupation and backfill levels. The whole area comprises two construction and occupation phases corresponding to those exposed in 2003 and during the most recent seasons (2011, 2014, and 2015).





Fig. 2. General view of area 64100, from the south-east.

## Construction phases in area 64100

### 1. First phase

The oldest built elements in this area were founded directly on the bedrock and numbered according to their location and the order in which the different surfaces of bedrock were exposed during excavation (fig. 3–4) : *loci* 64119, 64121, 64123, and 64125. The bedrock dips down from east to west and from north to south, the highest point being at 782.98 m asl (*locus* 64101) and the lowest at 782.33 m (*locus* 64119).

This phase is represented by the following built elements:

- wall 64114: oriented east–west, it is characterized by a single sandstone course, set on the bedrock, and numbered 64119 at this location (see fig. 1–2). It is thus located under mudbrick floor 64109, which was laid over it. It is visible over a length of 6.85 m and dips from east (783.02 m) to west (782.33 m) (fig. 5). Two blocks bearing Nabataean inscriptions were discovered in wall 64114. One contains several lines from one or more

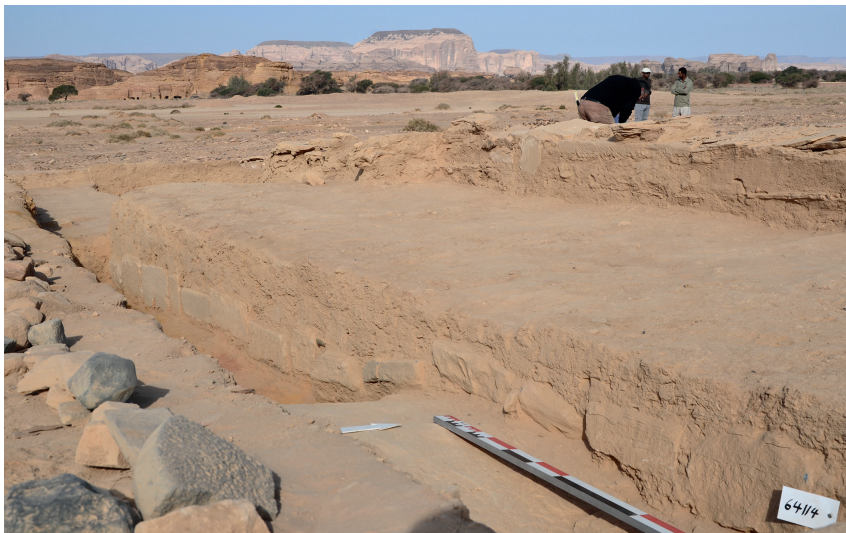


Fig. 3. The bedrock at the site, exposed under locus 64115.  
This section is numbered 64121 on figure 1.





**Fig. 4.** *The bedrock at the site, exposed under locus 64118.  
This section is numbered 64125 on figure 1.*



**Fig. 5.** *Wall 6411 under mudbrick floor 64109.*



**Fig. 6.** *Nabataean inscription on a stone in wall 64114.*





**Fig. 7.** Nabataean letters on a stone in wall 64114.

inscriptions and only a detailed examination of the stone will enable an accurate reading (fig. 6); the other only contains a single word (fig. 7);

– 64120: a few squared sandstone blocks, laid on two courses, were exposed at the south-east end of the sounding (fig. 8). The cleared section of their surface (alt. 782.96 to 783.3 m) measures 0.55 x 1.66 m. The two courses are laid directly on the bedrock, which was numbered 64125 at this location. A continuation of the excavation will, it is hoped, determine the function of these two courses;

– 64126 and 64127: two lines of sandstone blocks were discovered under mudbrick floor 64106. The first, 64126, 1.38 m long, is visible under the west face of wall 64106 (fig. 9), and it comprises five blocks at an altitude between 782.78 and 782.94 m. The second, 64127, is 2.08 m long and is visible under the east face of the same wall.



**Fig. 8.** Structure 64120.



**Fig. 9.** West face of wall 64106, consisting of four courses of mudbricks.



## 2. Second phase

The second phase is represented by the following elements:

– 64101: a built element located immediately south of wall 64106 and west of 64120. It is almost square in shape and probably represents the entrance to an architectural unit (**fig. 10**);



**Fig. 10.** Feature 64101, south of wall 64101.



**Fig. 11.** Wall 64106 from the south-west.

– 64106: a long north–south wall that forms the eastern limit of the excavated area. The section cleared in 2016 is 3.75 m long and 0.65 m thick. It lies at an altitude between 782.94 and 783.55 m. The east face comprises five courses laid over stone course 64126, and the west face was laid over stone course 64127. It is possible that this wall had a stone superstructure, as a few blocks have survived *in situ* at its southern end (**fig. 11**);

– 64107 and 64110: two mudbrick walls located in the

north-east of the area. They are separated by a thin layer of plaster coating, which probably covered the west face of wall 64107 before wall 64110 was built against it. Wall 64107 (1.85 m long and 0.50 m thick) is regarded as the continuation of wall 64012, which was cleared in 2015. Wall 64110 (1.80 m long and 0.67 m thick) is also the continuation of a wall exposed in 2015. The east face of wall 64107 is not clear: even in section, only a thick layer of backfill comprising stones mixed with a clayey soil and with mudbrick is visible. On the other hand, its north face, cleared in 2015, as well as the west face of wall 64110, are well-defined and comprise four courses of mudbrick laid over the stone paving 65008, which is thus earlier than the construction of these walls;

– 64109 and 64113: these two *loci* form a mudbrick floor (see **fig. 1**), 64113 being only an extension of this floor (integrating 64103) (**fig. 12**). Its continuation in the squares excavated in 2014 is 65208 (see preceding report, **fig. 1**). Floor 64113 was removed in order to clear stone course 64114 and expose bedrock 65119;

– 64112: an extension of wall 65001 excavated in 2014. It was exposed underneath the layer of





**Fig. 12.** Mudbrick floor 64109 viewed from the west.

stone blocks 64004 which completely covered it. It is 1.70 m long and 0.70 m thick;

– 64122: a small stone wall, exposed between wall 64106 and the eastern baulk, under layer 64116. The section which was cleared is 1.60 m long and 0.70 m thick;

– 64124: a mudbrick floor?

### The finds

*Loci* 64100, 64102, 64103, 64104, 64105, 64108, and 64118, as well as mudbrick floor 64109/64113, contained a lot of pottery. Provisional dates for the pottery have been provided by the project's ceramologists, C. Durand and Y. Gerber, and are as follows:

– 64100: probably Nabataean period; possibly, but not necessarily, extending into the second century;

– 64102: the pottery here is homogeneous. It is dated to the Nabataean period, first century AD and includes a jar rim 64102\_P01, a cup 64102\_P03, and a fine painted body sherd decorated with '2 red lines' 64102\_P04;

– 64103: homogeneous Nabataean pottery, probably not later than the first century AD, supported by bowl 64103\_P01, typical of local Nabataean pottery, as well as a jar rim 64103\_P02 and a bowl rim 64103\_P03;

– 64104: homogeneous pottery, mostly Nabataean, possibly as late as the second half of the first century AD;

– 64105: a few sherds might still be Nabataean (first century AD; residual?), but the majority seems to be of second-century date (especially jar rim 64105\_P01). An extension into the third century does not seem likely;

– 64108: a few sherds might still be Nabataean (first century AD) and are possibly residual (e.g. cooking pot rim 64108\_P02). The majority of the sherds, however, appear to belong to the second century AD, including the fabric of 150 body sherds as well as jar rim 64108\_P01 and bowl rim 64108\_P03. An extension into the third century does not seem likely but one or two sherds might be of later date (Byzantine?);

– 64109: the material mainly comprises body sherds and only two rims, one from a cooking pot (64109\_P01) and one from a jar (64109\_P02). It is therefore difficult to assign a date: possibly the second half of the first century AD and into the second century;

– 64113: the material is difficult to date, as it is not very diagnostic (body sherd and two rims). Probably Nabataean (first century AD) with a few sherds showing a late Hellenistic fabric (residual?);





Fig. 13. Pierced pottery sherd.



Fig. 14. Complete Nabataean bowl in situ, locus 64113.



Fig. 15. Camel bone, locus 64113.

- 64114: body sherds only, to which no precise date can be given. Perhaps Nabataean period;
- 64118 and 64121: a mixture of finds, the majority of which could be dated to the Nabataean period and the second century AD; one or two sherds could be dated to the third/fourth century.

Among specific pottery sherds, a green sherd with round holes should be singled out, discovered in *locus* 64118 (fig. 13). Additionally, a complete Nabataean fine ware bowl was discovered in *locus* 64113 (fig. 14). Two bronze coins were discovered in *locus* 64113. Metal objects include a heart-shaped pendant and a bronze finger ring (64102). Fragments of sandstone ware, glass, a shell, bones (fig. 15), and charcoal were also found.

## Conclusion

The built elements in the area excavated in 2016 belong to two phases, identified by construction techniques and the materials used. During the first phase, quite well carved and well-aligned white sandstone blocks were used. During the second phase, the construction materials consist of a mixture of sandstone and mudbricks, the latter occasionally laid over stone. They were also used side by side. The walls and other





**Fig. 16.** General view of the southern part of the architectural unit from the top of IGN 132.

built elements into which they are integrated form a dense and very imbricated fabric that is difficult to describe and interpret (**fig. 16**).

The structure was clearly built directly on the bedrock, which has an uneven surface and slopes down in two directions (to the west and to the north). The area that was cleared this year enables us to follow the continuation of the structures cleared in the previous years. Thus 64106, 64107, and 64110 are the continuation of 64006, 64012, and 64015. In addition, 64109, 64113, and 64114 are linked to similar *loci* in neighbouring areas. For the next season, we hope for the most part to continue clearing the built elements 64101, 64120, 64122, and 64124, both to the south and to the east.

## IN THE LABORATORY

### POTTERY STUDY

Caroline Durand (Ifpo Amman) and Yvonne Gerber (University of Basel)

In 2016, the pottery reading was undertaken by Caroline Durand, from 28<sup>th</sup> of January to 20<sup>th</sup> of February, and by Yvonne Gerber from 17<sup>th</sup> of February to 6<sup>th</sup> of March. Some pottery, unread from the 2014 and 2015 seasons, had to be studied and registered as first priority during this campaign: areas 35000, 60777, 64000 and 65100. Another focus of this year's season was the study of the pottery material which came from the fortified camp (Roman fort), Area 34, which yielded very homogeneous assemblages from the 2<sup>nd</sup>–4<sup>th</sup> centuries AD.

#### Area 35 (Tower 13, excavated in 2015, fig. 1)

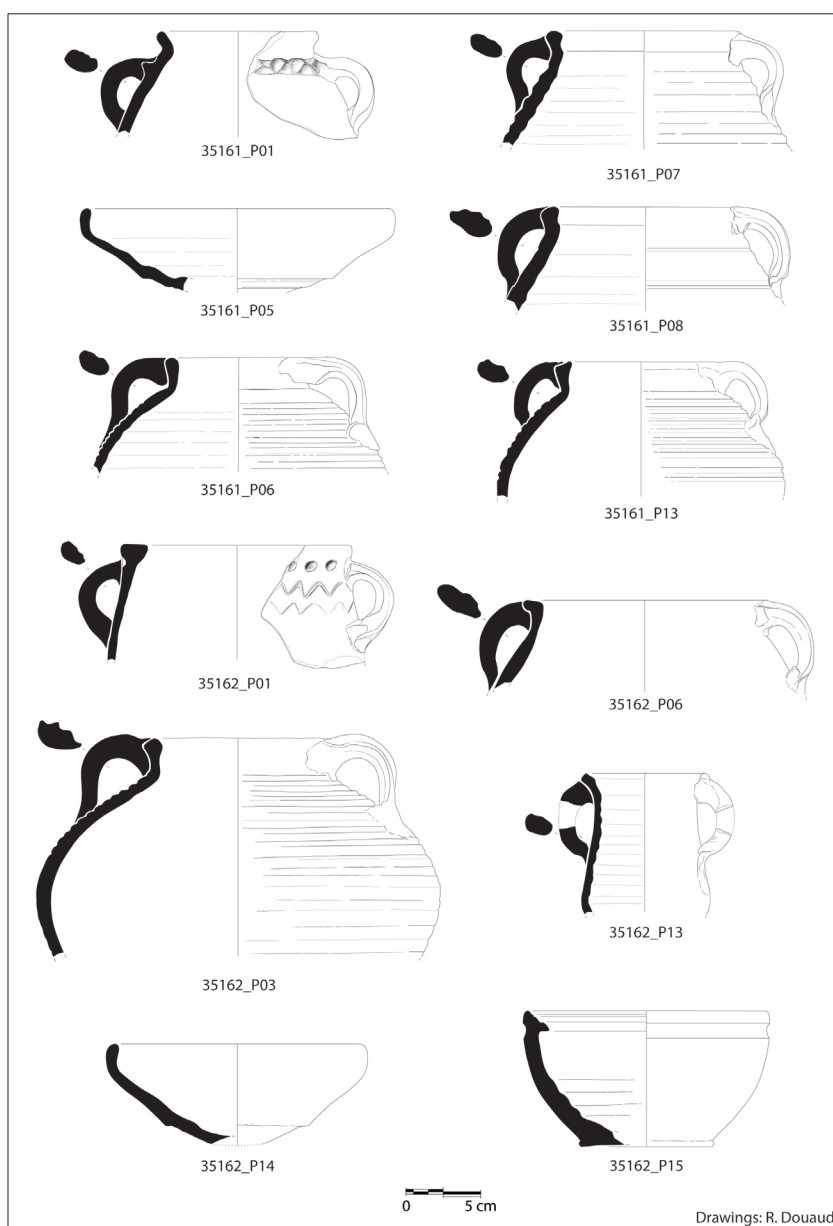


Fig. 1. Area 35: loci 35161–35162 (2<sup>nd</sup>–3<sup>rd</sup> century AD).



For Area 35, the focus was put on loci 35161 and 35162, which correspond to the occupation levels at the bottom of Tower 13. The assemblage consists mainly of local common ware, in particular numerous cooking pots (35161\_P06 to P08 and 35161\_P13; 35162\_P03 and P06), large piriform jars (35161\_P01) and some large thick-walled bowls (35161\_P05; 35162\_P14). These bowls show traces of fire on their exterior, suggesting that they have also served as cooking vessels (casseroles). The whole pottery assemblage can be dated to the Late Roman period, between the second half of the 2nd and the 3rd century AD.

### Area 65 (excavated in 2014, fig. 2)

In the Area 65, one *locus* is remarkably homogeneous: *locus* 65104. It can be dated to the 1<sup>st</sup> century AD. It contains local jars with pinched rim (65104\_P01 and P02), unpainted, thin-walled bowls (65104\_P04), and local painted Nabataean bowls ('2 red-lines' type, e.g., 65104\_P10) as well as various imports: Eastern Sigillata A (65104\_P11 and P12), Rhodian amphora, Parthian glazed ware and Petraean Nabataean fine ware, painted (phase Schmid 3a) and unpainted bowls (65104\_P06) as well as fine ware juglets (65104\_P08).

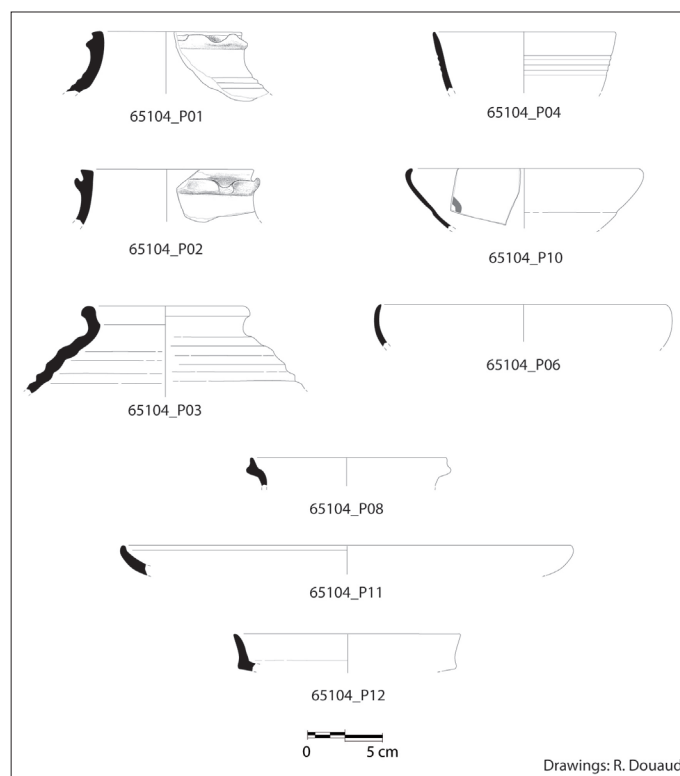
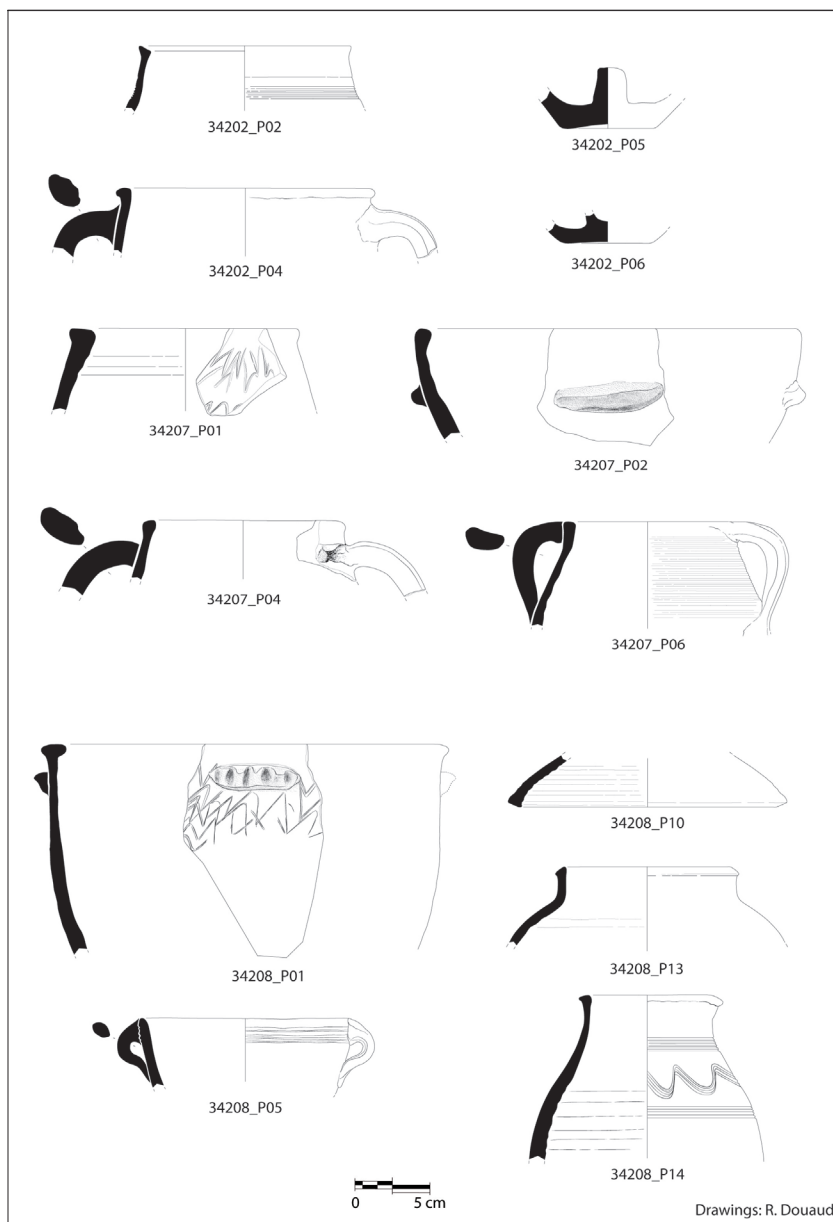


Fig. 2. Area 65: locus 65104 (1<sup>st</sup> century AD).

