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ZBIGNIEW T. FIEMA AND FRANÇOIS VILLENEUVE

The Roman Military Camp in Ancient *Hegra*

ZUSAMMENFASSUNG

Hegra bzw. das moderne Madain Salih im nordwestlichen Saudi-Arabien war in der Antike eine wichtige nabatäische Stadt und Zwischenstation an der Weihrauchstraße. Nach der Annektierung des nabatäischen Königreiches durch Trajan 106 n. Chr. wurde *Hegra* in die Provinz Arabia eingegliedert. Neue saudisch-französische Ausgrabungen lieferten archäologische Belege, die eine dauerhafte Präsenz der Römer in *Hegra* bekräftigen. Das in Areal 35 gelegene Stadttor wurde während der römischen Periode mehrfach umstrukturiert, und mehrere lateinische Inschriften, die die *legio III Cyrenaica* nennen, wurden als Spolien wiederbenutzt. Zusätzlich wurden im Areal 34 deutliche Belege für ein stark befestigtes, urbanes Römerlager des 2.–3. Jahrhunderts n. Chr. freigelegt. Dieser Aufsatz bietet eine kurze Beschreibung sowie Interpretationsvorschläge der relevanten archäologischen Befunde.

The site of ancient *Hegra* (modern Madain Salih in north-western Saudi Arabia) is well-known for its Nabataean monumental rock-cut tombs, similar to those from *Petra*, but it also includes a sizeable settlement. The political and economic importance of the Nabataean kingdom (2nd century BC – AD 106) is attributed to the economics of the long-distance incense trade between South Arabia and the Mediterranean, in which the Nabataeans achieved a manifest success. They established themselves in *Hegra* sometime in the 1st century BC and this frontier settlement soon grew into the significant, southernmost Nabataean commercial entrepôt (Fig. 1)¹.

Following the annexation of Nabataea by Trajan in AD 106, *Hegra* and the northern Hijaz were incorporated into the Roman Province of Arabia². The presence of Roman troops at *Hegra* is attested by the epigraphic record. A Greek inscription mentions a painter of *legio III Cyrenaica*. Greek graffiti left by soldiers of *ala Getulorum* and *ala dromedariorum* are located on the rocks facing the ancient north-south route passing by *Hegra*³. Finally, the monumental Latin inscription, found in 2003 and dated to AD 175–177, mentions the restoration (*restitutio*) of a monument, probably the city wall (*vallum*), with the assistance of two centurions of *legio III Cyrenaica*. The work was done at the expense of *civitas Hegraeorum* and was supervised by a *primus civitatis* who bore a Nabataean name⁴. Of major importance in this presentation is the extant city

wall, traditionally referred to as the rampart (Fig. 2), investigated through the systematic ground and geophysical survey, the examination of aerial and satellite images, and the actual excavations⁵. The rampart, 2,937 m long, encloses the entire settlement in *Hegra* (52.5 ha), and, with some exceptions (inf.), is generally built of mudbrick. The width ranges from ca. 0.85 m (in stone-built section) to 3.9 m, the average of the mudbrick sections being ca. 2.25 m. Currently, 36 towers abut the outer face of the rampart. Assuming the consistent distance of ca. 35 m from each other, at least 80 towers are postulated. Most of the towers, presumably added after the completion of the rampart, appear solid (i. e. buttresses) and almost all feature stone foundations, also where the curtain wall lacks stone foundations. The buttresses are generally ca. 4 m long and 3.5 m wide, which makes them reasonably spacious fighting platforms, although mainly serving to reinforce the rampart. Four or five gates have been located in the rampart, including a major gate in Area 35 (inf.). The pottery from sondages, stratigraphy as well as the construction technique imply that the rampart was built in the 1st century AD, thus during the Nabataean period. The rampart of *Hegra* resembles roundish or oval-shaped urban fortifications common in the Middle East in the 2nd and 1st millennia BC. It equally resembles large Hellenistic or Parthian mudbrick circuits with towers or solid bastions, such as at Dumat al-Jandal⁶ or *Hatra*.

The ongoing French-Saudi excavations at the site have considerably expanded the knowledge on the fortifications of *Hegra* during the Nabataean and Roman periods and, through the provision of new archaeological and epigraphic data, confirmed the presence of a Roman garrison there. This paper presents the preliminary results of the excavations in Areas 34 and 35, directly relevant to this subject.

AREA 35. THE SOUTH-EASTERN GATE (G2)

THE STRUCTURE AND ITS CHRONOLOGY

Area 35, at the foot of Hill A – one of the two major southern landmarks in the topography of Madain Salih (see Fig. 2) – was suspected of containing a gate because, unlike elsewhere, the two towers there, unusually close to each other and relatively large, do not project outward, but towards the interior. The location is convenient for connect-