### Area 34 (Roman fort, excavated in 2016, fig. 3)

In 2016, the excavations continued in the area of the Roman fort, in particular in the western part. The surface collection yielded huge amounts of pottery from various periods. All these surface *loci* contain a few (Late) Hellenistic, Nabataean (1<sup>st</sup> century AD) and 4<sup>th</sup> century AD elements, but the majority of the pottery dates from the Late Roman period (2<sup>nd</sup>–3<sup>rd</sup> century AD), containing, among others, some African Red Slip ware and Kapitän II-amphorae fragments.

The upper layers (*loci* 34202 and 34207) belong to the last occupation phase of the fort, which most probably dates to the 4<sup>th</sup> (or early 5<sup>th</sup>) century AD. They comprise mainly local common ware: *pithoi* with crude incised decoration (34207\_P01), jars with long inverted neck and slightly thickened, rounded rim, with a clay strip with finger-impressions on the exterior of the neck (34207\_P04), large basins with



**Fig. 3.** Area 34: loci 34202–34207 (4<sup>th</sup> century AD); locus 34208 (second half of the 3<sup>rd</sup> century AD).

horizontal decoration handle (34207\_P02), cooking pots with either long inverted neck and short everted rim (34202\_P02) and associated lid of fabric no. 37 (34208\_P10) or cooking pots with long inverted neck, slightly thickened rim and external narrow ribbing of the body (34207\_P06). *Locus* 34208 also contained *pithoi* with crude incised decoration (34208\_P01), cooking pots either with slightly inverted neck and bevelled rim (34208\_P13) – form and fabric typical for Late Roman period –, or with long inverted neck and slightly enlarged rim, the body decorated with incised horizontal and wavy lines (34208\_P14). This *locus* may be slightly earlier than the *loci* discussed above: the closing date of that *locus* may be the second half of the 3<sup>rd</sup> century AD.

On the exterior of the wall, *locus* 34217 seems to be a dump: it contains a lot of pots and local jars which are not represented in the interior of the rooms. It can probably be dated before the last phase of the fort, but clearly after the Nabataean period. The rim forms are typical for the 3<sup>rd</sup> century AD.



### Area 35 (excavated in 2016)

A small sounding in front of Tower 13 was performed in order to clarify the building history of this part of the city wall and gate. The *loci* of that sounding yielded in only a small number of very small body sherds, mainly Petraean Nabataean unpainted fine ware. Based only on the fabric of the unpainted fine ware, it is almost impossible to differ between earlier Nabataean (that is to say mid-1<sup>st</sup> century BC – early 1<sup>st</sup> century AD) and later Nabataean (mid-1<sup>st</sup> – second half of 1<sup>st</sup> century AD); nevertheless in some cases, an ‘earlier’ or ‘later’ Nabataean indication was given to the excavator. It still has to be checked with the detailed stratigraphy of that part, but the earliest date provided by the small sounding seems to be first half – mid-1<sup>st</sup> century BC.

**Note:** the pottery from the area excavated by D. Gazagne and L. Nehmé is not presented here, but a preliminary reading of the pottery was done in the project’s database. The conclusions given in the excavators’ report is based on them.

We would also like to draw the attention of the reader to the fact that the focus is now put on the ‘final’ publication of the Madâ'in Sâlih pottery, hence the short character of this yearly report.

## THE OWLS OF HEGRA, A HELLENISTIC-PERIOD COINAGE FROM HIJÂZ. PRELIMINARY REPORT

Thomas Bauzou (Université d'Orléans – IRAMAT)

*This preliminary report, on coinage that is so far very little known and is found in considerable quantities on the site of Madâ'in Sâlih, is largely based on the work of Christian Augé, who died recently. During his visits to the site, he had undertaken the identification of most of the coins, collected and left on site a great deal of data and, most importantly, sketched out a typological classification of the owl coins, for which there is no existing work of reference. Illness having prevented him from continuing his work, it is on the basis of his detailed notes that I am trying to complete the task he had undertaken.*

A third of the coins collected to date at Madâ'in Sâlih comprise bronze coins, of different weights and standards, deriving from the Athenian fifth-century BC type. This preliminary report concentrates on this particular category.

### 1. The coins of Madâ'in Sâlih: overall view

The coins found both on the surface and in the stratigraphy of the site of Madâ'in Sâlih can be divided into three main categories: Nabataean, Roman, and stylized owls. To these three categories can be added a small number of various Hellenistic coins. For now, the significant proportion of coins that are illegible due to corrosion and/or wear will be ignored. By bringing together the coins collected so far by the Saudi-French project and the 35 coins from earlier Saudi excavations,<sup>1</sup> and taking into account only the identifiable coins,<sup>2</sup> the following proportions can be observed:

Category	Number of coins	Percentage
Nabataean	329	45.4%
Owls	242	33.4%
Roman	110	15.2%
Hellenistic	43	5.9%

The Nabataean coins constitute the most important category with the highest number of coins: 45.4% or nearly half of the pieces identified. Only two date before 9 BC; almost all the coins are of Aretas IV or, in smaller quantities, of his successors. The Nabataean coins collected at Madâ'in Sâlih thus cover a span of 115 years from 9 BC to AD 106.

The Roman coins vary widely: silver or alloy denarii, Trajan drachms minted in Arabia, tetradrachms from Antioch, bronze coins minted in Rome, provincial and city coins, late third-century antoniniani, and coinage from the Tetrarchic and Constantinian dynasties. They are much fewer in number than Nabataean coins and only represent 15.2% of the collection, although they cover a longer period, from the first to the

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1 - al-Talhi 2000: 90–96, pl. 285–296.

2 - A large number of coins are so worn and corroded that even after cleaning, they are still illegible. The numbers given here are simplified and represent both certain and probable identifications. For example, the 329 Nabataean coins correspond to 282 certain identifications plus 47 uncertain ones; the 242 owls correspond to 168 certain and 74 uncertain identifications.



fourth century AD. From the end of Nabataean coinage ca. AD 106 up to the most recent found on the site and datable to 348–361, Roman coins are spread over a period of about 250 years.<sup>3</sup>

The near 3% of Hellenistic coins are also very varied. This category includes silver Alexandrian tetradrachms, bronze coins of all Ptolemaic and Seleucid standards and from coastal cities in the Levant, as well as small Jewish Hasmonean coins. There are probably more than the 43 so far identified, as many of the illegible coins must belong to this Hellenistic category, although this cannot be confirmed. A few examples come from north-east Arabia but no South Arabian coin has been identified at Madâ'in Sâlih.

The stylized owls represent a third of the attributed coins and come in various standards and flan types. The question of their chronology has not yet been resolved, although it is clear that on the whole they are older than the Nabataean Aretas IV coinage. The first coins date as far back as the third or even the fourth century BC, but the most recent ones appear to have been circulated in the city at the same time as the Nabataean coinage, which makes the date of the last minting problematic: many of these owls come from stratigraphic units containing Nabataean coins, and in some cases Roman ones too.

## 2. North Arabian stylized owls

### A. Type

These coins are either in low-standard silver, or much more often, in bronze, of various standards and weights, varying in weight between over 17 g to under 1 g. They are invariably of the same type, derived from Athenian tetradrachms of the fifth century BC.

The original coin type of Athenian owls is well known:

*Obverse:* head of Athena facing right with frontal eye, wearing an earring and necklace, the crown of her Athenian helmet decorated with a palmette with three olive leaves on the visor.

*Reverse:* incuse square inside which is an owl standing right, head facing; olive sprig of two leaves with one olive in the upper left corner, crescent moon above the owl's back, on the right the legend AΘE parallel to the right side of the square.

In the fourth century BC, these coins were always minted in Athens with a slight evolution of the type: the goddess's eye, in particular, was represented in profile. During the same period, many silver imitations were minted in several regions – Egypt, Levantine coast, Asia Minor, Syria and/or Mesopotamia, Bactria, and the Arabian Peninsula – until the first century BC. These imitations are more or less similar to the original model, and those that were minted in Egypt in the fourth century BC are very difficult to distinguish from the Athenian owls. Those attributed to north-west Arabia, and which are found in large numbers at Madâ'in Sâlih, are distinguished by the metal, style, and several details related to the monetary type. Most are in bronze, and the style of the engraving on the die evolved towards a geometric simplification and even abstraction. On the obverse there is a crescent or double crescent on Athena's cheek and, on the reverse, on most of the examples, the A of the Greek legend AΘE has disappeared.

The most significant detail, which can be observed on all the examples of north-west Arabian imitations, and which alone characterizes them, is the orientation, on the reverse, of the owl and the olive sprig in relation to the frame of the incuse square. Indeed, the owl's body does not follow the diagonal of the square as on the Athenian coins and all other imitations, but is parallel to the vertical sides of the square; similarly, the olive sprig is not in the upper left corner but in the centre of the left side: both the owl and the olive sprig have thus been rotated 45° to the left in relation to the frame of the incuse square, while the Greek legend AΘE, or just ΘE, always follows a line parallel to the side of the square. This 45° shift is only seen in north-west Arabian imitations, from the oldest – still close to the Athenian model – to those that are no doubt more recent and more removed from the Greek style.

3 - A few Roman coins found at Madâ'in Sâlih date from before AD 106. These are first-century bronze coins, very worn, some almost completely smooth, often countermarked, which circulated in Arabia during the early provincial era.

### **B. The stylized owls of Madâ'in Sâlih: present status**

This coinage, inspired by fifth-century BC Athenian tetradrachms, is still not well known. There are only a few examples in public collections and, in studies of Arabic coinage in antiquity, it is only mentioned briefly. The British Museum catalogue attributes it to third- and second-century BC 'Northern Arabian Felix'. More recently Martin Huth has revealed a stylistic evolution of this coinage from its origins up to the first century BC and has proposed a Lihyanite identification.<sup>4</sup> Based on five examples from public and private collections, he begins the description of this coinage with the presence of a 'conspicuous curve', clearly visible on Athena's cheek, which he interprets as the Dadanitic letter *r*. He sketches a relative chronology of these coin issues, emphasizing the evolution of the style ('coins of increasingly Picasso-like style'), which also corresponds to a decrease in the silver content. Indeed, the closest examples to the Athenian model appear to be of good-standard silver, while the most stylized and furthest from the Greek style, are of copper alloy. He proposes to date the beginnings of the coinage in the third century BC, and the most recent ones to the first century BC.

It is the discovery at Madâ'in Sâlih of hundreds of examples of this coinage, very rare elsewhere, which is likely to make things progress. In 1876 or 1877, Charles Doughty, while visiting the site, was the first to examine coins found on the ground, and noted that they were bronze coins imitating the famous Athenian owls.<sup>5</sup> He did not mention Nabataean or Roman coins and he showed three of these bronze owls in an illustration, without giving either the weight or the standard. The scholars who succeeded him on the site, notably Antonin Jaussen and Raphaël Savignac at the beginning of the twentieth century, did not appear to be interested in the numismatic material lying on the surface, and it was not before Dhaifallah al-Talhi's 1986–1990 excavations that we find the mention in his thesis, submitted in 2000, of 35 coins found in archaeological layers, including 9 owls.<sup>6</sup> Today, after several seasons of surveys and excavations, these bronze owls of different standards, weighing between about 2 and 16 g, form one third of the identified numismatic material, both from the surface and the excavations.

Thus, like Martin Huth, Christian Augé suggested it is a Dadanite or Lihyanite coinage stretching from the end of the third to the end of the first century BC,<sup>7</sup> and he drew attention to its great importance within the numismatic material collected at Madâ'in Sâlih. Finally, in view of the abundance of this coinage on the site of Madâ'in Sâlih, Jérôme Rohmer and Guillaume Charlux proposed that it was issued at Hegra itself.<sup>8</sup> In considering all the known examples of this coinage, whether published or just mentioned in the literature, or even in oral communication, a table of their provenance can now be drawn up:

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4 - Huth 2010b: 234 and fig. 5.

5 - "We took up also certain small copper pieces called by the Beduins *himmarî* (*perhaps Himyariât*) of rusted ancient money. Silver pieces and gold are only seldom found by the Arab in the ground where the camels have wallowed. A villager of el-Ally thirty years before found in a stone pot, nearly a bushel of old silver coinage. Also two W. Aly tribesmen, one of whom I knew, had found another such treasure in late years. Of the *himmarî*, some not fully corroded show a stamped Athenian owl, grossly imitated from the Greek moneys; they are Himyaric." (Doughty 1921: 112–113).

6 - al-Talhi 2000: 90–96, 285–296.

7 - Augé 2010: 277.

8 - Rohmer and Charlux 2015.



Madâ'in Sâlih (Hegra)	242
Maghâyir Shu'ayb	31
Khuraybah (Dadan)	7
Petra	3
Dûmat al-Jandal	1
Babylonia	1
Unknown provenance	38

One must not to attribute too much relevance to this table. The sites of Petra and of Madâ'in Sâlih have been much more intensively archaeologically explored than Dûmat al-Jandal and Maghâyir Shu'ayb. The number given for Madâ'in Sâlih is also a high estimate: the coins are often in very bad condition, and of the 242 owls, only 168 have been securely identified. This is nevertheless a considerable number, and the concentration of these owls at Madâ'in Sâlih, while they are relatively rare in other sites in the region, makes these coins characteristic of Hegra, where they were mostly circulated. It is also probably where they were produced, at least the oldest ones. They can therefore be called 'the owls of Hegra'.

### *C. Classification of this coinage*

The significant number of examples collected at Madâ'in Sâlih shows die links, although these coins were up until now considered extremely rare, and this allows us to propose an initial classification. The suggestions that follow take into account most of the known examples, some since the nineteenth century. Those from public collections (Cabinet des Médailles, British Museum, American Numismatic Society), as well as on public sale, good photographs of which are available on Internet websites such as CoinArchives, Acsearch.info or Vcoins, almost never have a known provenance, but they are worthy of selection because of their excellent condition; they are therefore part of a reference collection for a study of the types. To these are added here the most legible examples which come from surface collections and excavations at Madâ'in Sâlih, including those conducted from 1986 to 1990 by Dhaifallah al-Talhi, which are currently kept in Riyadh, but good photographs of which are reproduced in his thesis.

The coins collected by the Saudi-French project since 2008 are kept at the Museum of al-'Ulâ. It is very rare to find on the Madâ'in Sâlih site a bronze coin that is instantly legible: they are generally covered in a thick layer of oxidation, sometimes concretions, and must be cleaned and restored before deciphering. During the first seasons this essential work was undertaken by François Bernel, mostly by electrolysis, and since 2014 by Marie Peillet, most often using mechanical and chemical processes. This work takes a long time and the coins found during the last seasons, in 2015 and 2016, have not all been cleaned.

Finally, in an appendix to this contribution, the reader will find a short report concerning an unknown collection of (surface?) coins collected in 1878 by the British traveller Richard Burton on the site of Maghâyir Shu'ayb. This collection has never been properly catalogued and the few coins that were published in 1878 by Barclay Head, then in 1922 by George Hill in the British Museum Catalogue, have an ambiguous provenance. It is, however, essential for the study of coins from Madâ'in Sâlih as it forms a remarkable parallel: the same categories of coins (Hellenistic, Nabataean, and Roman owls up to the reign of Constantine II) have been observed; more importantly, Maghâyir Shu'ayb is the only known site outside Madâ'in Sâlih to have yielded a significant number – at least 31 – of these stylized owls.

## **3. Evolution of the owls of Hegra**

### *A. First examples of the reverse type*

The reverse type particular to the owls of Hegra appears on fifth- to fourth-century BC Arabo-Philistian coinage. It can be seen on the drachm and the tetradrachm, unique pieces of which the precise provenance is unknown. The Gitler-Tal drachm XIV.18Da (no. 1 below) has on the obverse a bearded janiform head; on the reverse, the body of the owl is roughly parallel to the vertical sides of the incuse square, the olive

sprig is in the centre of the left side and its stem is perpendicular to the edge of the square. The tetradrachm, apparently unpublished, was part of a group of five Athenian or pseudo-Athenian tetradrachms allegedly found together in the Near East. The first four of the group might pass for late fifth-century Athenian owls, but the fifth one (no. 2 below) associates an obverse in classical Athenian style to a reverse on which the owl and the olive sprig have been turned 45° to the left in relation to the well-defined frame of the incuse square.



1: Gitler-Tal 2006: 196–197, XIV.18Da. AR, 3, 53 g, 5h. Private coll.

2: CNG Printed Auction 99 (13.05.2015), lot 370. AR, 16.63 g. Private coll.

Although the provenance is not known, the most likely answer, especially in the case of the drachm, is that they are coins issued in the fourth century on the Philistian coast. It is known that Gaza coinage was circulated at this time as far as Hijâz in the region of Hegra: the hoard IGCH 1755 is partly composed of a group of 21 small silver coins apparently found at ‘Salih Hedjr’ – i.e. Madâ’in Sâlih – and minted in Gaza in the fourth century.<sup>9</sup>

### B. Silver and alloy coins

#### Class A



3: BNF 1976.71 (from Henri Seyrig coll.). AR, 17.27 g.

4: Numismatica Ars Classica 78.344. AR 16.16 g. Private coll.

The class closest to the Athenian model is apparently known only from two silver tetradrachms showing a crescent on Athena’s cheek and the reverse type with a 45° rotation to the left, as described above. As far as one can tell from the photographs, these two examples appear to have an obverse die link. The types are even closer to the Athenian model and the weights, 17.27 and 16.16 g, are close to the theoretical Athenian standard, leading this class to be considered as the oldest in this coinage.

The crescent on Athena’s cheek is a characteristic of this coinage that can be found throughout its minting. Martin Huth interprets it as a Dadanitic letter corresponding to *r*,<sup>10</sup> but in the inscriptions this letter is written like the *antisigma* ϳ, and it is therefore more likely to represent the religious symbol of the crescent, tips

9 - Fischer-Bossert 2010: 179–184.

10 - Huth 2010b: 234.



pointing upwards, well-attested from Arabia to Mesopotamia from the Iron Age to the present. In the imitation of the Athenian legend, the A is written like a Δ, followed by a letter than can only be read as an Aramaic *shin*. This extra letter only appears on the reverse of these two coins and is probably a characteristic of this class A.

### Class B

The class comprises coins of a lower grade in appearance, and of a significantly lower weight.



5: BNF 1973.1.307: ex coll. Henri Seyrig, 'bought in Amman'. AR (or alloy) 12.02 g.

6: Gemini Auction V, 201. AR 14.26 g.

7: Noble Numismatics Pty Ltd 68, 1962. AR 15.10 g.

- 8: *Numismatica Ars Classica* 72.386. AR 12,99 g.  
 9: *CNG electronic auction* 343, 262. AR 14.56 g.  
 10: *BMC p.77.2 (pl. XI.24)*: 'procured from a Syrian dealer'. AR (base) 14.13 g. 9 h.  
 11: *CNG electronic auction* 319, 136. Alloy 12.57 g.  
 12: *Doughty 1921: vol. I, p. 113, found at Madâ'in Sâlih*. 'Copper', weight and standards not given.  
 13: *BMC p. 77.1 (pl. XI.25)*. AR (base) 14,99 g. 9 h.  
 14: *Madâ'in Sâlih* 35014\_C01. Alloy 2.18 g. 9 h.  
 15: *Numismatica Ars Classica* 78.345. Alloy 13.64 g.

Class B coins are silver coins of apparently lower grade than class A. This table lists all the coins known or published that can be included in this category; the only coins with a secure provenance are no. 12 and 14 found at Madâ'in Sâlih.

They depict a more stylized image of Athena. On examples 11 and 12, the crescent on the goddess's cheek is split in two. On the reverse, the inscription does not contain an Aramaic letter but reproduces the Greek legend AΘE, the A drawn like a Δ (no. 12), an angular P or an inverted angular P (no. 13 and 14). The reverse of the coins is inscribed in an incuse square (except perhaps no. 8 and 15). They are also tetradrachms varying in weight between 12 and 15 g, with an average weight of 13.80 g. No. 9 and 10 appear to have obverse die links.

Subsidiary coins also existed; these are very rare, as only one is known, no. 14, found during the excavations at Madâ'in Sâlih. It is a silver coin of apparently low grade and it is, although on a smaller scale (as far as one can tell), of the same type as no. 13: the angular reversed P, especially, can be seen in the legend on the reverse. It weighs 2.18 g, which corresponds to the weight of an Athenian hemidrachm.

The layer of oxidation has not been completely removed from this unique coin, but it is already possible to pick out enough details for a description. It shows that class B coins comprised a range consisting of at least two denominations, the tetradrachm (or shekel as it was called in Palestine and on the Philistian coast in the fourth century BC) and the hemidrachm. Subsidiary coins were generally only used in the city that issued them, and the presence of this hemidrachm at Madâ'in Sâlih is another argument in favour of Hegra being the issuing city of this coinage from the time of class B coins. This hypothesis is reinforced by the fact that the only tetradrachm of the same class and of known provenance (no. 12) was also found at Madâ'in Sâlih.

### C. Copper alloy coins

#### Class C



- 16: *ANS 1969.109.1 (SNG ANS 1453)*. AE 12.78 g, 24 mm.  
 17: *Madâ'in Sâlih Surface\_C047*, AE 12.60 g, 20–22 mm.  
 18: *Madâ'in Sâlih Surface\_C066*, AE 11.67 g, 21 mm.  
 19: *Madâ'in Sâlih Surface\_C009*, AE 11.40 g, 23 mm.



Of all the large copper alloy coins found at Madâ'in Sâlih, those of the standard, weight, and types that are closest to the class B silver alloy tetradrachms, can be grouped in class C. They are distinguished, above all, by the metal, a copper alloy, and by the systematic presence of a double crescent on Athena's cheek. The closest to class B is without a doubt no. 16, from the ANS collection: the goddess's profile still includes locks of her hair under the helmet. On the reverse, the leaves of the olive sprig still bear the central vein, the little crescent is still present and, most importantly, the imitation of the Greek legend still comprises the three puzzling letters: ΘΘΕ? The other three examples come from Madâ'in Sâlih. Their condition is such that it is not possible to tell whether the lock of hair on the obverse is depicted. No. 19 presents an inversed obverse type where the stylized profile of the goddess is facing left. The type of the reverse appears more developed: on the original Athenian type, a small crescent is shown on the reverse, between the olive sprig and the owl's back; this small crescent also appears on class A and class B of the Hegra owls. On those of class C, however, it no longer appears, and the same goes for all copper alloy owls of Hegra; moreover, as far as one can tell, the imitation of the Greek legend now only consists of the two letters ΘΕ. One can see very clearly, however, that on the two examples no. 17 and 18, the reverse die is still a square, the straight upper edge of which is visible.

Class D





20: BN 1973.1.448 (formerly Henri Seyrig coll.). AE 13.41 g.

21: Gemini LLC Auction VI (2010) 384 (ex David Hendin coll., acquired in Jerusalem). AE 13.38 g.

22: Zurqieh. AE 12.39 g, 21 mm.

23: CNG electronic auction 347, 284. AE 11.69 g, 20.5 mm.

24: CNG Triton XV (2012) 1304. AE 11.60 g, 21 mm.

25: CNG 93, 594. AE 11.71 g, 21 mm.

26: *Madâ'in Sâlih* 10096\_C01. AE 9.63 g.

27: *Dûmat al-Jandal*, al-Dayel 1986: pl. 84.1, Charloux, Cotty and Thomas 2014: 204 fig. 14. Weight and standard not given.

28: *Madâ'in Sâlih* Surface\_C058. AE 6.46 g, 23 mm.

29: *Babylonia*, Head 1878: pl. XIII.17; BMC p. 77 (pl. XI.26).<sup>11</sup> AE 10.87 g.

30: *Madâ'in Sâlih* Surface\_C242. AE 11.10 g, 23–24 mm.

11 - Head 1878: 274: "Another coin, pl. XIII. No. 17, of the same class, but of copper without any traces of plating, has been kindly sent me for exhibition this evening by the Rev. Prof. Churchill Babington. It is said to have been found by Mr. Loftus in Babylonia (...)"



- 31: *Madâ'in Sâlih Surface\_C002. AE 4.82 g, 21 mm.*  
32: *CNG Triton XVII, 402. AE 11.32 g, 23 mm.*  
33: *Huth 2010 p.14 no. 40, acquired in Ma'ân. AE 9.28 g, 23 mm.*  
34: *Madâ'in Sâlih, al-Talhi 2000: no. 13. AE 5.9 g, 22 mm.*  
35: *Madâ'in Sâlih Surface\_C245. AE 10.65 g, 22 mm.*  
36: *Zurqieh AE 8.25 g, 21 mm (same obverse die as 90042\_C02).*  
37: *Madâ'in Sâlih 90042\_C02. AE 9.02 g, 24 mm.*  
38: *Madâ'in Sâlih 10146\_C01. AE 9.01 g, 24 mm.*  
39: *Madâ'in Sâlih 10257\_C01. AE 10.9 g, 27 mm.*

This class comprises copper alloy coins of 21 to 27 mm standard, weighing between 5.9 and 13.5 g. Despite disparities in the weights, the uniformity of the series is confirmed by die links. Thus no. 20 and 21 are die linked (same obverse die), as are no. 25, 26, and 28; no. 25, 26, and 27 are die duplicates (same obverse and reverse die);<sup>12</sup> no. 29, 30, and 31 are die linked; no. 32, 33, and 34 have a reverse die link; no. 36, 37, and perhaps 38 are die linked.

On the basis of the nature of the metal, standards, and weights of the heaviest examples, coins of this class can be compared to class C bronze tetradrachms. The difference lies in the obverse type: the goddess's lock of hair is not shown; above the line of the eyebrow, which prolongs the line of the brow and nose, there is a kind of geometric frieze on two registers which corresponds to the evolution of the crown of olive leaves and the crest of the helmet which appear on the original Athenian type. There is only one crescent on the goddess's cheek, still in the same position under the eye. The fine 11.32 g example (no. 32) on which the crescent appears to be double,<sup>13</sup> is linked by its reverse die to an exceptionally clean example in the Huth collection (no. 33), making it a class D coin.

Two fairly different styles can be observed in the engraving of the obverse in no. 20–31 and 32–39. The Arab die engravers reappropriated the original Athenian type, which they treated quite separately from the conventions of Greek art, a 'Picasso-like' style to quote Martin Huth: the physical elements of the face (eye, ear, nose, lips) become less distinct and the image as a whole is dominated by the, initially secondary, ornamental elements which take over the whole field. The phenomenon of reappropriation is comparable to the evolution of Greek Macedonian types on Celtic coins of Western Europe of the third to first century BC; there is of course no link between Celtic and Arabic coinage but it is a remarkable convergence of styles. It is probably the reason why these coins were so sought after by collectors and why many examples in good condition exist in the collections.

Of the 20 coins in this class, 10 have a known provenance: nine were found at Madâ'in Sâlih and one at Dûmat al-Jandal (no. 27, see al-Dayel 1986: pl. 84.1). Another was found in the mid-nineteenth century by William Loftus in Babylonia (no. 29, see Head 1878: 274), but it is not known under what conditions, whether he found it himself on site or whether he purchased it. The coin found at Dûmat al-Jandal and the one from Babylonia each show die links with coins from Madâ'in Sâlih. Among those of unknown provenance (two of them were acquired in Jerusalem and Ma'ân), several are in a very good state of preservation and present a black patina, the so-called 'desert patina', which is never observed among coins found at Madâ'in Sâlih: it is therefore unlikely that they come from this site.

The number of die linkages is significant for such a modest sample, comprising only 20 coins of various provenances. This suggests that these coins were produced in very limited numbers, which is also confirmed by their extreme rarity.

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12 - I was only able to consult one photograph of coin no. 27 found at Dûmat al-Jandal, and the publication only reproduced the reverse. Is the obverse of the same die as no. 25, 26, and 28?

13 - It is probably just a false impression caused by the coin's patina. This obverse die only depicts one crescent on Athena's cheek.

Class E



- 40: *Madâ'in Sâlih* 70500\_C03. AE 10.62 g, 21–24 mm.  
 41: CNG electronic auction 353, 205. AE 13.34 g, 18 mm.  
 42: ANS 1944.100.69449 (SNG ANS 1981, 1454). AE 13.80 g, 22 mm.  
 43: CNG electronic auction 216, 253. AE 9.89 g, 20 mm.  
 44: BNF 1973.1.308. AE 13.77 g.  
 45: CNG Triton XVIII, 761. AE 13.11 g, 20 mm.  
 46: Gorny and Mosch Giessener Münzhandlung 225, 1708. AE 13.30 g.  
 47: Private coll. (Huth and Van Alfen 2010: 234 fig. 5d).  
 48: Private coll. AE 12.72 g, 20 mm.

Class E comprises copper alloy tetradrachms comparable to those in class D: same average weight, standard, engraving style, and evolution of the reverse with the absence of a crescent and with its two-letter legend. The difference is that Athena's cheek bears a double crescent, as in class C.

The exact provenance of these coins is unknown, except for no. 40 found at Madâ'in Sâlih. Here again there are die links: no. 44 and 45 are from the same pair of dies, no. 46 and 47 from the same obverse die.



## Class F



49: *Madâ'in Sâlih* 25051\_C01b. AE 7.91 g, 22 mm.

50: *Madâ'in Sâlih* 21003\_C09. AE 4.84 g, 18 mm.

51: *Madâ'in Sâlih* 21003\_C06. AE 4.26 g, 22 mm.

52: *Madâ'in Sâlih* 25216\_C03. AE 10.45 g, 22 mm.

53: *Madâ'in Sâlih* 10063\_C01. AE 4.89 g, 23 mm.

54: *Madâ'in Sâlih* Surface\_C150. AE 6.30 g, 20 mm.

55: Doughty 1921: vol. I, p. 113, found at *Madâ'in Sâlih*. 'Copper', weight and standard not given.

Class F comprises coins weighing between 4.26 and 10.45 g, standard between 18 and 23 mm. It is characterized by the style of the goddess's profile on the obverse: the lines are particularly thick, the nose straight, the double crescent on the cheek is drawn as the prolongation of the lips and continues up to the ear. This very particular style applies to profiles of the goddess facing right, but also to obverse dies on which the profile faces left. Inversed reverses are also found, the letters ΘE appearing in the left field. The seven examples attributable to this class come from *Madâ'in Sâlih*, two of them, no. 50 and 51, from the same stratigraphic unit. No. 51, 52, and 54 probably share the same obverse die, and this might also be the case for no. 53, which is very worn. Coin no. 55, known only from a drawing by Doughty and lacking weight and standard, has been included in this class because of the obverse type.

Class G



56



57



58



59



60



61



62



63



64

56: Athena Numismatics, AE 7.97 g, 19 mm.

57: Münzen & Medaillen GmbH Auction 17 (2005), 1067. AE 8.97 g, 19 mm.

58: *Madâ'in Sâlih* Surface\_C011. AE 5.47 g, 19 mm.

59: *Madâ'in Sâlih* 10049\_C02. AE 5.09 g, 19 mm.

60: *Madâ'in Sâlih* Surface\_C142. AE 5.58 g, 17 mm.

61: *Madâ'in Sâlih*, al-Talhi 2000: no. 25. AE 3.3 g, 16 mm.

62: Private coll. AE 4.69 g.

63: *Madâ'in Sâlih* Surface\_C151. AE 5.08 g, 17 mm.

64: *Madâ'in Sâlih*, al-Talhi 2000: no. 24. AE 3.4 g, 18 mm.

Class G comprises coins of a lower weight and standard compared to class F: 3.30 to 5.47 g and 16 to 19 mm. Examples no. 58–61 and 63–64 come from Madâ'in Sâlih. To them can be added, because of both the style of the engraving and their obverse die, the two heavier coins no. 56 and 57, of unknown provenance and which appear to have the same obverse die.

The engraving style of the obverse dies, visible on examples no. 58–61, appears to be a simplified version of the class D portraits, especially examples no. 20–31: it is possible that these coins are contemporaneous and class G is just a subdivision of class D.



## Class H



65: Private coll. AE 2.19 g, 16 mm.

66: *Tantalus Online Coin Registry*. AE 2.33 g, 15 mm.

67: *Schick Coins*. AE 15 mm (weight not given).

68: *CNG 90, 751*. AE 2.29 g, 15 mm.

Class H comprises smaller examples of this coinage, weighing between 2.19 to 2.33 g with a standard of 15 or 16 mm. There are few examples here, and none of them has a known provenance; none of the examples found at Madâ'in Sâlih, which could be included in this class, is sufficiently well preserved or cleaned to be able to reproduce a clear enough photograph.

These four clearly legible examples come therefore from the commercial sector or from private collections. It should be noted that no. 65 and 66 share the same reverse die. The bevelled and cut flans are identical to the smallest denominations struck in Palestine in the first century BC and the beginning of the first century AD.