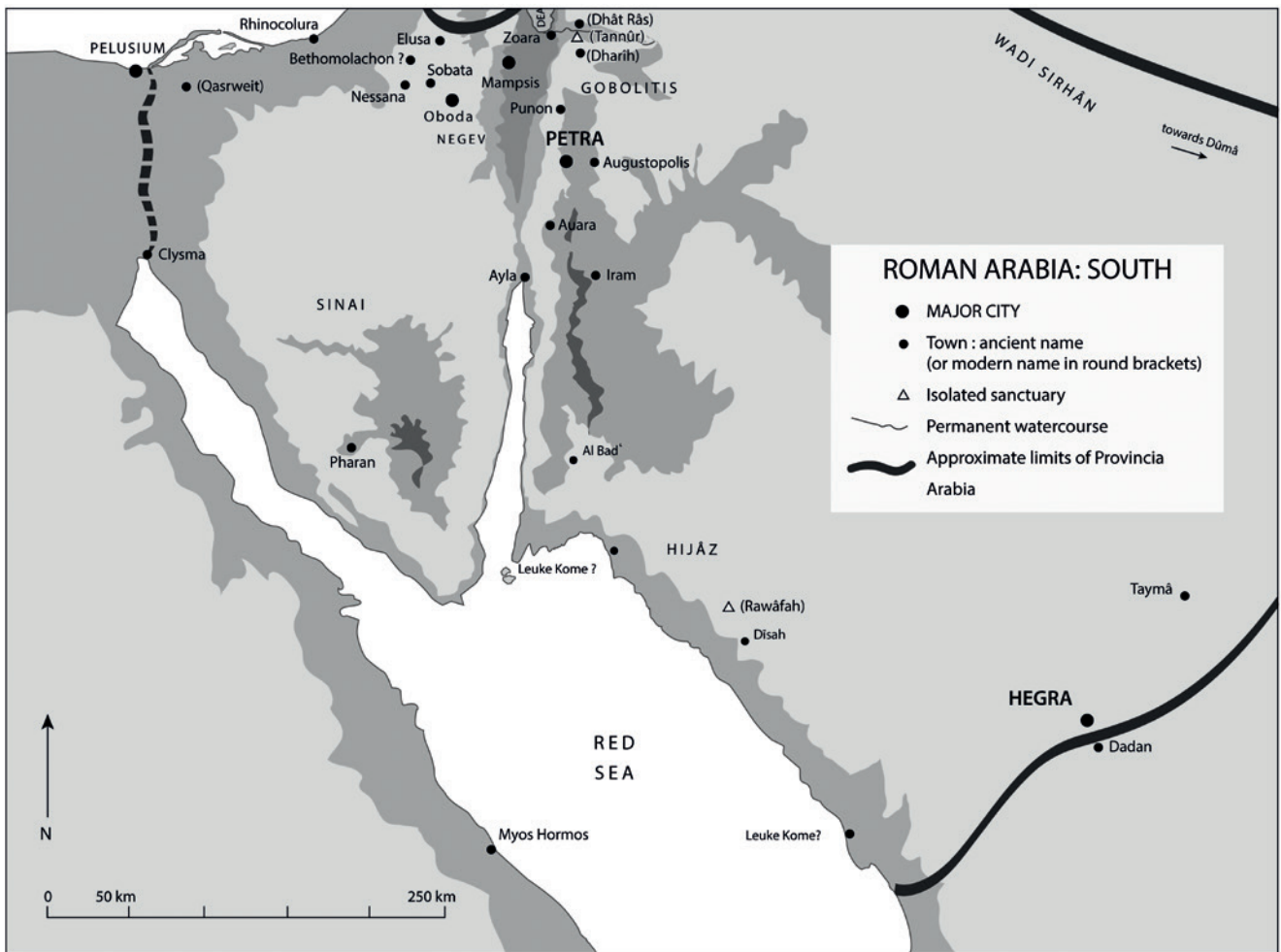


Fig. 1: Location of *Hegra* on the southern border of Provincia Arabia (by F. Villeneuve, R. Douaud, J. Humbert).

ing the city centre with the assumed south-north caravan route running east of *Hegra*. The excavations revealed a good preservation of the gate (the foundations and the preserved superstructure being altogether ca. 2 m high), partly due to the combined stone-mudbrick masonry which is not present in most of the other parts of the rampart.

The gate consists of a gateway, 3.75 to 3.8 m wide, flanked by two rectangular towers, longer in depth than width (externally 6.7 m x 4.25 m and 7.15 m x 4.15 m). The gate was inserted into the mudbrick rampart, here ca. 2–2.2 m thick (Fig. 3). Both towers are flush with the outer line of the rampart but they project into the interior of the circuit. Such an arrangement is not the most common for city gates in the East during the Roman period but is attested, for example, in Tell el-Hajj on the Middle Euphrates in the 1st century AD⁷. The outer faces of the towers' walls and the gateway were built of sandstone ashlar, all of them reused from earlier building(s), and with a mudbrick superstructure. The inner faces of the same walls were built either entirely of mudbrick or as a precarious mix of mudbricks and reused stones. This indicates, similar to the large mudbrick repair in the stone front wall of the south-western tower and to the stone repair in the foundations of the north-eastern tower, that there was at least one phase of hasty rebuilding of the gate, employing both mudbricks and reused stones. Dismantled remains of an earlier building were actually unearthed beneath and in

front of the north-eastern tower, with two phases attested, the first completely in mudbrick (late 1st century BC – early 1st century AD), the second featuring excellent ashlar masonry (probably of the second half of the 1st century AD). Whether these structural remains, generally running parallel to the gate and rampart, represent an earliest gate or another unknown building, cannot be determined yet. Based on the stratigraphy, ceramics, a few coins, epigraphic data and one ¹⁴C date⁸, the following chronology featuring six phases dated between the turn of the Common Era and the 3rd century AD can be proposed:

Phase A: an early mudbrick building (related or not to the rampart); late 1st century BC/early 1st century AD; Nabataean phase.

Phase B: mudbrick rampart and possibly a first gate (presumably smaller and slightly off the location of the extant gate) in excellent ashlar masonry, built directly over the partly dismantled remains of Phase A; second half of the 1st century AD; Nabataean phase.