#### 4. The owls of Maghâir Shu'ayb

##### A. The Richard Burton collection

In 1878 the British explorer Richard Burton visited the site of Maghâir Shu'ayb – 350 km north-west of Madâ'in Sâlih and ca. 30 km east-north-east of the small port of Maqnâ on the Gulf of Aqaba – principally in order to collect mineral samples, but also to make archaeological observations. During surface collection throughout the site with one of his companions, J. Charles J. Clarke, he collected a total of 258 coins.<sup>14</sup>

14 - "Walking down the left bank of the great Wady, and between the secondary gorges that drain the 'Yellow Hill' (Jebel el-Safrâ NDC), we came upon a dwarf mound of dark earth and rubbish. This is the *Siyaghah* ('mint and smiths' quarter'), a place always to be sought, as Ba'lbak and Palmyra taught me. Remains of tall furnaces, now level with the ground, were scattered about; and Mr. Clarke, long trained to find antiques, brought back the first coins picked up in ancient Midian. The total gathered, here and in other parts of Maghâir Shu'ayb, was 258, of which some two hundred were carried home untouched; the rest, treated with chloritic and other acids, came out well. One was a silver oval which may or may not have been a token. Eleven were thick disks, differing from the normal type; unfortunately the legends are illegible. The rest, inform bits of green stuff, copper and bronze, were glued together by decay, and apparently eaten out of all semblance of money until the verdigris of ages is removed.

All are cast like the Roman 'as', before B.C. 217, and some show the tail. The distinguishing feature is the human eye; not the outa of Horus, so well known to those who know the Pyramids, but the last trace of Athene's profile. Two are Roman: a Nerva with S.C. on the reverse; and a Claudius Augustus, bearing by way of countermark a depressed oblong, of 20/100 by 14/100 (of inch), with a raised figure, erect, draped, and holding a sceptre or thyrsus. There is also a Constantius struck at Antioch. The gem of the little collection was a copper coin, thinly encrusted with silver (...). The obverse shows the owl in low relief (...). It has the normal olive-branch, but without the terminating crescent (...) on the proper right, whilst the left shows a poor imitation of the legend AΘE(NH). The silvering of the reverse has been so corroded that no signs of the goddess' galeated head are visible.' (Burton 1879: 91–93).

This collection was examined by the curator at the British Museum, Reginald S. Poole, and his assistant Barclay V. Head. The latter described rather succinctly some of these coins in an article in the *Numismatic Chronicle*, illustrated with a few casts (Head 1878). In 1920, 28 of these coins were handed over to the British Museum by the Camberwell Public Library, but it is not known what happened to the others. For example, it is clear that two of the coins cast by Head in 1878 are not part of the 28 coins in the British Museum 42 years later. In his article, Barclay V. Head appears not to know the exact provenance of these coins or the conditions in which they were collected for he writes, erroneously, that Burton acquired them in ‘Macna’, a small port in the Gulf of Aqaba. In 1922 George F. Hill repeated this error in the *British Museum Catalogue*.

The coins collected at Maghâyr Shu‘ayb have unfortunately never been properly catalogued but one can get some idea of the collection. There were 258 in all, of which 58 were chemically cleaned with acid, the others sent back to England uncleaned (Burton 1879: 92). The collection included North Arabian owls, Jewish Hasmonean and Herodian coins, and Procurator, Nabataean, and Roman coins. Burton also noted some coin-shaped objects of an indeterminate nature.

The short list below combines observations published by Richard Burton (1879: 92–93: RB) and Barclay Head (1878: BH).

#### Owls:

- Silver-gilt copper coin. Obverse illegible. Reverse: stylized owl, on right olive sprig without crescent, on left imitation of Greek legend ΑΘΕ (RB, BH). Burton does not give the weight or the standard, presenting it as ‘the gem of the little collection’. Head describes it as ‘an ancient plated coin copied from one of the thick Attic tetradrachms of the older style’ and compares it to the copper alloy tetradrachm no. 29 in the present classification. Nothing more is known as this plated or dipped coin was not reproduced in the *Numismatic Chronicle*. Burton and Head’s descriptions suggest that it is a class C to F tetradrachm. Burton notes the absence of the small crescent above the owl’s back (present on the reverse of class A and B coins) but he does not state whether the imitation of the Greek legend comprised only two letters. Unless Burton has made a mistake in his description, the reverse is inversed in relation to the Athenian model.
- A group of small coins of the same type, of which 28 are now part of the British Museum collection, while the casts of two more are reproduced in the *Numismatic Chronicle*. They all appear to belong to class H, but the style of one of them is very similar to some coins of class D (NC 1878, pl. XIII.18).

#### Jewish coins:

- Several coins of Alexander Jannaeus and Alexander II (BH).
- One coin of Herod Archelaus (BH).
- Procuratorian coins:
- Several coins of Tiberius (BH).
- One coin of Pontius Pilatus (BH).

#### Nabataean coins:

- A few coins of Aretas IV (BH).

#### Roman coins:

- One coin countermarked ‘Claudius Augustus’. The countermark, measuring 3.5 x 5 mm, shows a draped divinity, standing, holding a sceptre or thyrsus (RB). It is probably one of the large or medium Roman or provincial first-century bronze coins, which are very worn and countermarked in order to circulate them in the East.
- One coin of Nerva with SC on the reverse (RB). Almost certainly an as from Antioch.
- One coin of ‘Constantius’ from the Antioch workshop (RB). It is possibly a follis of Constantius Chlorus Caesar or, more likely, a coin of Constance II.



Coin-shaped objects:

- A silver oval (RB).
- Eleven thick disks (metal not specified, but likely to be bronze) 'differing from the normal type', with illegible legends (RB). They may be considered as coins, perhaps Ptolemaic coins or class F owls.

Despite the lack of detail in this reconstituted catalogue, it should be compared to the coins collected at Madâ'in Sâlih. The two sites have yielded the same type of numismatic material: North Arabian owls, Jewish coins of the Hellenistic era, and Nabataean or Roman coins up to Constantine II. No Byzantine or Arabic coins were reported on either of the two sites. The difference lies in the proportions: Head suggested that the Nabataean coins in the collection brought back by Burton were few in number, whereas in fact they represent almost half of the numismatic material at Madâ'in Sâlih.

As at Madâ'in Sâlih, the site of Maghâyir Shu'ayb contains Nabataean rock-cut tomb facades, although they are far fewer in number.<sup>15</sup> Peter J. Parr has observed a Nabataean/Roman tell and an abundance of Nabataean pottery, and concludes: 'it is one of the largest Nabataean sites known' (Parr, Harding and Dayton 1971: 33; cf. Gatier and Salles 1988: 176). It should also be stated, inasmuch as the available documentation is to be believed, that this site has yielded the same categories of coins as Madâ'in Sâlih. There is therefore a strong link between the two sites in which the North Arabian owls / owls of Hegra, circulated before Aretas IV.

### ***B. Coins kept at the British Museum***

Their weight varies considerably, from 2.68 to 0.49 g, with an average of 1.55 g. The flans were not very carefully prepared, were serial cast (or rather parallel cast) and sheared without trimming, and in this respect are very like the flans on which small Jewish Hasmonean, Herodian, Procurator, and possibly Nabataean coins were struck until the middle of Aretas IV's reign, which is the reason Hill dated these pieces to the first centuries BC and AD. They can be attributed to class H.

Athena's profile, always facing right, bears two crescents on her cheek. The general layout corresponds to the highest level of stylization of the ancient Athenian model. A combination of two different dies<sup>16</sup> can give us some idea, as does another coin that is only known from the photograph of a cast:



The reverse types are also very simplified. As far as one can tell, the owl appears to face right (and the Greek letters are on the right) on 13 examples, and faces the other way on 8 of them. The outline of the head is a simple oval or a curving line because the feathers that lined it are no longer depicted; the body is reduced to nine globules, the feet and the tail reduced respectively to two and three oblique strokes in relation to the axis of the body.

15 - See Nehmé 2015: 49–53.

16 - No die links have been observed within this sample. The assemblage presented here combines the obverses of 1920,071.4 and 1920,0721.2: these two dies have different obverses, but they evidently appear to be very similar.

The homogeneity of the group kept at the British Museum, in addition to a few examples cast in 1878, is striking: same class of coin (class H), same state of preservation. This group, once cleaned and presented on the British Museum trays, recalls a coin deposit. Something in Richard Burton's report suggests that the coins he brought back from Maghâyir Shu'ayb were collected as a group of coins bound together by oxidation: 'The rest, inform bits of green stuff, copper and bronze, were glued together by decay, and apparently eaten out of all semblance of money, until the verdigris of ages is removed.'<sup>17</sup>

The following list was compiled from digitised photographs of these coins available on the British Museum website, as well as a few photographs of coin casts, from the same group, reproduced by Barclay Head in 1878, but which do not appear to be part of the group kept today at the British Museum. In the present contribution, the photographs have been rotated so that they appear the right way up. In this way, it is possible to see that the coin orientations vary greatly from one coin to another, which was not the case for classes A to G, the reverse of which are nearly always oriented at 9 o'clock, as are the original fifth-century BC Athenian owls.



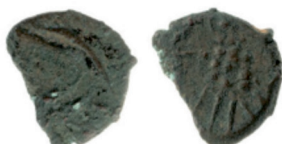
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17 - Burton 1879: 92.





192,0721.17



1920,0721.18



1920,0721.19



1920,0721.20



1920.0721.21



1920.0721.22



1920,0721.23



1920,0721.24



1920, 0721.25



1920,0721.26



1920,0721.27



1920.0721.28



1920,0721.29



NC 1878 pl. XIII.18



NC 1878 pl. XIII.19

- 1920,0721.1: AE 2.682 g. BMC p. 78.1.  
 1920,0721.2: AE 2.65 g. BMC p. 78.2.  
 1920,0721.3: AE 2.566 g. BMC p. 78.3 and pl. LV.2.  
 1920,0721.4: AE 2.546 g. BMC p. 78.4 and pl. LV.3.  
 1920,0721.5: AE 2.267 g. BMC p. 78.5.  
 1920,0721.6: AE 2.008 g. BMC p. 78.6.  
 1920,0721.7: AE 1.982 g. NC 1878 pl. XIII.20; BMC p. 78.7 and pl. LV.4.  
 1920,0721.8: AE 1.943 g. NC 1878 pl. XIII.21; BMC p. 78.8 and pl. LV.5.  
 1920,0721.10: AE 1.665 g. BMC p. 79.10 and pl. LV.6 (reverse).  
 1920,0721.11: AE 1.658 g. BMC p. 79.11.  
 1920,0721.12: AE 1.658 g. BMC p. 79.12.  
 1920,0721.13: AE 1.619 g. BMC p. 79.13.  
 1920,0721.14: AE 1.6 g. BMC p. 79.14.  
 1920,0721.15: AE 1.445 g. BMC p. 79.15.  
 1920,0721.16: AE 1.393 g. BMC p. 79.16.  
 1920,0721.17: AE 1.36 g. BMC p. 79.17.  
 1920,0721.18: AE 1.354 g. BMC p. 79.18.  
 1920,0721.19: AE 1.347 g. NC 1878 pl. XIII.22; BMC p. 79.19 and pl. LV.7.  
 1920,0721.20: AE 1.321 g. BMC p. 79.20 and pl. LV.8 (reverse).  
 1920,0721.21: AE 1.25 g. BMC p. 79.21.  
 1920,0721.22: AE 1.211 g. BMC p. 79.22.

1920,0721.23: AE 1.127 g. BMC p. 80.23.  
1920,0721.24: AE 0.971 g. BMC p. 80.24 and pl. LV.9.  
1920,0721.25: AE 0.926 g. BMC p. 80.25.  
1920,0721.26: AE 0.842 g. BMC p. 80.26.  
1920,0721.27: AE 0.777 g. BMC p. 80.27.  
1920,0721.28: AE 0.725 g. BMC p. 80.28.  
1920,0721.29: AE 0.492 g. BMC p. 80.29.  
NC 1878 pl. XIII.18  
NC 1878 pl. XIII.19

## 5. Chronology of the owls of Hegra

The owls of Hegra constitute a coherent coinage, which is only found in significant quantities at Madâ'in Sâlih, and to a lesser extent, at Maghâyir Shu'ayb. It is therefore a local coinage which, one is tempted to suggest, was issued at Hegra, as was discussed above. The question of its chronology is the next problem. There are a few helpful indications:

- A small fourth-century BC hoard probably found at Madâ'in Sâlih in the nineteenth century and comprising silver coins from Gaza (*IGCH* 1755; Fisher-Bossert 2010: 179–184).
- Several archaeological layers uncovered at Madâ'in Sâlih containing bronze owl coins. *Locus* 25214 contained five bronze coins, all of the owl type. Associated pottery is datable to the late Hellenistic period (first-century BC). *Locus* 21009 contained 12 bronze coins, 10 of which were of the owl type, one is in such bad condition that it cannot be attributed, and finally one is a small Nabataean coin of Aretas IV. Associated pottery is datable to the second half of the first century BC and the beginning of the first century AD including, notably, many imports from Petra.
- Radiocarbon dating of several samples from trenches in area 1 excavated in 2011 has enabled to propose a chronological sequence, the first three phases of which (phases 1, 2a, and 2b) date as far back as the fifth to the mid-first century BC.<sup>18</sup> Several *loci* belonging to these first phases have yielded owl type bronze coins, in particular *locus* 10341 which radiocarbon dating puts in phase 1, fifth to mid-fourth century BC. This *locus* has yielded a coin from class F or G:



10341\_C01: AE 20–23 mm, 7.14 g, 9h. Moulded oval flan, bevelled edge, traces of two casting sprues that have been chopped off.

*Obverse*: stylized profile of Athena facing right, crest, two crescents on cheek.

*Reverse*: stylized owl facing forward with eyes shaped like a  $\odot$ ; on left letter E or  $\Theta$ E; on right stylized olive sprig.

Within the group of owls of Hegra coinage, this coin seems to have evolved a great deal in comparison with classes A and B, which are still relatively close to the Athenian model. It is difficult to date it as early as the fourth century BC.

While it is too early to draw any conclusions on coin 10341\_01, one can still observe that the owls of Hegra were circulating in abundance in the city under Aretas IV, at least at the beginning of his reign

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18 - Rohmer and Charloux 2015.



and, moreover, that they continued to circulate during the second and third centuries since they can be associated, within the same *locus*, to Roman coins. It is also clear that the owls of Hegra were used as the city's currency before the introduction of Nabataean coinage at the beginning of Aretas IV's reign and, therefore, that their production continued up to the end of the first century BC.

The different classes into which we propose to distribute the owls of Hegra enable a relative chronology to be established.

Class A (tetradrachms of good-quality silver and Athenian weight in a style close to the Greek model) is evidently the oldest. It could be contemporaneous with other fifth-century BC Eastern and Egyptian imitations of Athenian owls because it circulated with them. It is probably inspired by imitations of owls minted in Gaza and on the Philistian coast, and one can deduce that it is trade with Gaza which drew Hegra into the monetary economy in the fourth century BC, as is confirmed by the small hoard *IGCH* 1755 from Madâ'in Sâlih comprising Gazan coins from this period.

It is succeeded by class B, mainly comprising slightly lighter tetradrachms of apparently lower grade, and a style more removed from the Greek model. This class contained at least two denominations, the tetradrachm and the hemidrachm, of which a single example is known from Madâ'in Sâlih (here no. 14, 35014\_C01). The existence of this subsidiary coin suggests that this coinage, which is still made of silver despite its lower grade, was not exclusively destined for major trade with the outside world: small subsidiary coins were generally minted to supplement the local circulation. The third century BC can be proposed for class B.

Coins in classes C and D come in the standard and approximately the weight of the tetradrachm, although they are now exclusively of bronze. The style is further removed from the Athenian model to the point that it becomes unrecognizable. There are particularly large numbers of them at Madâ'in Sâlih and a few examples circulated as far as Dûmat al-Jandal (no. 27), and even Babylonia (no. 29).

Classes E, F, and G differ from class D in the style of the engraving of the die, in the way the flans were prepared, and in the weight. Since the nineteenth century, it has been observed that the very small coins corresponding to our class H were struck on roughly prepared flans, in the same way as those of the small Hasmonean coins, which would date them to the first century BC.

It is difficult to date classes C to H more precisely than the third to first century BC. In the same way that third-century BC class B was minted in at least two denominations corresponding to the tetradrachm and the hemidrachm, it is possible that in the more recent period when the Hegra owls were only minted in bronze, there may have been several denominations and class H was a subdivision of one of the previous classes.

## 6. The issuing authority

The special link of this coinage with the city of Hegra seems fairly clear. Since it was produced from the fourth to the first century BC, the question remains, by what political authority was it issued? It is no longer possible to attribute this coinage to the Lihyanite kings of Dadan:<sup>19</sup> a recent study favours dating the period of the Lihyanite kings' domination before the third century BC, and reveals a Dadanite decline from the end of the third century BC.<sup>20</sup> If the first owls of Hegra, classes A and B, were minted from the fourth century, at the latest during the third century BC, it is clear that the minting of more recent classes continued until the first century BC, that is, during the period stretching from the end of Lihyanite domination to the appearance at Hegra of Nabataean coinage under Aretas IV. It is during this period that Hegra expanded and, as has been seen, probably minted coins.

The uniqueness of this coinage lies in the fact that there is no indication of issue: neither the name of the city nor the name of some kind of authority is shown. Perhaps the Aramaic *shin* inserted in the imitation of the Greek legend on the class A owls originally corresponded to an indication of its origin? By class B,

19 - Huth 2010b: 234; Augé 2010: 277.

20 - Rohmer and Charloux 2015.

however, this letter has disappeared. The only distinctive mark on these coins is the simple or double crescent, systematically placed on the goddess's cheek. This is a well-attested religious symbol throughout the Middle East, especially in relation to the lunar divinity of sanctuaries such as Taymâ'. It is thus possible that the cult of this divinity also held an important place in pre-Nabataean Hegra.

The area of distribution of this coinage, at the present stage of our study, is generally limited to the city of Hegra, and to a lesser extent, if Richard Burton's book published in 1879 is credible, to Maghâyr Shu'ayb, 350 km away to the north-west. Examples found elsewhere (as far as Babylonia) seem to be isolated finds, although the fact that three were found at Petra shows that this coinage was not unknown there. The case of Maghâyr Shu'ayb will have to be closely studied: indeed, in the last 138 years no one has reported on the coins that Burton claimed he had found there in such great numbers.

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## CAMEL BONES FROM AREA 34

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The 2016 season of the Madâ'in Sâlih project provided the opportunity to analyse faunal remains from Area 34, of which one section (A) was excavated in 2015 and a second (B) in 2016. The assemblage in this area comprises a total of 2413 faunal remains, of which 1251 were identified to species and/or skeletal element, representing 52% of the total assemblage. It complements an already very rich archaeozoological corpus of more than 30,000 bones from various contexts (domestic, religious, funerary) and from chronological phases covering the protohistoric, Hellenistic, Nabataean, Roman, and post-Roman periods (see reports from previous seasons).

Area 34 stretches along the wall that surrounds ancient Hegra, on a rocky plateau located at the foot, and to the west of the so-called Hill B, shown on the plans of the residential area. It is a fortified complex which, in view of the architectural structures and the material recovered, has been interpreted as a Roman fort (see Z.T. Fiema's report in this volume). The 2413 studied animal remains come from the following twenty-six *loci* (sieved *loci* are shown in bold): **34013**, 34051, 34101, 34102, 34103, 34107, 34111, 34114, 34115, 34116, 34117, 34119, 34124, 34131, 34133, 34134, 34138, **34202**, 34204, 34205, **34207**, 34210, **34217**, **34219**, **34220**, and **34225**. Bones were collected either during excavation, or by sifting the sediments using a 0.5 cm mesh. The sifted *loci* correspond to levels that were very rich in material and so were collected more intensively. The majority of the analysed bone assemblage comes from levels dated to the Roman period, but all the occupation phases identified in Areas A and B yielded faunal material.

The oldest occupation phase in Area 34 is dated to the Nabataean period (first century BC–first century AD). It comprises 194 bones in total, of which 129 were identified. The transition phase (end of first–beginning of second century AD) and the Roman occupation respectively yielded 671 remains (of which 337 were identified) and 737 (of which 425 identified). During the fourth century BC and later periods, after the Roman soldiers had abandoned the fort (towards the end of the third century BC), the civilian population settled in the buildings that were still standing. The post-Roman periods, identified by two final phases of occupation, yielded 393 remains (of which 208 were identified) and 119 remains (of which 52 were identified). A small group of 299 bones (of which 100 were identified) comes from as yet undated archaeological layers.

At this stage of the archaeozoological analysis, the quantity of examined bone is still too small to be able to establish the relative frequencies of taxa by occupational phase. The faunal assemblage of Area 34, however, appears to stand out in the residential areas in the urban centre with an abundance of large bones mainly belonging to camels. These are represented by a total number of 336 remains, of which 20 have been specifically attributed to the dromedary (*Camelus dromedarius*, 6% of the camels). In order to simplify quantification, this whole assemblage will be considered as remains of camel, tentatively attributed to the dromedary *Camelus cf. dromedarius*.

The Roman-period levels in areas A and B have shown that the camel represents a third (33%) of identified remains (NISP = Number of Identified Specimens) at the time the fort was occupied (camel NISP = 138; total sample NISP = 425). This high proportion is already apparent during the Nabataean-Roman transitional phase in Area A, where the dromedary stands out representing 28% of the remains (camel NISP = 94; total sample NISP = 338). This is also the case in the Nabataean layers in Area A, which yielded 40% camel remains (camel NISP = 94; total sample NISP = 338). These percentages for each period must be considered as preliminary until the data from other architectural structures in Area 34 are examined, since it is well known that carcasses of large-sized animal are preferentially dumped in middens located outside towns or in open, public dump areas. Consequently, general refuse areas contain higher quantities of remains of large mammals, such as camels. Moreover, in the future, when all remains have been examined, the use of complementary methods of quantification, such as calculation of the minimum number of individuals (MNI) or anatomical elements (MNE), will help establish a more solid quantitative





**Fig. 1.** The left femur (distal part) of a dromedary (*Camelus cf. dromedarius*) showing striations caused by dismembering.

exploitation of camels can, on the other hand, be tackled by observing anthropic marks on each bone. Bone modification left by butchery or food preparation have been grouped into three categories: striation marks following the use of a knife (**fig. 1**), chop marks left by a heavy cutting tool such as a cleaver (**fig. 2**), and impact points made by a club or heavy instrument of percussion to fracture the bone. Table 1 gives the breakdown of the different damage categories for the two phases containing the most abundant faunal remains, namely the transition period between the Nabataean and Roman eras and the Roman period. The average of bones bearing cut marks is 19% for the transition period and 32% for the Roman period. These averages are high when compared, for example, with the pre-Islamic and Islamic site of Dūmat al-Jandal (Saudi Arabia), where only 1.5% of camel bones were marked by sharp tools.<sup>1</sup> The rate is also lower at al-Yamāma, in the Riyadh area (pre-Islamic, Islamic, and modern), where it reaches 4% of the number of remains.<sup>2</sup> By contrast, in Petra (Jordan), among the culinary refuse of Nabataean and Roman residences in the az-Zantūr quarter, the rate of butchery damage reached 48%.<sup>3</sup> For older periods, as in levels dated to the sixth–second century BC at Tell Jemmeh (southern Levant), camel bones represent 18% of butchered remains.<sup>4</sup> The authors

approach to species. It is also important to recalculate animal proportions by taking into account fragments that have not been attributed to species, but which may be attributed according to size classes, i.e. corresponding to large- (e.g. dromedary) or medium-sized (e.g. caprines) animals. There is no doubt that these different approaches applied to a more sizeable faunal assemblage – thanks to further excavation in Area 34 – will confirm (or refute) the preliminary results in which the quantity of camel remains is higher in a military context than in the residential areas of the urban centre: on average less than 10% in Areas 1, 2, and 9, ranging between 1% (Area 9) and 20% (Area 1), depending on the context and the period.

If the importance of the dromedary in Area 34 is still to be confirmed, the question of the manner of



**Fig. 2.** A camel joint. One rib still in anatomical connection to the articulated surface of the corresponding thoracic vertebra (dromedary *Camelus cf. dromedarius*). Specimen aged over 4 years. The joint has been cut at both ends. A heavy blow (from a cleaver?) to the top of the rib separated it from the vertebral column (right on photograph). The rib was then shortened to a tenth of its original length by two further blows, before it was finally severed by a third blow (left on photograph).

1 - Monchot 2014: 202.

2 - *Ibidem*: 204.

3 - Studer and Schneider 2008: 586.

4 - Wapnish 1984: 174.

Butchery	N. transition Roman			Roman period			cut mark		chop mark		impact point		
	end 1st- beginning 2nd c. AD			2nd- 3st c. AD									
	NISP	NR trace	%	NISP	NR trace	%	NtrR	Rom	NtrR	Rom	NtrR	Rom	
head	skull	1	0	0%	12	1	8%	-	1	-	-	-	-
	mandible	1	0	0%	2	1	50%	-	-	-	-	-	1
	isolated tooth	1	0	0%	11	0	0%	-	-	-	-	-	-
trunc	vertebra	19	1	5%	23	9	39%	-	1	1	7	-	1
	rib	16	2	12%	20	9	45%	-	3	1	6	1	-
	sternum	1	0	0%	-	-	-	-	-	-	-	-	-
upper forelimb	scapula	5	3	40%	3	2	67%	1	1	2	1	-	-
	humerus	4	1	50%	2	1	50%	-	-	1	1	-	-
	radius	1	1	100%	1	0	0%	1	-	-	-	-	-
	ulna	1	0	0%	2	0	0%	-	-	-	-	-	-
upper hindlimb	pelvis	-	-	-	8	3	38%	-	-	-	3	-	-
	femur	5	3	40%	1	1	100%	1	1	-	-	2	-
	tibia	1	0	0%	2	1	50%	-	-	-	1	-	-
lower limb + phalange	carpal	3	1	33%	7	2	29%	1	2	-	-	-	-
	tarsal	2	0	0%	3	0	0%	-	-	-	-	-	-
	metacarpal	1	0	0%	1	1	100%	-	-	-	-	-	1
	metatarsal	-	-	-	2	1	50%	-	-	-	-	-	1
	metapodial	7	1	14%	3	0	0%	-	-	-	-	1	-
	phalange	3	1	67%	8	4	50%	-	2	1	2	-	-
<b>Total</b>	<b>72</b>	<b>14</b>	<b>19%</b>	<b>111</b>	<b>36</b>	<b>32%</b>	<b>4</b>	<b>11</b>	<b>6</b>	<b>21</b>	<b>4</b>	<b>4</b>	

**Table 1.** Hegra. Area 34. Cut marks on camel (*Camelus cf. dromedarius*) remains. NtrR = Transition between Nabataean and Roman eras; Rom = Roman era; NR = number of camel remains. Only elements identified to skeletal part are included. Percentages given for anatomical element with NISP count of less than 4 are not meaningful due to small sample size.



of these studies have interpreted all these assemblages as residues of the use of camel as food, due to the diversity of human modifications on the bones, the locality of the cut marks, and the presence of all the elements of the carcass. Interestingly, the Roman and Byzantine military occupations of Lejjûn, Qasr Bashîr, and Da'janiyale (Jordan) have yielded only a few camel remains, of which less than 1% bore cut marks.<sup>5</sup> Apparently, camels were not common on the menu for these soldiers, who primarily consumed other livestock.<sup>6</sup>

The 50 butchery marks observed on the camel remains in Area 34 occur on all the elements of the carcass (from skull to phalanges, see Table 1), and especially in the articulated areas of the skeleton (as striations, **fig. 1**), on the shaft of the long bones (as chop marks), and on the thorax (reflected by splitting of the ribs and vertebrae with a blunt tool, **fig. 2**). The variety of damage to all anatomical elements of the carcass undeniably points to camel butchery and consumption. This is also the case in the domestic areas of the urban centre at Hegra. Moreover, a few marks observed on the camel remains in Area 34 were made by the precise action of an expert butcher or cook (skinning, cutting up of the carcass, removal of the meat, jointing, preparation of pieces of meat for cooking, etc.). To conclude this preliminary study on the evidence for butchery of camel carcasses for food, it is notable that only six bones are burnt, and these are only scorched, suggesting that they were accidentally exposed to fire.

In conclusion, based on the quantity of camel remains and the extent of butchery damage, their meat must have formed a significant part of the diet of the soldiers stationed in the Roman fort at Hegra. The widespread spatial distribution of these large bone remains throughout the areas and levels excavated to date in Area 34, offers some confirmation as to the reliability of these archaeozoological results.

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5 - Toplyn 1994: 266.

6 - *Ibidem*: 268.

## NOTE ON THE TEXTILES FROM TOMBS IGN 88, 97, AND 116.1

Patricia Dal-Prà (Institut National du Patrimoine)

*Words followed by a \* are listed in the glossary at the end.*

The typology of the textiles from the three tombs **IGN 88, 97, and 116.1** matches that of material from the previously excavated tombs IGN 20 and 117. These include cloth coated in layers of resin, numerous straps with and without a knot, fragments of cloth, mainly ecru plain weave\*, and leather both connected and unconnected to textiles. The most common fibre is flax, but hair (from unidentified animal: sheep, goat, camel?) and cotton were also found.

Excavation of tomb **IGN 116.1**, during the 2015 season (Delhopital 2015), revealed a few fragments of cloth occasionally associated with leather remains. The material is in a very bad state of preservation. Most of the cloths are coated in a black powdery substance and are disintegrating. Some have nevertheless kept the shape of pleats in the fabric. A few rare fragments reveal a few millimetres of plain weave on which the twist – S-twist\* – of the thread is visible, and it is occasionally possible to analyse the fibre and flax and count the threads.<sup>1</sup> We were able to identify positively two types of plain weave, one tighter than the other. The leather fragments are very brittle. Some of them show straight stitches sewn with a leather strand (**fig. 1**).



**Fig. 1.** *Fragment of leather with stitching.*

Examination of the skeletons by Nathalie Delhopital has confirmed the remains of leather and cloth shrouds mixed with resin. The shrouds were wrapped tightly around the bodies,<sup>2</sup> which left marks on the skeletons. The combination of these materials in this first-century AD tomb matches what has been found on a larger scale in tombs IGN 20 and 117. The leathers found in these tombs were studied by Céline Bonnot-Diconne and Martine Leguilloux.<sup>3</sup>

Tomb **IGN 97**, excavated in 2014 (Delhopital 2014) has yielded small conglomerated layers of resin<sup>4</sup> in contact with layers of cloth, fragments of straps of which about twenty with a knot, numerous pieces of plain weave, as well as a very small number of extended tabby\* or *louisine\** fabric. The most commonly used fibre is flax, but a small quantity of wool (or rather hair, as the animal species could not be identified) and cotton was also found.

The **straps** in tomb IGN 97 were found in large numbers: they filled four bags measuring 50 x 30 cm, accounting for several hundred fragments of various sizes.

1 - 50561\_T01 (L. 1.5 cm, W. 4 cm) and 50561\_T02 (L. 1.4 cm, W. 2 cm): fragments of leather with a fragment of plain weave, number of threads: vertically (small size) = flax, 18 threads per cm, S-twist; horizontally: flax, 15 threads per cm, S-twist; this is a lower thread count than for the plain weave which we have classed as finer, although we were unable to count the threads.

2 - Delhopital 2015: 66, skeletons 50563 and 50564; 67, skeletons 50550 and 50561; 71, skeleton 50542; 73, skeleton 50531.

3 - Bonnot-Diconne 2009; Leguilloux 2012.

4 - Consisting of fatty substances mixed either with vegetal gum or with a triterpenic resin (Mathe *et al.* 2009).





Fig. 2. Knot in extended tabby, 50432\_T01.



Fig. 3. Knot in lousine edged with a brown line, 50432\_T16.



Fig. 4. As figure 3, 50432\_T19.

Their typology is identical to the straps found in tombs IGN 20 and 117. They measure between 1.8 and 4.2 cm wide. They are all made of flax, even the brown-coloured threads on the edges of some of the samples. The most common weave\* is the *lousine*, edged with a plain weave selvedge\*, and occasionally with brown threads emphasizing the edges. The thread count is more or less low. There are a few rare examples of plain and extended tabby weave. None of the straps was in contact with a fragment of cloth or leather, as in tomb IGN 117 (Dal-Prà 2012). Analysis

was conducted on all fragments with knots, amounting to about twenty: 50432\_T01 in braided weave (fig. 2), 50432\_T16 in *lousine* edged with a brown line (fig. 3), and 50432\_T19 (fig. 4). This completed the study of material in tomb IGN 117. The remainder of the fragments, at present kept in polyethylene bags, could ultimately be sorted by knot type in order to find connections.

Examples of straps found in the three tombs (IGN 20, 97, and 117) form a homogeneous corpus, regardless of which tomb. Comparisons with similar straps, found in Egypt (Ptolemaic to Roman periods), show a match of the width and type of weave (*lousine*).

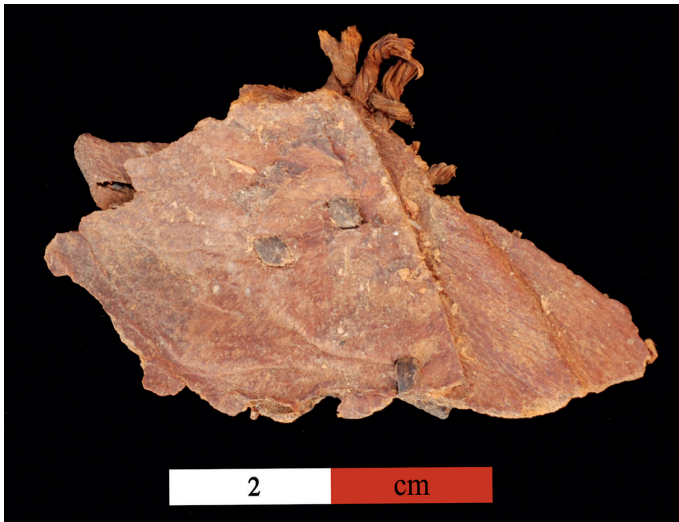
Among the textile material from tomb IGN 97, a few cotton **cords** were collected during sorting, which were folded into a loop and knotted. It was thought that they might have served as harness decoration, for example 50532\_T27 (fig. 5) and it cannot be assumed that they belong to the Nabatean period.

Most of the **fragments of resin mixed with layers of cloth** were examined (fifteen groups). Items that only held an imprint of cloth were set aside. Among the fifteen resin conglomerates, two had an outer layer of leather: 50432\_T33 and 50432\_T39<sup>5</sup> (fig. 6, front and fig. 7, back), the latter was very similar to 50534 (fig. 1).



Fig. 5. Group of cords, 50432\_T27.

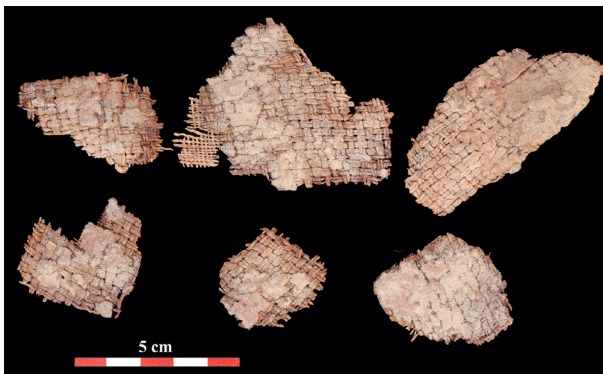
5 - See al-Salameen and Falahat 2009: 94. Small piece of leather with stitching, found together with fragments of fine white fabric and a cruder fabric of yellowish colour, second/third century AD.