Phase C: the extant gate featuring monumental stone architecture; ashlar reused from dismantled possible gate of Phase B. At least the towers' front walls had a stone revetment in their lower parts. A few decorative elements (small *cyma* cornice, wing of an eagle statue) may date back to either Phase A or B; early 2nd century AD; Roman phase.

Phase D: following an indeterminate destruction (tempo-

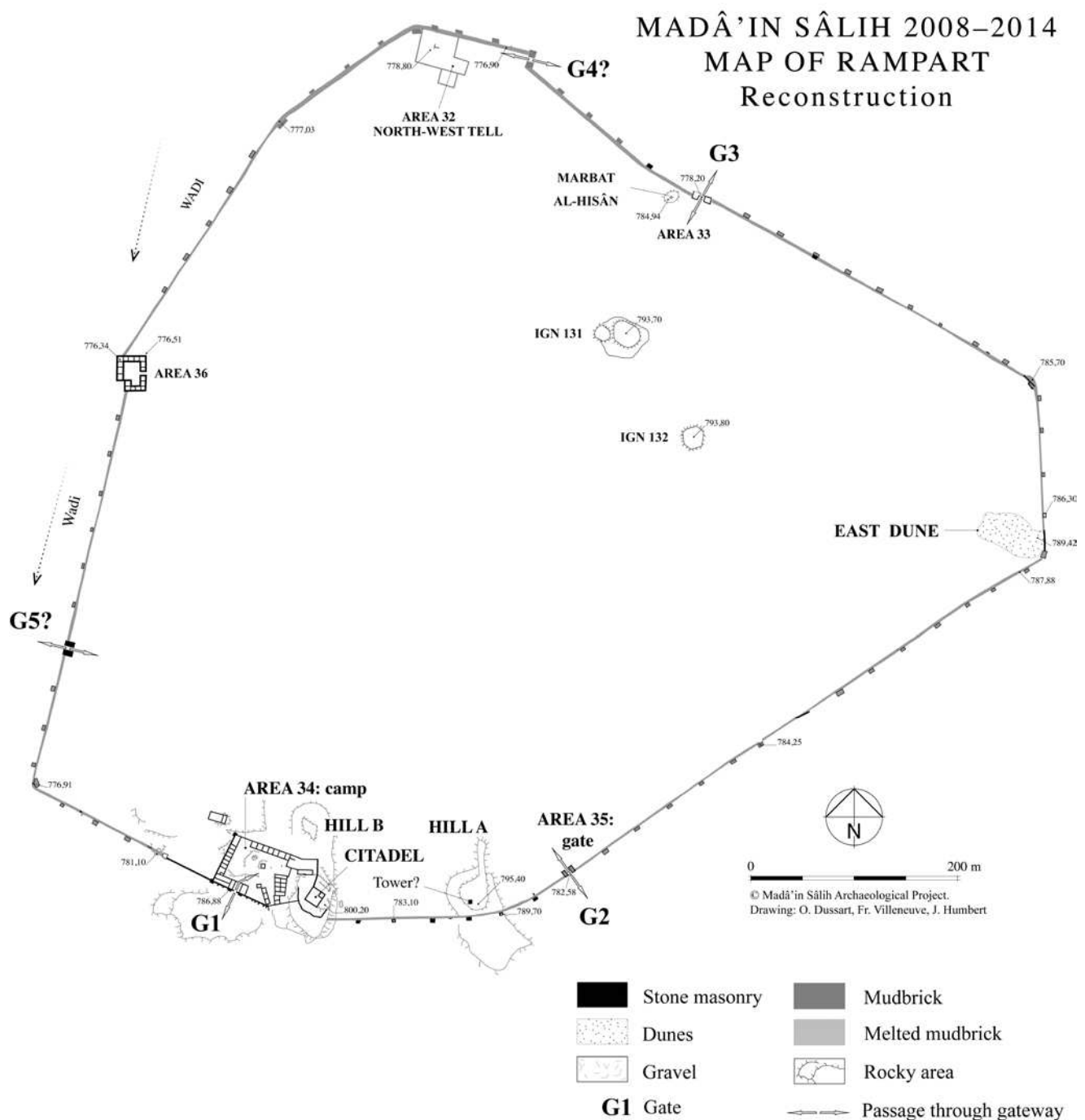


Fig. 2: Map of the rampart at *Hegra* as reconstructed (by F. Villeneuve and J. Humbert, 2014).

rary abandonment is also possible), the gate was rebuilt according to a roughly orthogonal layout, reusing stones taken either from the Phase C gate (including the Latin inscriptions, *inf.*) or from other buildings. During Phase D, both towers were true towers, not solid bastions. That (re)building should date to the 2nd century, possibly ca. AD 175–177 if related to the information provided by the Latin inscription (*sup.*, n. 4). The ¹⁴C dating provides a terminus ante quem of AD 212 (with certainty) or even AD 177 (but with less probability), for the beginning of Phase D.

Phase E: following yet another probable destruction episode or natural deterioration, a new restoration included

repairs to the masonry and the conversion of the south-western tower into a bastion by intentional infilling and blocking its door. The other tower remained in use and a new, inferior, arrangement for the threshold and doorjambs of the gate was effected. Pottery in ashy fireplaces and dumps of the latest military occupation in the north-eastern tower indicates that occupation ended not later than the end of the 3rd century AD.