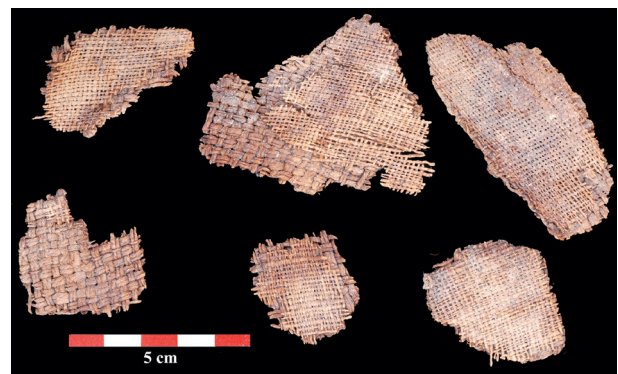
**Fig. 6.** Resin conglomerate mixed with layers of cloth and covered in leather, 50432\_T39, front.



**Fig. 7.** As figure 6, back.



**Fig. 8.** Fragment of extended tabby associated with remains of leather and plain weave, 50432\_T33, front.



**Fig. 9.** As figure 8, back.

Of the twenty-four analysed fabrics, one is in extended tabby<sup>6</sup> associated with the remains of leather and plain weave fabric (50432\_T33, **fig. 8**, front, and **fig. 9**, back), the rest are in plain weave. Ten are of S-twist flax, five of S-twist cotton, five of S-twist hair or a Z-slight-twist made up of two S-twist ends, and four could not be analysed. It was not possible to find a connection in the thread count between flax weaves and cotton weaves: whatever the fibre, it varies from six threads in one direction and eight in the other to twenty threads in both directions. On the other hand, the woollen cloths all have a higher thread count, the highest being twenty threads in one direction and twenty-eight in the other. The difference in quality in the same group seems to suggest that this is possibly the layer of fabric that lay closest to the body.<sup>7</sup>

A fragment partially coated in resin differs from this group (50432\_T54, **fig. 10–11**). This is a linen cloth decorated with a brown (or originally red) band with a thin yellow border woven in wool (indeterminate animal). It is one of the rare decorated fragments among all those discovered in the tombs.<sup>8</sup>

Among the mass of sorted fragments, about twenty **cloths** were selected according to their technical characteristics: weave (plain, *louisine*, extended tabby), selvedge, fringes, and stitching.

6 - It is possible that these fragments belong to a strap, but no selvedge was observed.

7 - Bouchaud *et al.* 2015.

8 - Dal-Prà 2012: 11, fig. 30.5.

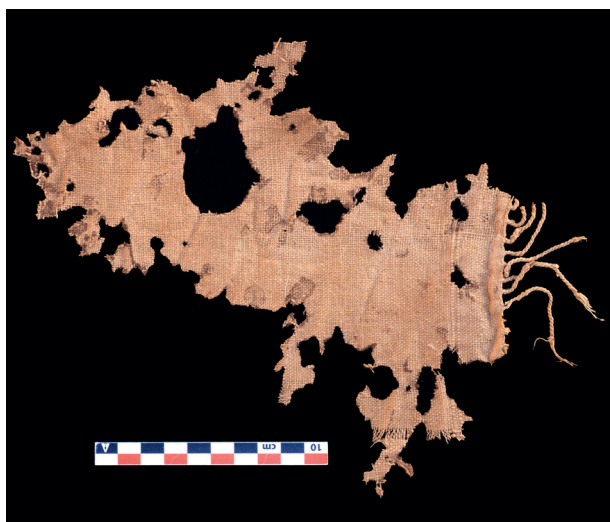




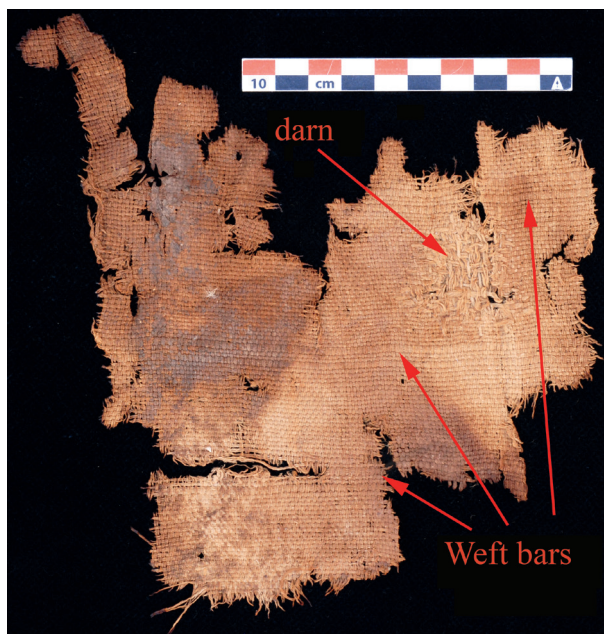
**Fig. 10.** Fragment of linen decorated with a band of brown woollen weave edged with a thin yellow line, front.



**Fig. 11.** As figure 10, back.



**Fig. 12.** Cotton fabric with fringes, weft bars, and a strip showing holes in the weave, 50432\_T41.



**Fig. 13.** Linen cloth in extended tabby with selfband of three weft bars and a darn, 50432\_T50.

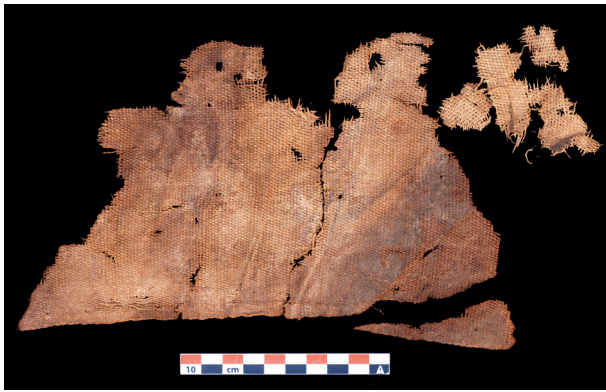
Several fragments of plain weave<sup>9</sup> of the same cotton fabric, both warp and weft, exhibit fringes, selfband, and strips with holes in the warp. These holes are surprising, but they could be explained by the fact that threads of a different material were used, which have now disappeared (50432\_T41, L. 26 x 1.20 cm, **fig. 12**). This textile has no equivalent in the other tombs. This is also the case of another fabric, 50432\_T50 (**fig. 13**). It is a flax braided weave in both directions with selfband made of three weft bars and a darn.<sup>10</sup> Apart from these two textiles, most of fragments that were sorted and studied have no distinguishing features. The linen fragment 50432\_T47<sup>11</sup> (**fig. 14**) is representative of a large number of the fabrics observed. It is a plain weave with a very apparent warp, similar to some of those in contact with the piles of resin, such as 50432\_T66 (**fig. 15**).

Lack of time prevented us from examining the textiles from tomb **IGN 88**. These include numerous fragments, including leathers with layers of different plain weaves superimposed on layers of resin, as in the two other tombs (50421\_L01, **fig. 16–17** and 50421\_L01, **fig. 18**).

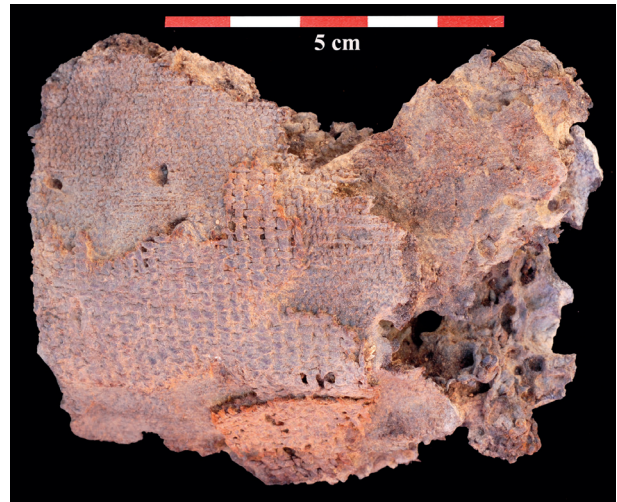
9 - 50432\_T41, 50432\_T42, 50432\_T43, and 50432\_T44, 12 to 15 simple threads, Z-twist in the warp, 10 to 12 simple threads, Z-twist in the weft.

10 - L. 18.5 cm, W. 16 cm, 10 double threads per cm (i.e. 20 threads) in the warp, S-twist; 7 double threads per cm (i.e. 14 threads) in the weft, S-twist; the darn measures 4 x 3.5 cm and was done with a simple flax S-twist thread.

11 - L. 24 cm, W. 13.4 cm, fragment of plain weave with a 24 cm selvedge, 14 simple S-twist threads per cm in the warp; 7 simple S-twist threads per cm in the weft.



**Fig. 14.** *Linen cloth, weave with a very apparent warp, 50432\_T47.*



**Fig. 15.** *Another example of a weave with a very apparent warp, 50432\_T66.*



**Fig. 16.** *Fragments of leather with layers of plain weave fabric superimposed over layers of resin from tomb IGN 88, 50421\_L01.*



**Fig. 17.** *As figure 16, back.*



**Fig. 18.** *Another example of fragments of leather and superimposed plain weaves, 50421\_L02.*

The plain weave associated with leather in this group is similar to 50432\_T47 and 50432\_T66. They can be compared to a fragment discovered in the burial tomb of Wadi Matâhah north of Wadi Mûsa in Petra.<sup>12</sup> The textile and leather materials in these three tombs thus have common elements matching those of material discovered in tombs IGN 20 and 117. All this material needs to be examined in more detail. Analysis of the fibres is currently in progress. The main difficulty lies in a lack of comparative pieces.

The fabrics discovered at Khirbet Qazone, for example, are being studied, as are those from other Jordanian sites. When they are published, it will then be possible to establish firm parallels between the burials or to class them by type.

12 - Blackburn 2010: 44, fig. 7.



## Glossary

- *weave*: style of crossing over the warp and weft threads;
- *slight-twist*: loosely twisted yarn or thread;
- *selvedge*: narrow edging formed on each side of the fabric;
- *louisine*: a variation of the plain weave in which the warp and weft threads are grouped in twos or more;
- *extended tabby*: variation of the plain weave in which the warp and weft threads are grouped in twos or threes;
- *twisted thread*: thread obtained by assembling together, generally in the opposite direction, previously twisted threads called “ends”;
- *plain weave*: weave in which the ratio is limited to two warp and two weft threads and in which the odd and even warp threads alternate with each pass of the weft over and under this thread;
- *S- or Z-twist*: twist of a thread which, when held vertically, spirals in the direction of the letter S or the letter Z.

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## CONSERVATION AND CARE OF ARTEFACTS

### Marie Peillet (Metal restorer)

The conservation laboratory activity at Madâ'in Sâlih concerns mainly the treatment of the metallic artefacts discovered either during the on-going excavation season or during previous seasons if extra treatments need to be applied, for instance and most often on coins. The other kinds of material which are treated in the lab include stone, glass, ostrich eggshells, etc. Occasionally, pottery fragments are glued in order to obtain a more complete profile, and this is done under request by the ceramicists. The conservation laboratory is equipped to provide chemical (solvents, sequestering agents, acids), mechanical (scalpel, fiberglass sticks, Dremel(r), ultrasound pen, etc.), and electrochemical treatments, under binocular (**fig. 1**).

During the 2016 mission, a little more than 100 objects were treated in the conservation laboratory, either for a simple cleaning or a more complete conservation process.

### 1. Objects

Each day, the artefacts isolated by the archaeologists on the field are recorded in a database and then given to the various specialists for study. At the conservation lab, the artefacts made of stone, glass, metal, etc. are systematically washed with water, demineralised water and/or ethanol, and then carefully dried. If necessary, consolidation and gluing can be performed with synthetic conservation material (acrylic rosin: Paraloid(r) B72 and B44).

The metallic artefacts from the site are mostly copper alloy fragments of objects, folded sheets, pins, etc. The metal core is relatively well preserved but the external corrosion layers are often thick and hard.

The iron objects are very degraded and badly preserved at Madâ'in Sâlih. They are entirely corroded and very fragmented. Only the big and dense objects are generally found, but they are very difficult to



**Fig. 1.** View of the conservation laboratory.

study because they are extremely fragmented and their dimensions vary considerably: the advanced corrosion of the iron multiplies by 2 or 3 the dimensions of the objects, thus making their interpretation more difficult. The copper alloy objects are treated in both chemical and mechanical ways. The surface layers of corrosion are softened (partially dissolved) in sequestering agent solutions (EDTA, sodium citrate, 5% solutions in demineralised water), and the corrosion is removed mechanically under binocular (scalpel, ultrasound pen, Dremel(r), fiberglass sticks, etc.). After careful rinsing and drying, any additional information obtained through the cleaning of the object is registered in the database.

All the artefacts from Madâ'in Sâlih are kept in the storerooms of the al-'Ulâ museum. These storerooms seem very stable (temperature, humidity level) and there is no sign, on the objects which have been stored there for several years, of any active corrosion. In consequence, most of the metallic artefacts are not protected by a varnish unless this is really needed.

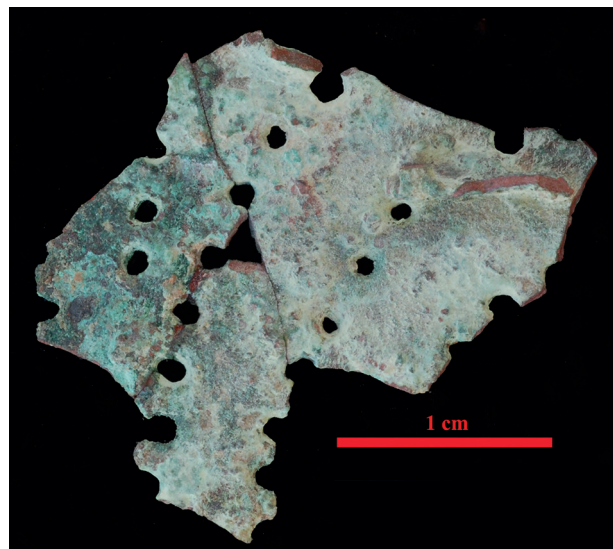




**Fig. 2.** Iron axe (34219\_M01) found in very bad condition. In order to avoid further losses, the completely corroded iron has been consolidated with Paraloid B44.



**Fig. 3.** Copper alloy signet-ring (34015\_M01) covered with corrosion. The corrosion has been removed from the signet only because it hid information such as engraved patterns.



**Fig. 4.** Copper alloy small fragments with holes (34207\_M07). The fragments have been cleaned and glued back together to obtain partial patterns of the holes.



**Fig. 5.** Copper alloy female head (Surface\_M261) which may be part of a pendant or a lid. It has been completely treated (removal of corrosion through chemical and mechanical cleaning, filling with Paraloid B44 and glass micro balloons) to reveal the details.

## 2. Coins

The treatment of the coins is a big issue for the conservation laboratory because the coins are a very important source of information for the archaeologists. The coins found in identified *loci* in the field are treated prior to the surface coins. The surface of the coins is most often covered with a thick and hard corrosion layer which has to be removed in order to show the symbol(s) and caption of each coin. The coins are therefore treated with chemical and sometimes electrochemical procedures (to reduce the corrosion layers), before a mechanical treatment is undertaken under binocular in order to obtain as much detail as possible.

During the 2016 campaign, the numismatist Thomas Bauzou was working on a particular type of coin (the so-called owl type). Some of the coins which had been previously cleaned electrochemically have therefore been cleaned again, mechanically this time, in order to get more precise information.

## 3. X-ray tomography

During the 2014 campaign, a large iron object, very corroded and fragmented, was discovered in Area 6 (*locus* 60691). In the same area, in 2011, a copper alloy casket had been found. Considering the context, it seemed important to try to understand the function of this iron artefact. However, the conservation laboratory was not equipped for this and we could only put back together some fragments. It is well known that the principal method commonly used to determine the shape and the real surface of archaeological iron objects is X-ray radiography.

In 2016, the Madâ'in Sâlih Project has had the opportunity to work with engineers from King Abdullah University of Science and Technology (KAUST) to perform an X-ray tomography analysis on this iron object. The purpose of this analysis was to locate the surface in between the corrosion layers and to have an idea of the shape of the object. Fragments from another very large iron object found in 2016 (from *locus* 34227) were also sent to the KAUST laboratory for the same purpose. The methodology and results of this analysis are presented in the next report.



## PRELIMINARY REPORT ON THE PHYSICOCHEMICAL CHARACTERIZATION OF CORRODED METAL ARTIFACTS

Laurence Hapiot and Gilles Lubineau (KAUST)

### Introduction

We have been charged, with the agreement of the SCTH authorities in Riyadh, to analyse two heavily corroded metal fragments to assess the informative potential of physicochemical investigations on such artifacts. This report mainly presents the approach, as the first phase was mainly exploratory. This first phase was entirely based on non-destructive methods of investigation to:

- assess the conservation of the metal and its state of deterioration;
- attempt a reconstruction of the original shape of the object, to consider in determining the function;
- characterize each object by its chemical composition.

The analyses were performed in King Abdullah University of Science and Technology (in COHMAS Laboratory for XRay CT, and in the Analytical Core Lab for XRF). This project has also provided the framework for the internship of Mohammed Al Bassami, a Saudi student enrolled as a KAUST Gifted Sponsorship Program student in Penn State University.