Phase F: the threshold stone was placed vertically in the now disused gateway, where a small stone bench was also installed. The north-eastern tower remained open, as attested by remains of a camel's cadaver probably pulled in-

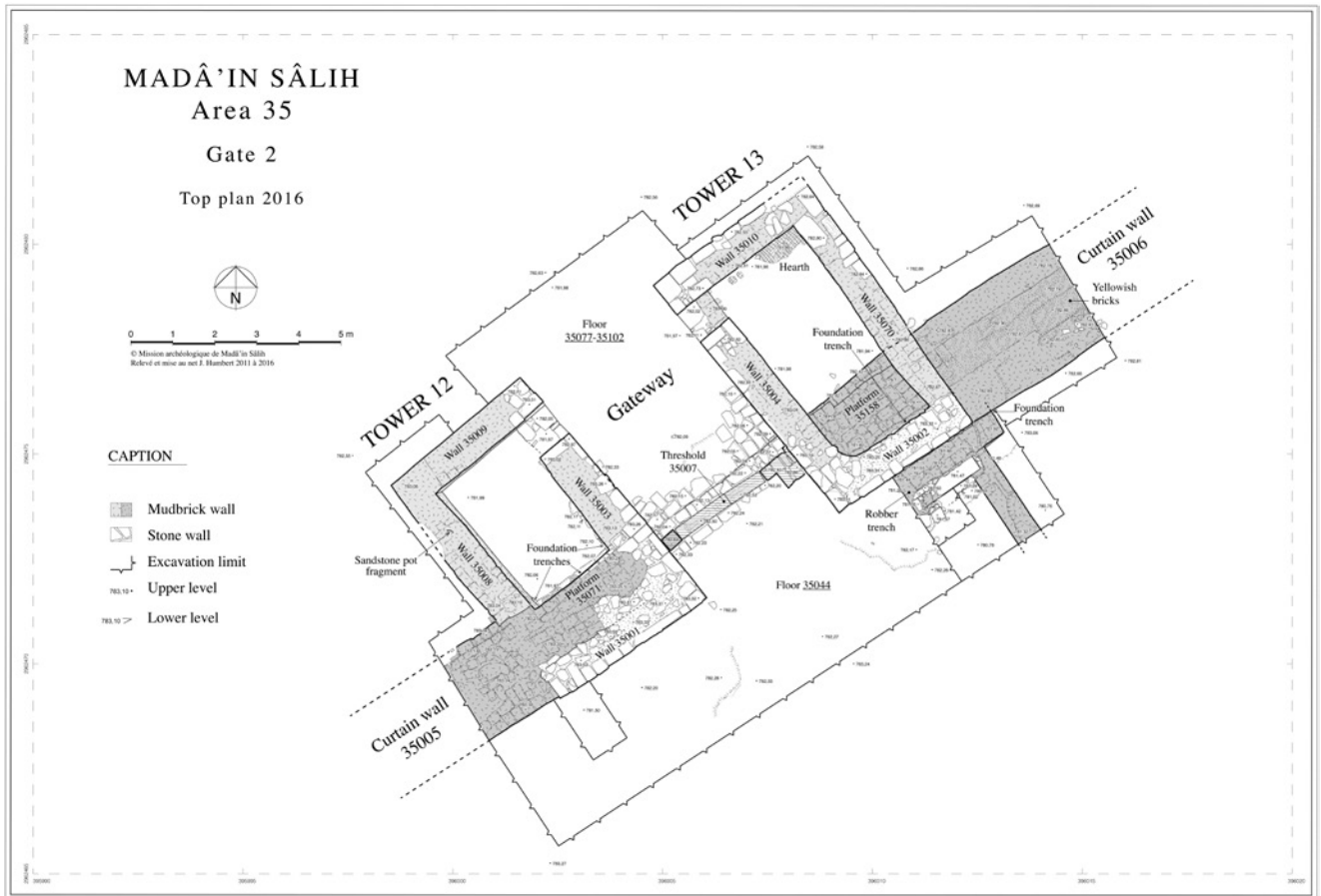


Fig. 3: Detailed plan of the south-eastern gate, following the 2016 season (by J. Humbert).

side by a predator, after human occupation ceased there.

THE INSCRIPTIONS

Thirty-three inscriptions or fragments, on the reused stones of the revetment of the front walls of both towers and the gateway walls, comprise 14 Nabataean, eleven Greek and eight Latin texts. Some of these texts, mostly Greek and Nabataean graffiti, were certainly inscribed directly on the stones in their current location. Others, mainly Latin military texts, were inscribed on stones either originally used in another building or used during an earlier phase of the gate. These stones were finally reused in significant positions (doorjamb of the north-eastern tower, bottom of the north corner of the south-western tower, etc.), which may indicate that the texts still had some significance for those who reused the stones. Fragmentary texts were also found on stones fallen from the masonry.

The Nabataean graffiti present only names and simple invocations, such as: “May Hânî’at son of Ghânimû be safe and sound” (inscription 35003i10, reading by L. Nehmé). The Greek texts, each mentioning only one person, are located at eye-level and on visible spots on the walls. All begin with the *mnesthe* formula (“remember/preserve memory of”) and at least two end with the formula *hopou an ei* (“wherever he could be”). The names consist of one, two and in one case maybe three anthroponyms, e. g. Komodos, Chasetos Baris (Varius), Sept[imos ?] Phoskianos (Fuscianus), XX Maximos Zedilos. The association of a Graeco-Latin name with a Semitic name is predominant. Most likely these graffiti were written by soldiers on duty at the gate, during Phases D and E (late

2nd and 3rd centuries).

The Latin documents, reused during Phase D, are true inscriptions with official formulations. Inscription 35004_I06, on the north-western jamb of the doorway to the north-eastern tower, is a votive invocation to Hammo, the tutelary deity of *legio III Cyrenaica*, by the *princeps prior* and *pilus posterior*, centurions serving in two different cohorts, and by *stationarii* on duty at the gate (*porta*). The presence of troops from the Third Cyrenaica, the *Bostra*-based garrison legion of Roman Arabia, was already known in *Hegra* (sup.). However, this document seems to imply that during the Roman period *Hegra* was considered a *statio*, a military post in control of the settlement and the countryside, and presumably serving as a customs post collecting duties on passing merchandise.

Latin inscriptions 35003_I02 and 35009_I01 (Fig. 4) are written on two faces of a corner stone reused at the bottom of the north angle of the south-western tower. A simple relief depicting an eagle holding the draped bust of a masculine figure on its outspread wings is seen on the corner. In addition to two frames occupied by these inscriptions, a third frame probably also contained an inscription that was erased. Inscription 35003_I02 is, again, a thanksgiving invocation, to “our god Hammo”, by two centurions who are grateful to the god because they “made good their escape [from great danger?]” (*bene exivimus*). That rather uncommon formula could also be understood as “we reached the end of the road” (after the long journey to *Hegra*, for example), or “we reached the successful end of our tour of duty”. The text is thus clearly a Roman military votive inscription, dedicated to Jupiter Hammon, un-



Fig. 4: The south-eastern gate, northern angle of the south-western tower (T12), featuring the location of reused Latin inscriptions 35003i2 (left) and 35009i1, with eagle bearing a bust (by J. Humbert).

doubtedly represented as the draped figure with characteristic horns located on the wings of the eagle. Inscription 35009_I01 poses particular problems as everything in it is abbreviated. It used not only shortened formulas but it also displays less common ligatures, such as small letters inscribed within larger ones etc. It is again a votive inscription to Jupiter Hammon, here abbreviated as IOMH [*Iovi Optimo Maximo Hammoni*], the author being an officer or warrant officer (an *optio*?) from a cohort of *legio III Cyrenaica*.

Although many issues remain unsolved, the three Latin inscriptions presented here confirm, that *legio III Cyrenaica* was significantly present in *Hegra* after the Roman annexation. Altogether, four centurions, in addition to the two already known from the 2003 inscription, and three different cohorts are mentioned. These inscriptions also confirm that at the site of Gate 2 (or nearby) there must have been a Roman-period structure dated to Phase C and undoubtedly earlier than the stone architecture currently visible and representing Phase D at the gate.

AREA 34. THE ROMAN MILITARY CAMP

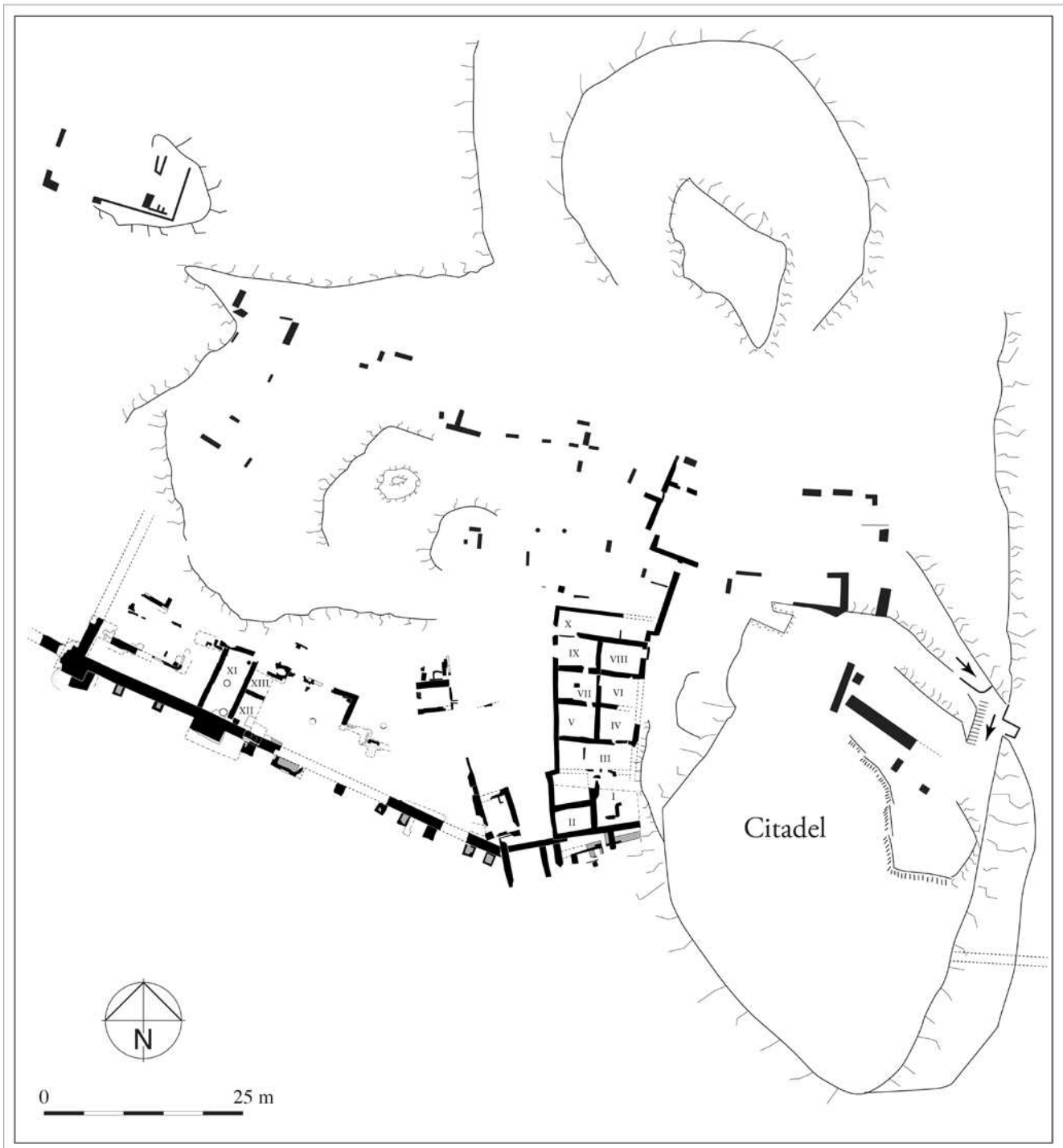
The epigraphic evidence recovered from Area 35 indicates that the Roman military presence in *Hegra* was not ephemeral and, therefore, the Roman soldiers in *Hegra* should have been based in some kind of urban military camp or cantonment. Area 34, so far the best candidate for such, is located directly west of Hill B (see Fig. 2). Unlike Hill A, further east, Hill B was incorporated into the rampart's circuit and its top once held a masonry citadel. Al-