### 1. Description of samples and their conservation

#### *Artifact 34227\_M*

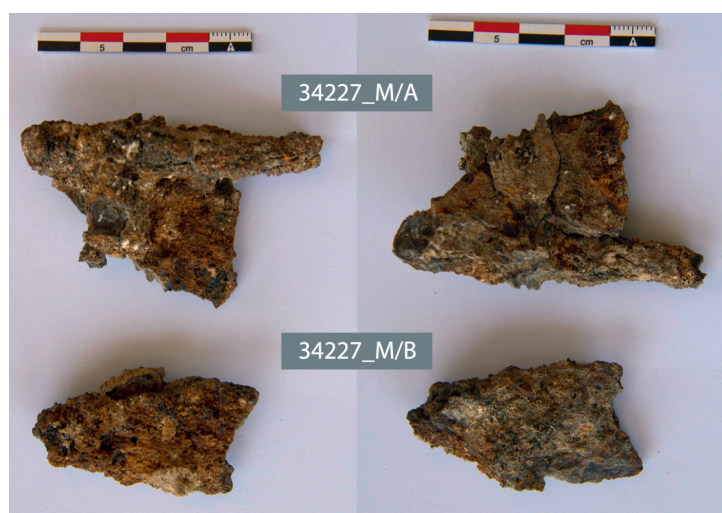


Fig. 1. Fragments 34227\_M/A and 34227\_M/B.

This artifact, discovered in 2016, is constituted of two fragments, which do not match (**fig. 1**). The bigger one (70 x 41 mm, referred to below as 34227\_M/A) presents a singular morphology as a “T-shaped” rod can be distinguished within the fragment. The second fragment (50 x 25 mm, referred to below as 34227\_M/B) is flat and presents metallic exfoliation layers, also called flaking. The two fragments show a similar corrosion, globally red-orange with black spots.

#### *Artifact 60691\_M*

The object was discovered in 2014. It consists of 24 fragments of varying size (**fig. 2**). Despite the fact that the complete shape of the object could not be reconstructed, fragments could be glued back together to recover several features of the shape of the object:

- Group G1 (**fig. 3**) shows a circular shape (diameter 102 mm);
  - Group G2 (**fig. 4**) appears to be the bottom (or top) of the circular part of the object;
  - Group G3 (**fig. 5**) has an elongated shape (length: 95 mm; diameter: 30 mm). The appearance of the outer surface shows that it is either another part of the object (one end, or a handle or grip) or a different object.
- All objects are massively oxidized as they feature significant cracking, flaking and discoloration.



**Fig. 2.** 24 fragments of artifact 60691\_M.



**Fig. 3.** Reconstructed fragment with circular shape 60691\_M/G1.



**Fig. 4.** Reconstructed fragment 60691\_M/G2.

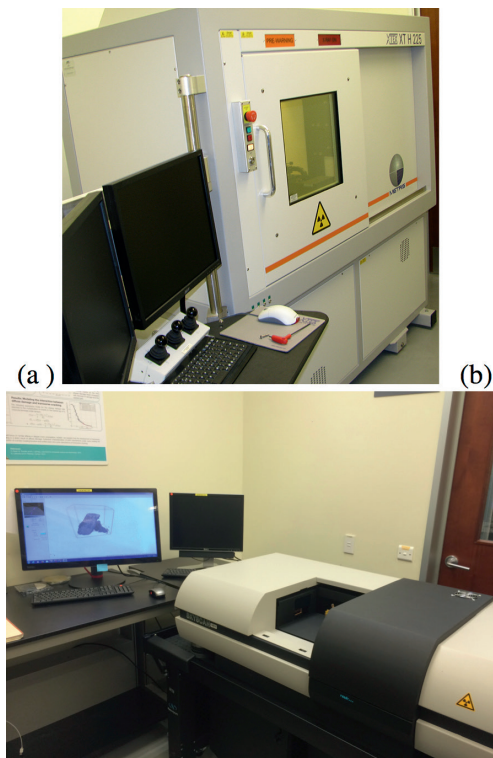


**Fig. 5.** Reconstructed fragment 60691\_M/G3.



## 2. Methods and laboratory equipment

### *X-Ray Computed Tomography*



**Fig. 6.** 2D radiographic projections of 34227\_M/A. (a) X-Tek XT H 225 cone-beam  $\mu$ -tomograph; (b) Skyscan 1172.

Two different scanners, located in Cohmas Laboratory/KAUST, were used, the choice between the two depending mainly on the size of the object.

By default, we used an X-Tek XT H 225 cone-beam  $\mu$ -tomograph with a wide scanning room which can accommodate even our biggest samples (**fig. 6a**). A microfocus X-ray source is used providing a spot size of about  $3\ \mu\text{m}$ . The voxel size varies from sample to sample depending on the amplification, but is usually ranging from  $10$  to  $30\ \mu\text{m}$ . The X-Tek XT H 225 can operate up to relatively high voltages ( $225\text{kV}$ ), which are sometimes required when working with thick metallic samples. Aluminum filters (which remove one part of the X-Ray spectrum and prevent unnecessary dispersion) were generally needed to ensure good quality of the radiographic images.

For selected samples of smaller size, we also performed additional scans using a Skyscan 1172. This bench system (**fig. 6b**) can scan the samples with a voxel size as small as  $0.5\ \mu\text{m}$  but its scanning room is limited to samples no larger than  $30\ \text{mm}$ .

### *X-Ray fluorescence (XRF)*

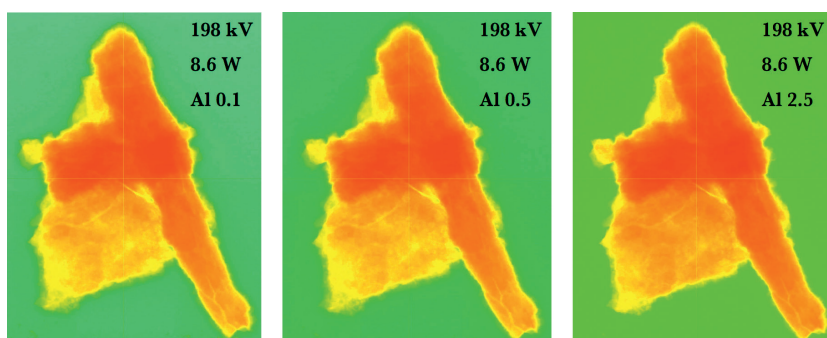
The surface chemical composition of the samples was characterized by analysis of X-Ray fluorescence using a

XGT-7000n Horiva equipment located in core laboratories/KAUST.

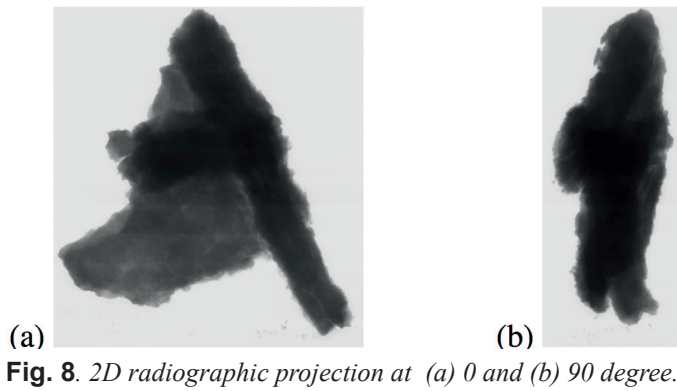
It is clear that applying non-destructive techniques on the surface of the samples is not a valid final approach. It does not inform quantitatively about the composition of the sample as what is measured is mainly the pollution of the surface. However, since we did not want at that time to go for more destructive sampling, we limited ourselves to a first qualitative evaluation. Some fragments have been specifically chosen for the existence of clear inner fracture surface that was a way to get more meaningful data with respect to the composition of the core of the samples (for example, fragment 60691\_M no. 13).

## 3. Preliminary results

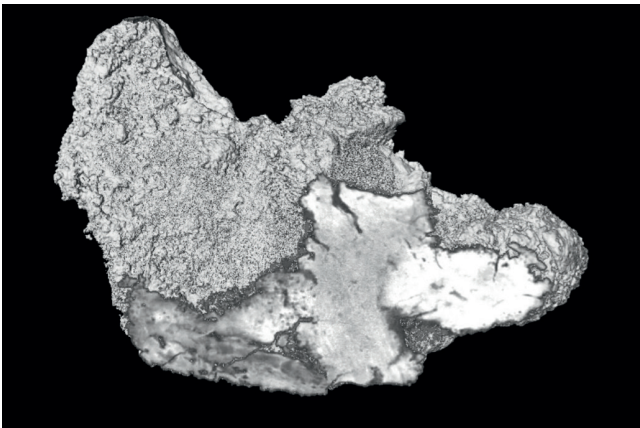
### *Artifact 34227\_M*



**Fig. 7.** 2D radiographic projections of 34227\_M/A.



**Fig. 8.** 2D radiographic projection at (a) 0 and (b) 90 degree.



**Fig. 9.** 3D reconstructions (a) with cross-section to show the inner core.



**Fig. 10.** Location of XRF sampling points on the surface of 34227\_M/B.

Radiographic observations: 34227\_M/A was first scanned using the X-Tek XT H 225. Fig. 7 illustrates the artificially colored 2D projections obtained at 198kV/8.6W using three choices of Aluminum filters. We clearly identify a denser core, with a “T-shape” surrounded by a less dense part.

Following these first 2D projections, a complete scanning has been performed (Voltage=168kV, current = 85uA). 721 projections were captured corresponding to an angular resolution of 0.5deg. A frame averaging technique (4 frames/projection) was used to reduce further noises for each projection. **Fig. 8** shows the projection at 0 and 90 degree of the object.

Cross section in **fig. 9** shows the intensity of corrosion within this part as cracks can be observed almost up to the core of the material. This conclusion holds for all parts: the corrosion is very severe and we do not see evidence of a core with the pristine material.

The following step will be to analyse the morphology of these reconstructions to detect inclusions, evidence for welding or other treatments that might help identifying the fabrication technique.

*Chemical composition:* XRF measurements were made at 15 different sampling points over the surface of 34227\_M/B (**fig. 10**).

**Fig. 10** provides the XRF results limited to the 6 more common elements in the sample: Fe, Si, Al, S, Ca and Tb. The average values for each element over the 15 sampling point are provided as “AVERAGE ALL”, Table 1.

However, it seems that among all the 15 spectra, two typical profiles can be extracted. Spectra 1, 2, 9 and 12 (type I) have a high Si and Ca content, whereas all the others (type II) are more enriched in Fe. We can conclude that type I sampling points are probably very polluted from

the soil, and testify from the presence of silicates. Other points (type II) might be more representative of the sample, which is mainly made of Fe (65%), Si (16%), Al (6%), S(4%) and Ca (2.6%).

Getting more information about this iron object would require investigating it invasively (in the core) about its chemical content (carbon content and other impurities) and its microstructure.



Spectrum Label	Fe	Si	Al	S	Ca	Tb	TYPE
Spectrum 1	21.18	34.35	10.74	7.02	19.36		I
Spectrum 2	42.72	32.69		10.21	9.12		I
Spectrum 3	80.06	8.71		1.75	1.06	4.89	II
Spectrum 4	77.24	9.38	4.91	1.97	0.49	2.99	II
Spectrum 5	68.80	17.16	5.51	2.15	1.02		II
Spectrum 6	64.96	19.83	5.90	1.51	1.01	3.54	II
Spectrum 7	62.08	14.66		7.80	6.55	3.87	II
Spectrum 8	48.46	18.89	7.87	10.12	7.55	3.42	II
Spectrum 9	18.33	33.80	9.66	16.24	15.25		I
Spectrum 10	60.80	25.08		0.83	1.29	5.98	II
Spectrum 11	52.10	24.07	6.87	6.03	1.60	3.56	II
Spectrum 12	45.14	33.31	8.62	4.39	1.81		I
Spectrum 13	70.62	11.97	5.32	3.52	2.89	2.76	II
Spectrum 14	84.19	8.28			0.61	4.63	II
Spectrum 15	53.87	26.14		6.73	4.77	4.56	II

AVERAGE ALL	56.70	21.22	7.27	5.73	4.96	4.02	
AVERAGE (Type II only)	65.74	16.74	6.06	4.24	2.62	4.02	
SD (Type II only)	11.18	6.35	1.01	3.03	2.40	0.93	

**Table 1.** Main elements in the XRF spectra of 34227\_M/B.

#### *Artifact 60691\_M*

##### *Radiographic observations.*

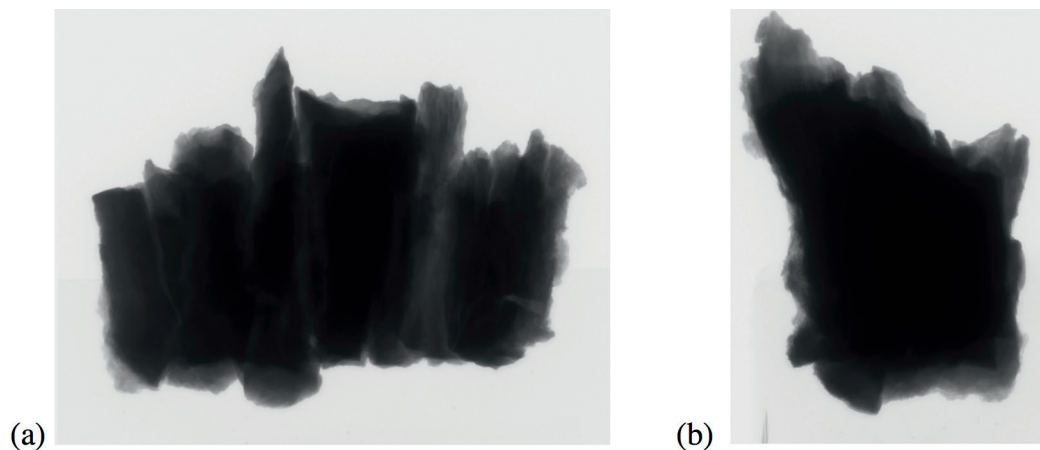
A complete scanning has been performed for the object 60691\_M/G3 (Voltage = 225kV, current = 84uA). 721 projections were captured with a 0.5 mm Al filter and averaging on 4 frames. **fig. 11** shows the projection at 0 and 90 degree of the object.

A complete scanning has been performed for the object 60691\_M/G1 (Voltage = 203kV, current = 55uA).



**Fig. 11.** 2D radiographic projection at (a) 0 and (b) 90 degree for 60691\_M/G3.

721 projections were captured with a 0.5 mm Al filter and averaging on 4 frames. **fig. 12** shows the projection at 0 and 90 degree of the object.



**Fig. 12.** 2D radiographic projection at (a) 0 and (b) 90 degree for 60691\_M/G1.

*Chemical composition:* two pieces have been analysed for 60691\_M.

Fragment 60691\_M no. 13 is an isolated fragment that probably belong to the same part as 60691\_M/G1. We can easily differentiate on this fragment an oxidized face that was exposed to environment, and a clean inner fracture surface, which is less oxidized. Following the XRF analysis of this inner surface, its chemical content was: Fe (87%), Si (4%), Al (2.5%), Tb (2%), S (1.8%) and K (0.67%).

60691\_M/G3 (the long elongated part reconstructed for various fragments) was also analysed on 20 sampling points over the surface. The average chemical content was: Fe (70%), Si (15.6%), Al (7.8%), Ca (6%), S (2.7%) and Tb (1.3%).

## **Conclusions**

The XRF data are at this stage too coarse to provide any definitive conclusion. The only certitude is that we are facing here iron or iron alloy for all objects. The observed different Fe content in 60691\_M/G1 (via 60691\_M no. 13) and 60691\_M/G2 can result from a different conservation or from a different pollution of the surface by the environment. All these samples should be analysed after cross sectioning so that the core can be probed. Other techniques, revealing more precisely the type of oxides as well as the content in light elements are also be needed.



## OTHER ACTIVITIES BY MEMBERS OF THE PROJECT

### Dadanitic inscriptions

Laïla Nehmé spent a few days re-examining, with a view to publication, the collection of Dadanitic inscriptions at Madā'in Sâlih, which consist of about 100 short texts distributed throughout the site in roughly twenty epigraphic locations. She therefore took advantage of the expertise of Khalid Alhaiti, who initially trained as a geomatician and with whom she collaborated in part of the epigraphical survey carried out during the first four-year period of activity at Madā'in Sâlih, between 2002 and 2005, as well as the presence in the team of Damien Gazagne (Éveha) who, during her absence, supervised fieldwork to the east of IGN 132. There are two good reasons for the re-examination of this collection:

1/ Recent interest in the so-called 'Lihyanite' period at Hegra, the chronology of which has recently been reviewed and assigned an earlier date (roughly the fifth and fourth centuries BC): the so-called Dadanitic inscriptions are those that correspond to this period of occupation of the site (Rohmer and Charlux 2015); 2/ to find, photograph, and localize several groups of inscriptions, which we had previously been unable to find. Some had been seen by A. Jaussen and R. Savignac at the beginning of the twentieth century, while a group of thirty-six texts was published (in Arabic) in 2002 by H. Abu al-Hassan (2002: nos. 312–347). These thirty-six texts had allegedly been found at a high point, dominating the landscape, of the northern part of Jabal Ithlib, on a plateau identified as an observation point for soldiers in charge of protecting the Lihyanite territory. This interpretation was based not only on the location of the texts, but also on the mention, in sixteen of them, of the term *nṯr ddn* 'he protected Dadan', Dadan being the name of the capital of the kingdom of Lihyan.

After four or five days' work, all the known epigraphic locations were reviewed, geolocated, and detailed photographs taken. Most of the inscriptions mentioned by A. Jaussen and R. Savignac were found. Finally, after a day's futile attempts to locate the inscriptions published by H. Abu al-Hassan, Khalid Alhaiti and Laïla Nehmé decided to consult the shepherd who had acted as a guide for H. Abu al-Hassan, a resident of al-Hijr called Al-Asmar Hulayyil aṣ-Ṣaylawān al-Kham'alī. He still lives in the village and agreed, despite his fairly advanced age, to serve again as a guide. Thanks to him, the inscriptions were found in a location reachable after a short climb. In the vicinity to the particularly impressive panel on which the inscriptions are carved (fig. 2), there is a parapet walk along which other, unpublished, inscriptions are written.