though its use as a quarry in the 20th century prevents further investigation, the citadel must have been in a close functional relationship with the structures in Area 34. The western side of Hill B steeply slopes westward forming a stony plateau (ca. 110 m east-west x ca. 70 m north-south) which turns then into a flat ridge continuing north-westward. The stone-built rampart runs along the southern edge of the plateau.

Among surface ceramics, sherds of 2nd-3rd century AD date were predominant but some 1st century BC/AD and 4th century types were also present. Imported material included, for example, Kapitän II amphoras. More than 70 coins (25 from the excavations) were found. 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 well-represented. The surface also yielded impressive bronze finds: a female statuette, a Roman fibula, an oversized finger of a statue, a hind leg of a bull statuette and numerous fragments which might have belonged to specialized equipment, e. g. horse harness and/or bronze armour.

The survey and surface clearance, supplemented by the imagery provided by a kite-flown camera, revealed traces of numerous stone foundations/walls on the plateau and arranged in long, often parallel and subdivided rows. This architectural complex appears as a rough quadrangle consisting of series of rooms surrounding an irregular central courtyard (Fig. 5). The entire complex stretches from east to west for ca. 85 m and over 65 m from north to south up to the rampart (i. e. the built-up area is little over

MADĀ'IN SĀLIH Area 34 Roman camp



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 Field Survey : P. Courbon, Fr. Villeneuve, J. Humbert
 First drawing : S. Eliès, Final drawing : O. Dussart, J. Humbert

- | | | | |
|----------|-------------------------|------------------------|--------------------|
| walls | reconstructed wall line | rocky cliff | locus number |
| mudbrick | rock cutting | front of modern quarry | altitude |
| | | | ascending stairway |

Fig. 5: Plan of the Roman camp in Area 34, following the 2016 season (by J. Humbert).

half a hectare in size).

TRENCH A AND THE “NARROW” RAMPART

Trench A was opened in the south-eastern part of the area in order to clarify the dating of the stone rampart where it is ca. 0.85 m wide (henceforth “narrow” rampart), and where it merges with the slope of Hill B, continuing then for ca. 15 m in a south-westerly direction. The lowermost deposits in the excavated space (Room I), dating to the 1st century AD, are probably contemporary with the con-

struction of the narrow rampart and the walls enclosing Room I. The main occupational deposits, including a beaten-earth floor, were dated to the late 1st–2nd century AD and probably relate to the creation of the architectural complex, featuring, among other elements, the eastern wing of rooms (Rooms III–X). 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 convenient place of disposal for debris from adjacent rooms,