**Fig. 1.** Part of a large panel covered in Dadanitic inscriptions at Jabal Ithlib, epigraphic point no. 94.1.

To the thirty-six inscriptions already published, therefore, should be added another twenty or so unpublished inscriptions, which were not read by H. Abu al-Hassan. The location of the texts, on a plateau about 50 m above the plain to the north, is ideal as a territorial – or border? – observation post. Furthermore, it is possible that the dry-stone watchtowers, built not far from this panel on the summits of Jabal Ithlib, considered until now to be from the Ottoman period, were in fact Dadanitic. They will be re-examined in 2017 in order to confirm this.

This work marks the completion of the Madâ'in Sâlih Dadanitic inscriptions project as far as the data are concerned, and a publication is planned in the medium term. This will be undertaken in collaboration with Michael Macdonald who is an expert on these inscriptions.

## Lectures

To celebrate the publication in two volumes of *Les tombeaux nabatéens de Hégra* (The Nabataean tombs of Hégra), a book launch and signing ceremony were organized on the 24 January 2016 at the residence of the French embassy in Riyadh, hosted by the Ambassador Bertrand Besancenot, in the presence of Ali al-Ghabban (Secretary general of the SCTH), Michel Zink (Permanent secretary of the Académie des Inscriptions et Belles-Lettres, AIBL), Christian Robin (Vice-President of AIBL), Didier Le Tallec (Director of OTV-LMP [Veolia], large municipal projects<sup>1</sup>), as well as several ambassadors and key figures: see [www.ambafrance-sa.org/Presentation-du-Livre-Les-tombeaux-nabateens-de-Hegra](http://www.ambafrance-sa.org/Presentation-du-Livre-Les-tombeaux-nabateens-de-Hegra) (fig. 2).



**Fig. 2.** From left to right: Maud Besancenot, Bertrand Besancenot, Michel Zink, and Ali-al-Ghabban asking a question following L. Nehmé's speech.

Eighty copies of the book were delivered to Riyadh and either sold directly or bought by the French embassy's SCAC (Service de coopération et d'action culturelle [Department of cultural cooperation and activities]). The proceeds were later used to reimburse the *Académie des Inscriptions et Belles-Lettres* the € 8000 it had put into the printing of the two volumes. As well as various speeches (by B. Besancenot, M. Zink, A. al-Ghabban, L. Nehmé), the evening included a showing of those excerpts from the documentary film *Pétra capitale du désert* ('Petra capital of the desert') which concern Madâ'in Sâlih (Arte, April 2015).

1 - The publication was sponsored by OTV.



## Visits and excursions



**Fig. 3.** *L. Nehmé, M. Zink, D. Le Tallec, and B. and M. Besancenot in front of the excavation area of the city gate.*



**Fig. 4.** *Daifallah al-Talhi explaining the Saudi excavation to the Saudi Minister of Trade.*

As is usual every year, the team received several groups of visitors:

- the French ambassador and his wife, accompanied by M. Zink, C. Robin, and D. Le Tallec (see above) (**fig. 3**);

- the Italian ambassador and his wife;

- the Saudi trade minister, Toufic ar-Rabi' (**fig. 4**);

- the economic adviser at the French embassy, Princess Reem Mohammad al-Faysal, the Polish team from the archaeological project of 'Aynûnah, a group of students from King Saud University in Riyadh, etc.

Finally, all the members of the project – both European and Saudi – were delighted to be able to visit the site of 'Aynûnah on the Red Sea, 500 km north-west of Madâ'in Sâlih, which has been excavated for the last two years by a Polish team led by M. Gawlikowski. It entailed spending the night in 'chalets' rented at the project's expense. Apart from the archaeological interest of the visit and the contacts that were made with the excavation team at 'Aynûnah, this was also an opportunity for

a genuine exchange of ideas and friendship outside the strict working environment.

## Conclusion and future projects

The 2016 season has proved to be less fruitful than expected in terms of actual archaeological results because fewer excavations areas were opened than originally planned (four, of which one was led by our Saudi colleagues, and only two weeks' work on the south-east gate of the city wall). As mentioned in the introduction, this was due to the absence of F. Villeneuve and L. Tholbecq. Nevertheless, the results are generally satisfactory, especially as regards the Roman garrison camp where the plan and chronology are now better established. As for the excavation of the south-east gate of the city wall, it was possible to demonstrate the existence of Nabataean occupation levels: at least three pre-Roman phases have been revealed, of which the third – second half of the first century AD – is already characterized by a gate in the city wall, while the fourth corresponds to a second-century Roman phase.

Excavations opened around mound IGN 132 have partly suffered from the complexity of the terrain:

numerous destruction layers, very compacted in some places; severe imbrication of exposed built elements, the majority built of mud brick, sometimes on stone substructures, which have merged together with the surrounding degraded mud brick; finally, the absence of proper connections between different excavations and test trenches, which hinders our understanding of an area measuring almost 1 ha. The Nabataean phases, from the advent of the Christian era to the beginning of the second century AD, were reached in various locations both at the summit and at the foot of the outcrop, but they are quite degraded, very incomplete, and covered by Roman to proto-Byzantine levels which have hidden the majority of the original elements of what continues to be interpreted as an urban Nabataean sanctuary (high temple and low temple?).

The results obtained by the project must also be judged according to the study of the materials undertaken by those members of the team who worked in the laboratories set up in one of the railway station buildings: pottery, fauna, textiles, coins, and metal objects were examined in 2016. The **pottery** is studied in a systematic manner, *locus by locus*, a tedious but necessary task rigorously undertaken each year by the two ceramologists, in order to provide the archaeologists, sometimes very shortly after excavation, with an interpretation of the excavated material.

In the case of the **textiles**, this year P. Dal-Prà continued the work she had undertaken in 2012, which contributed to the reconstruction of the burial process in tomb IGN 117, a medium-sized decorated facade tomb. This reconstruction was also based on the study of the leather, resins, and vegetal remains (see Bouchaud *et al.* 2015) which were put to light in both IGN 117 and in IGN 20, one of the largest facade tombs on the site (which contained textile fragments as well). In 2014 and 2015, several other tombs yielded textile fragments: IGN 88 (small facade tomb), IGN 116.1 (simple funerary chamber without a decorated facade), and IGN 97 (medium-sized facade tomb). The questions asked to P. Dal-Prà were thus as follows: does the material extracted from the other tombs at Madâ'in Sâlih corroborate the results obtained from tombs IGN 20 and 117? Is the burial process generally the same from one tomb to another, or are there differences related to the dimensions of the tombs and consequently to the social status of their owners? Were the funerary rites more or less identical throughout the site? The answer to these questions, inasmuch as it is possible to answer them in view of the state of the material (**fig. 5**), is yes, with the proviso that the leathers from tombs



**Fig. 5.** P. Dal-Prà and 'punnets' filled with countless textile fragments to be studied.

excavated in 2014 and 2015 have yet to be studied, and this will be done by M. Leguilloux in 2018. This is a definite advance on the studies of funerary practices in Nabataea; the next stage will be a consideration of the regional characteristics of these burial rites, especially in comparison with those known at Petra.

Finally, with respect to the **fauna** and the **coins**, the project's directors chose to let the two specialists in charge of this material, J. Studer and T. Bauzou, prioritize the tasks: first, the material from the

Roman garrison camp, second the so-called owl coins. In both cases, the results of their studies, presented in this report, are entirely new. Evidence of a coinage minted at Hegra by an – as yet – indeterminate political entity between the fourth and first centuries BC, i.e. before the arrival of the Nabataeans, represents a breakthrough.



## Future projects

The 2017 season will be the last official excavation season of the ongoing four-year period, which began in 2014. Emphasis will therefore be on the excavations opened in the residential area: Roman fort, city gate, Area 9 (domestic and possibly cultic), and urban sanctuary IGN 132 in its context.

The following two years, 2018 and 2019, will be devoted to **publications, complementary surveys, and the study of some types of material** neglected up to now (see below). There is no plan to begin another four-year excavation period immediately after the end of the current one. A waiting period is necessary and one or two future seasons of study and survey will enable us to take stock of the various issues and to decide on the direction to take in a future potential research programme.

One of the most important publications is that of the **pottery** at Hegra, for which two ceramologists, C. Durand and Y. Gerber, collected a large amount of data: 3200 isolated sherds, all photographed and most of them drawn, 1300 analysed archaeological layers and their content described by category. The pottery – great quantities of it – is locally produced, although it does include imported material: fine ware from Petra, black glazed ware, amphorae from the eastern Mediterranean, eastern sigillata – and two fragments of western sigillata, — green-glazed so-called Parthian ware, etc. (see Durand and Gerber 2014: 159–164). As the material from north-east Arabia is still very little known (the same work is ongoing at the site of Taymâ' but is not yet published), it is important to introduce this frame of reference, which will be very useful for all archaeological work undertaken in the region.

In June 2016, a meeting with the mission's ceramologists was set up in Paris to establish their aims and draw up a schedule. The material presented will be primarily that of areas 1, 2, and 9, to which will be added firstly material from excavations undertaken in Jabal Ithlib (Nabataean banqueting halls) and in the tombs, which is relatively less abundant, and secondly, imported material. One chapter will discuss the specific characteristics of Nabataean fine ware from Hegra, while another will examine the chemical and mineralogical analysis of the sherds. A 10–15-page chapter on each of the areas 1, 2, and 9, written by the archaeologist responsible for that particular excavation, is also planned. These chapters will summarize the stratigraphy and chronology of each excavation. This will help the ceramologists to establish a concordance of the phases in the three areas. The schedule will be as follows: submission of the chapters on the different areas in June 2017 for publication in 2018.

Another publication is planned on **the religious monuments of Jabal Ithlib**, comprising about 100 small monuments, of which at least twenty-five are unpublished,<sup>2</sup> and which were surveyed and described between 2002 and 2005, during the first four-year period of exploration of the site. These monuments are interesting for the following reasons:

- they present types and variations of types which do not exist at Petra (e.g. 'horizontal' betyls);
- they appear in various archaeological and spatial contexts (compounds used for meetings of religious brotherhoods or isolated monuments along roads);
- they are often associated with Nabataean inscriptions – signatures of members of religious brotherhoods who met in the compounds to which they belonged;
- their relatively small number means they can be studied comprehensively;
- there is extensive information on these monuments and well-archived documentation (photographs, surveys, plans, descriptions), which allows for publication in reasonable time;
- a four-month contract has been obtained in autumn 2016 from Labex RESMED for Delphine Seigneuret, who has recently defended her thesis on the Nabataean temple at Khirbet edh-Dharih in Jordan. She will take over this project with a view to publishing the results with L. Nehmé, who will for her part undertake the necessary supplementary checks on site for the publication of the inscriptions.

The other planned **publications** will deal with the results of the actual excavations – the domestic areas, Nabataean tombs, tumuli, and Roman camp – as well as on the material – the coins, especially the so-called

2 - Nehmé 2005: 656–667.

‘owl’ coins, fauna, leathers, and vegetal micro-remains. Some of these publications will appear as journal articles rather than as independent books.

Finally, the agreement signed between the project and Airbus Group includes, among other things, the planned publication of **an archaeological and epigraphic guide** to Madâ’in Sâlih, now visited by more than 100,000 tourists a year. There is as yet no such guide – a serious omission for a site that is included on the Unesco World Heritage list – and it is the project’s responsibility to produce one.

The **complementary surveys** and plans concern on the one hand, the verifications which need to be made with a view to publishing the projects and on the other, to avenues of research that it would be interesting to explore:

– **projects to be published:** these are the religious monuments of Jabal Ithlib and the inscriptions associated with them; the Dadanitic inscriptions (see above); the wells. Note that the data which was collected on the wells from 2002 to 2005 (description of 132 wells, photographs, and plans) was passed on to Céline Marquaire, who registered as a doctoral student under the supervision of Laïla Nehmé in 2016;<sup>3</sup>

– **other projects:** another doctoral student, Anaïs Chevalier, who is writing a thesis on protohistoric funerary monuments, wishes to study a 1500 km<sup>2</sup> area in the region of Madâ’in Sâlih, in addition to the areas she is already studying at Dûmat al-Jandal and al-Kharj. The documents she needs for this have been obtained, with the agreement of Wael Abu-Azizeh who is responsible for the tombs at Madâ’in Sâlih, and given to her in September 2016. At present, the work is being undertaken by remote sensing, but surveys on site, for verification purposes, have not been ruled out and may be necessary. First observations have already revealed the presence of a considerable number of tombs with enclosures in the vicinity of Madâ’in Sâlih, as well as the existence of a type of tomb that has not been seen elsewhere: triangular constructions (similar to isosceles triangles) without a tail, while there are almost no so-called cuneiform tombs (with a tail). Moreover, Anaïs Chevalier has observed, to the west of the site, in a wadi branch, a very high density of tombs, comparable to the density of tombs observed in the outcrops of Jabal al-Khramât, but in this case distributed along the foot of the plateau. It should be noted that the question of protohistoric tombs at Madâ’in Sâlih is important in as much as Wael Abu-Azizeh has revealed the existence, at the turn of the third and second millennium, of a funerary tradition that could be characteristic of north-west Arabia (Abu-Azizeh *et al.*, forthcoming).

Another research project could also be undertaken to compare the **carving techniques** in the oldest tombs at Madâ’in Sâlih – carved high up on the rock faces (probably before the Christian era) – and those at Khuraybah, ancient Dadan, in order to establish potential common characteristics. It would be very interesting to know whether stone carvers using the same techniques – or indeed the same stone carvers – worked at both sites. To achieve this, one would first photograph the carved surfaces of a selection of tombs at both sites (**fig. 6**), with a view to producing orthoimages allowing for measurements to be taken. Second, if examination of the orthoimages were to prove insufficient, it might be necessary to call upon a stone carver to examine the carving techniques on site.

In the medium term, Laïla Nehmé would like to initiate a **survey** of the region that lies between Madâ’in Sâlih and Medina, first in order to try and find possible access routes, and second to establish whether this strip of land, measuring almost 300 km, was or was not part of the Nabataean kingdom, and if so to what extent. Finally, it is in this region that one can expect to find new Nabataeo-Arabic inscriptions, i.e. texts written in a transitional alphabet between Nabataean and Arabic, of which most of the known examples are dated to the fourth and fifth centuries AD and come from north-west Arabia (**fig. 7**). This period corresponds to the decline of Roman-Byzantine power in these regions and to the emergence of Arab principalities where administrations contributed to the transition of the Nabataean script towards the Arabic script by using the former on flexible writing materials. This survey, requiring few resources but which is potentially productive in terms of scientific results, would be undertaken in 2018 or 2019. The Saudi authorities, which

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3 - Title of thesis: ‘Water and environment strategies in antiquity in the North Arabian oases’.





**Fig. 6.** Example of a carved surface in a tomb at Khuraybah, ancient Dadan.

have been informally consulted on this project, are not currently opposed to it.

As for the **study of materials**, this part of the project relates not only to the pottery, but also to the glass and stone finds, which have so far not been examined at all. For the stone, contact has been made with a Polish student who would come in 2018 to study the material. Metal finds, especially numerous in the Roman fort, also deserve special attention. Study of the leather finds must also be completed in 2018 as well as that of the fauna, vegetal macro-remains, and pottery.



**Fig. 7.** Example of a Nabataeo-Arabic inscription from north-west Arabia.

In addition, Laïla Nehmé is considering initiating a **European Research Council project** for 2018 involving a comparative study, through multiple perspectives, of the Egyptian and Arabian coasts of the northern part of the Red Sea. There are indeed many parallels between the two coasts, which were certainly in closer contact than was thought and which functioned in a similar way. This project would be an excellent way of uniting, under shared issues, the Polish, Finnish, and Italian teams working on the Arabian coast (at 'Aynûnah, and in the regions of al-Wajh and Umm Lajj, respectively) and in the interior of

these lands (Taymâ' and Madâ'in Sâlih). On the Egyptian side, the project would be focused on the Eastern Desert mission, led by Bérangère Redon.

**In summary**, projects for 2018 and 2019 are as follows:

- **study of the material** (pottery, metal, glass, leather, stone, coins, fauna, vegetal macro-remains, human bones);
- **surveys**: wells, protohistoric (?) tombs, caravanserais (?), and hopefully the region between Madâ'in Sâlih and Medina;
- **thematic studies and other work**: stone-carving techniques in the oldest tombs at Madâ'in Sâlih and Khuraybah; creation of a digital model of the residential area from drone photography;
- **publications**: pottery, religious monuments and their inscriptions, excavation results, Dadanitic inscriptions.

## Conclusion

The Madâ'in Sâlih mission has reached a certain level of maturity, not only through its results which have at times completely revised our knowledge – funerary rituals, importance of the Roman presence, numismatics and issuing authorities of new monetary series, regional chronology, etc. – but also by spreading its influence, enabling it to be at the centre of a number of projects that are beyond its remit but which it has initiated or supported (protohistoric tombs, water strategies, organization of trade and caravan routes, etc.). The collaborations it has set up are numerous and enable it to position itself in the landscape of research in Arabia. The Del Duca prize, won in 2008, ensured a large part of its finance, but the € 200,000 prize-money is more or less exhausted and other financial resources have had to be found. The contract with Airbus Group, which is partly for excavation and partly for the publication of an archaeological and epigraphic guide of the site, was signed in October 2016. Support from the French Ministry of Foreign Affairs and the Saudi Commission for Tourism and Heritage for the two forthcoming study seasons is still needed to complete the ongoing programmes, all equally interesting.

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