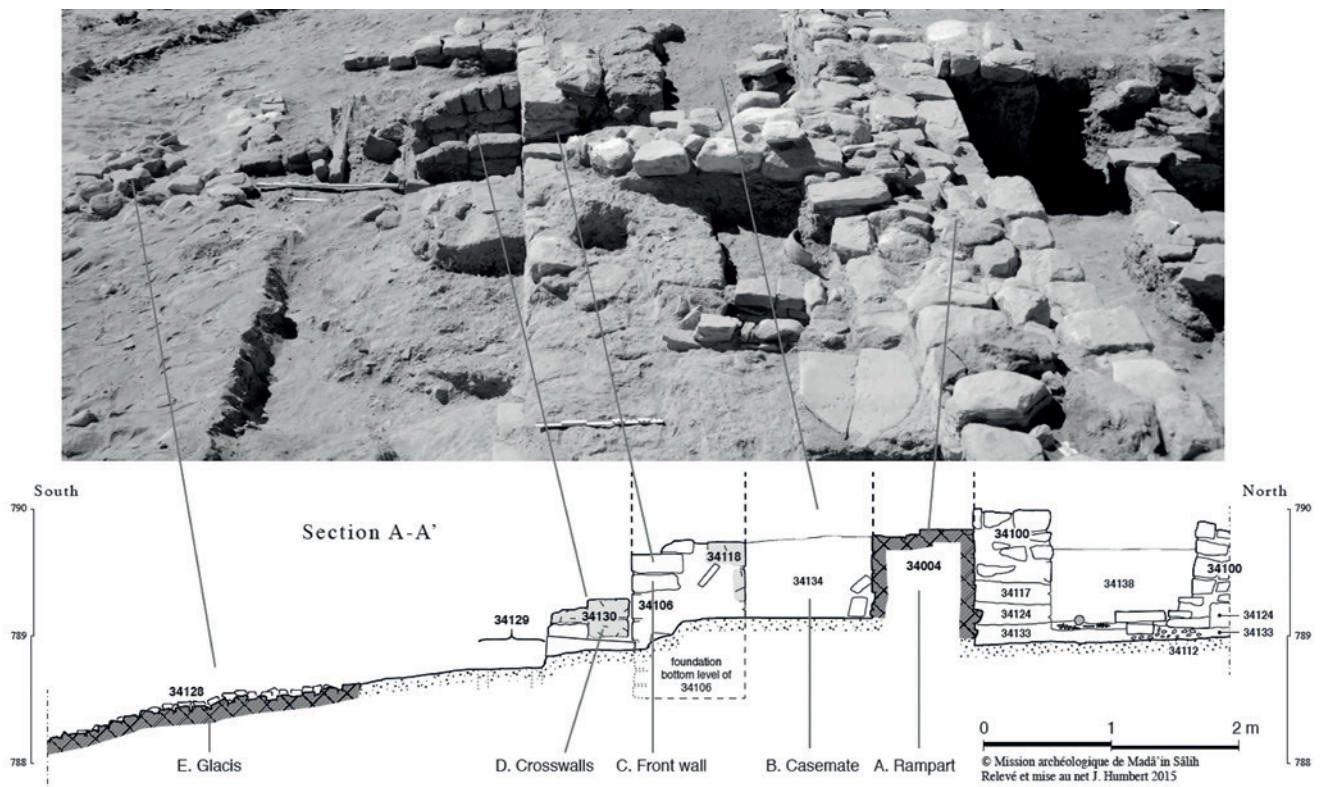


Fig. 6: Area 34, Trench A: the narrow rampart and the fortification reinforcement (by J. Humbert and Z. T. Fiema).

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 narrow rampart, featuring small blocks in irregular coursing, was built upon the bedrock 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 (Fig. 6). Specifically, ca. 2 m from the outer face of the rampart, a parallel wall was built, with an outer stone revetment and mudbrick to the rear. The revetment is ca. 2.1 m high, made of ashlar in regular courses and of higher quality than the narrow rampart. The space (ca. 1 m wide) between this front wall and the narrow rampart thus formed a casemate subdivided by cross-walls and filled up with stones and soil. The datable material was overwhelmingly of 2nd century date. Further south, a series of perpendicular, stone and mudbrick cross-walls abutted the stone revetment, while a massive deposition 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, three large, parallel stone walls running north-south, again of a construction superior to that of the rampart, mark the western limit of the fortification reinforcement.

THE “WIDE” RAMPART AND TRENCH B

Directly west of the three north-south walls, the enclosure of Area 34 dramatically changes its direction from northeast-southwest into southeast-northwest and the rampart there is markedly different (henceforth, “wide” rampart). It is at least 1.3–1.4 m wide and constructed of dressed stones in regular courses (Fig. 7). The wide rampart continues for ca. 65 m along the southern edge of the plateau

until it reaches a corner tower (ca. 5 m x 5 m). Here the plateau ends and another wall (ca. 1.3 m wide) bonds with the tower and continues westward. This, apparently, is the western limit of the architectural complex in Area 34.

The wide rampart features nine small (ca. 1–5 m x 1.5 m) buttresses and in the middle of its course there is a small gate, ca. 2.4 m wide, with a monolithic threshold. The gate is flanked by two large, solid bastions/buttresses, ca. 4.2/3.7 m x 1.6/1.7 m, contemporary with the wide rampart; the foundation deposit of these yielded late 1st–early 2nd century sherds. Trench B, directly west of the gate, revealed the soil/stone build-up levelling the uneven bedrock, a flagstone floor as well as north-south running walls forming a room (Room XI) of ca. 8.5 m x 3.2 m. The occupation on the floor was dated to the 2nd–3rd century, after which most of the flagstones were removed. Concurrent with that activity, the gate was expertly blocked by inserting two large, round stone basins and stacks of flagstones, while a small buttress (1.5 m x 1.5 m) was built outside in front of the blocking (see Fig. 7). Coin-dated stratigraphy and the ceramics indicate the mid- to late 3rd century for the blocking. The subsequent occupation on the beaten-earth floor inside the room and datable to the late 3rd–4th century involved storing and food processing, judging from the presence of two stone basins and quantities of pottery and bones.

Trench B excavations provided interesting archaeozoological evidence, mirrored by the finds from Trench A, which clearly set Area 34 apart from all other areas in Madain Salih. The unique nature and pattern of habitation in the camp is reinforced by the preference in the consumption of large mammals (cattle, camel, donkey, horse). Sheep and goat, while more common elsewhere in *Hegra*, were also present, although represented by adults and



Fig. 7: Area 34: the wide rampart and the blocked gate (centre), the 3rd century small buttress (lower left), the large 2nd century buttress (centre left) and the interior of Trench B (centre right) (by Z. T. Fiema).

with no extremities preserved. Apparently, the preference was for the maximum volume of meat, whereby the butchering was done elsewhere and carcasses brought into the camp, perhaps reflecting a policy of wholesale purchase, butchering and redistribution, not unlike in the military context.

THE EASTERN WING OF ROOMS

Of particular interest is the eastern wing of rooms (Rooms I-X) aligned north-south, featuring two parallel rows abutting each other, and divided into units two-room deep (see Fig. 5). Such an arrangement resembles *contubernia* in Roman forts, e. g. of Davison Type B with a rectangular front *arma* and a rectangular rear *papilio* of roughly the same dimensions⁹. The rooms at *Hegra* are 3.6 m wide and 5 m deep, and if applying *pes Monetalis* (0.296 m)¹⁰, these measure 12 p. M. x 17 p. M., thus close to legionary *papiliones* (12 p. M. x 15 p. M.). For comparison, the *contubernia* in the fort at Humayma in Jordan, chronologically the closest parallel to *Hegra*, as dated to the 2nd century, feature *arma* which are somewhat smaller (ca. 3.4–3.6 m x 3.8–4.6 m) than the *papiliones*, which are ca. 3.6–3.9 m x 4.6–4.8 m¹¹. 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,¹² all rooms being rectangular and roughly of the same size, as in *Hegra*. Such barracks were found in the forts at Dormagen (Germania inferior) and at Wallsend and South Shields (Britannia)¹³. This hypothesis is, however, highly speculative, awaiting confirmation through future excavations.

PRELIMINARY INTERPRETATION

Area 34 occupies the 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*. Thus, if the complex in Area 34 is interpreted as a military camp, it is perfectly located for an occupation army to oversee the activities in a conquered city and to defend it from an external foe. Probably, the term “fort” is not warranted here but a “fortified camp for an urban garrison” may be more appropriate. As such, *functionally*, the complex at *Hegra* would find parallels in urban legionary camps, such as that of the *III Cyrenaica* in *Bostra*, the *II Parthica* in *Apamea*, the *X Fretensis* in Jerusalem, the *I Illyricorum* in *Palmyra* and the base of the Roman auxiliary units at *Dura*.

The development in Area 34 during the Nabataean period (1st century AD) included the narrow rampart and some walls surrounding Room I. Their construction is markedly different from most of the major walls in the area. Perhaps the narrow rampart never enclosed the whole area or was entirely replaced by the wide rampart. Probably soon after the annexation of the Nabatean kingdom in AD 106, the Roman garrison was established in *Hegra*, including their camp. While the Nabataean rampart was incorporated into the new circuit, the main investment was the wide rampart with its southwest corner tower and the gate flanked by two large bastions, as well as the other major

walls of the camp. The eastern wing of rooms was probably also built then, since it bears the indelible mark of Roman barracks, while other barracks or service rooms were built against the inner face of the wide rampart. Generally, barracks built against a fort’s circuit wall are a well-known feature in the late 3rd–early 4th century in the East¹⁴, but such features also occurred in smaller fortifications in Africa and in the East already in the 2nd–3rd century¹⁵.

Sometime in the 2nd century, the south-eastern sector of the camp, featuring the Nabataean narrow rampart, was substantially reinforced by the addition of the casemate space, the wall with the stone revetment, the cross-walls and the “glacis” – a massive fortification, so far not evidenced anywhere else in Area 34. Elsewhere in the Empire, the widening of original timber/mudbrick fortifications by adding a stone wall (or revetment) is attested during the early Antonine period¹⁶. Alternatively, the strengthening of the narrow rampart might reflect the information from the Latin inscription of 175–177 (sup., n. 4). This major reinforcement may appear excessive; after all, it was unlikely that *Hegra* would be invested by the enemy equipped with battering rams and siege engines. Probably, the location of the garrison of the town deemed it necessary to fortify it with disproportionate defences against any real or imaginary foe. Additionally, such a massive fortification was meant to strengthen Roman prestige in the region and impress travellers, particularly those coming from the South.

By the mid- to later 3rd century, the gate in the wide rampart had been blocked and nine small buttresses abutting the wide rampart constructed, presumably by the Roman soldiers. But the military abandonment of the fortified camp in *Hegra* must have happened soon afterwards, i. e. still in the later 3rd century. Room I was abandoned but the occupation in Room XI continued. Most likely, civilians moved into the abandoned camp and continued inhabiting the area at least until the 4th century.

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- 1 For the history and archaeology of *Hegra*, see Nehmé et al. 2010, 286–309; Nehmé et al. 2015, 21–47.
- 2 Gatier/Salles 1988, 184–185.
- 3 For all these, with references, see Nehmé 2009, 46–47.
- 4 al-Talhi/al-Daire 2005.
- 5 For details, see Villeneuve 2010 and Villeneuve 2014.
- 6 See Charloux/Loreto 2014, 145–259.
- 7 Stucky 1975, pl. III.
- 8 Centre de datation par le Radiocarbone, Lyon-9766.
- 9 Davison 1979, 4–5, 267, fig. A.
- 10 See Walthew 1981 and Millett 1982 for discussion.
- 11 We are grateful to J. P. Oleson for this unpublished information.
- 12 Sommer 1995.
- 13 For Dormagen, see Müller 1979. For Wallsend and South Shields, see Hodgson/Bidwell 2004, 123–127.
- 14 E. g. in forts at Dajaniya and Qasr Bshir in Jordan and 'Avdat in Israel (Kennedy 2004, 86–91, 169–172; Erickson-Gini 2002).
- 15 E. g. forts at *Tisavar* in Tunisia (Lander 1984, 102–104), Hallabat, Uweinid and Aseikhin in Jordan (Lander 1984, 136–143; Kennedy 2004, 62–68) and probably the Nabataean/Roman forts at Khalde and Kithara in Jordan (Lander 1984, 145; Kennedy 2004, 199–204).
- 16 E. g. the strengthening of the fort at *Arcidava* and adding two parallel revetments in Bretcu, both in Dacia (Lander 1984, 43–46).

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