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of Jordan
XIV

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STUDIES IN THE HISTORY AND ARCHAEOLOGY
OF JORDAN
XIV

Part 2
Greco-Roman; Byzantine and Islamic;
Archaeological Methods, Excavation, Curation, and Reception

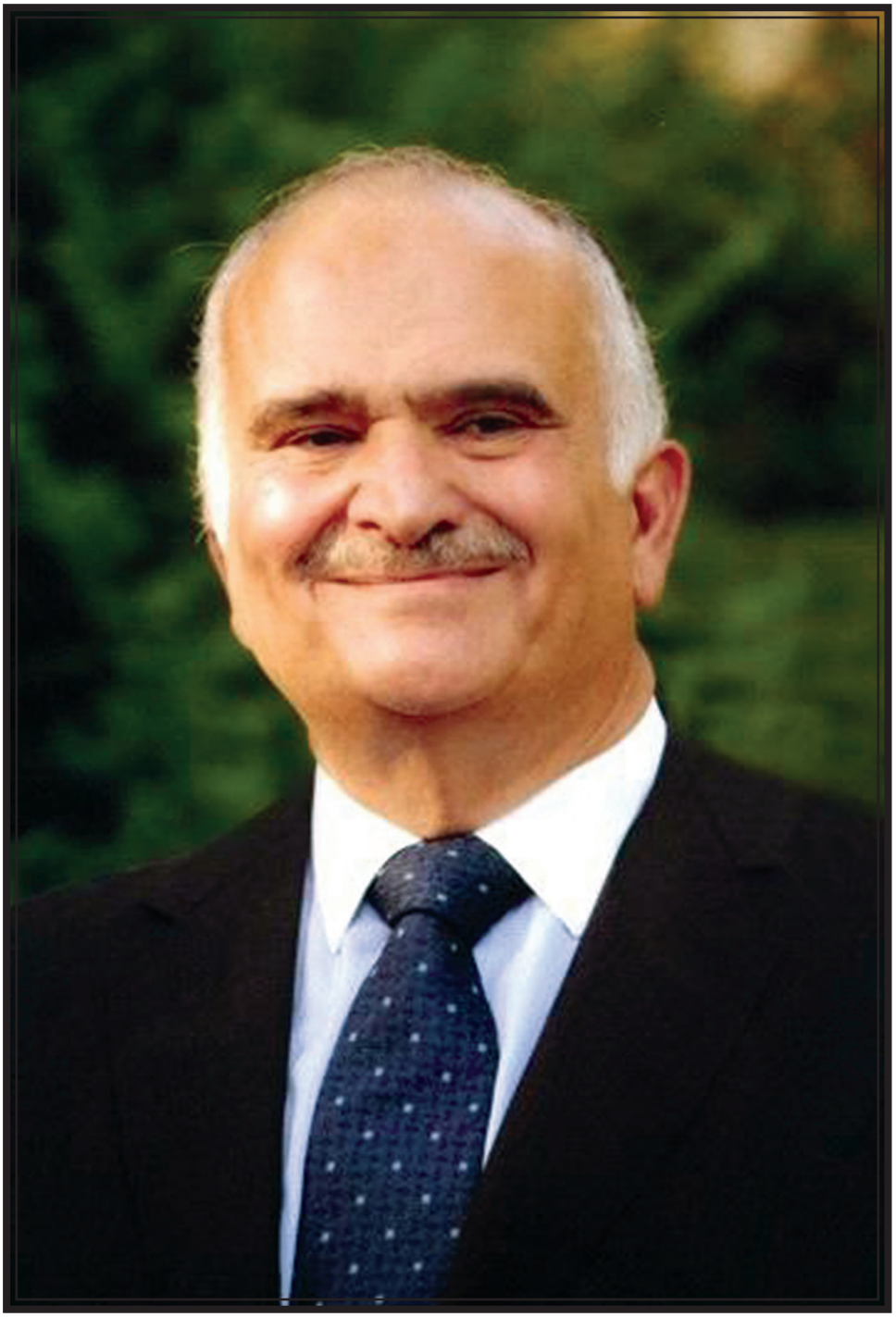
Department of Antiquities
Amman, Jordan



HIS MAJESTY KING ABDULLAH THE SECOND IBN AL-HUSSEIN
OF THE HASHEMITE KINGDOM OF JORDAN



HIS ROYAL HIGHNESS PRINCE
AL-HUSSEIN BIN ABDULLAH THE SECOND



HIS ROYAL HIGHNESS PRINCE
EL-HASSAN BIN TALAL



THE HASHEMITE KINGOM OF JORDAN

STUDIES IN THE HISTORY AND ARCHAEOLOGY OF JORDAN XIV

Culture in Crisis: Flows of Peoples, Artifacts, and Ideas

Proceedings of the 14th International Conference on the History and Archaeology of Jordan

Florence, Italy
21–25 January 2019

Part 2
Greco-Roman; Byzantine and Islamic; Archaeological Methods, Excavation, Curation, and Reception

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Culture in Crisis: Flows of Peoples, Artifacts, and Ideas

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Abbreviations

Journal title abbreviations follow the guidelines of the *American Journal of Archaeology*. Other abbreviations used in this volume are detailed here.

BMCRE	H. Mattingly, *Coins of the Roman Empire in the British Museum* (London, 1923–)
ERAUL	*Etudes et Recherches Archéologiques de l'Université de Liège*
FGrH	F. Jacoby, *Die Fragmente der griechischen Historiker* (Berlin, 1923–1959)
ICHAJ	*International Conference on the History and Archaeology of Jordan*
IGLS	L. Jalabert and R. Mouterde, *Inscriptions grecques et latines de la Syrie* (Paris, 1929–)
ILS	H. Dessau, ed., *Inscriptiones latinae selectae* (Berlin, 1892–1916)
LIMC	J. Boardman, *Lexicon iconographicum mythologiae classicae* (Zurich, 1981–2009)
NEASB	*Near East Archaeology Society Bulletin*
PLRE	*Prosopography of the Later Roman Empire* (Cambridge, 1971–1992)
PNAS	*Proceedings of the National Academy of Sciences of the United States of America*
RE	A. Pauly and G. Wissowa, *Real-Encyclopädie der Classischen Altertumswissenschaft* (Stuttgart, 1893–1978)
RES	*Répertoire d'épigraphie sémitique* (Paris, 1900–1935)
RIC	H. Mattingly *et al.*, *Roman Imperial Coinage* (London, 1923–)
SEG	*Supplementum epigraphicum graecum* (Leiden, 1923–)
SAOC	Studies in Ancient Oriental Civilization (Chicago)
SHAJ	*Studies in the History and Archaeology of Jordan*
SLSA	*Schweizerisch-Liechtensteinische Stiftung für archäologische Forschungen im Ausland*

System of Transliteration from Arabic

Transliterated spellings have been standardized across the volume by the Department of Antiquities of Jordan.

Consonants

ء	’ *(except where initial)*	ض	ḍ
ب	b	ط	ṭ
ت	t	ظ	dh
ث	th	ع	‘
ج	j	غ	gh
ح	ḥ	ف	f
خ	kh	ق	q
د	d	ك	k
ذ	dh	ل	l
ر	r	م	m
ز	z	ن	n
س	s	ه	h
ش	sh	و	w
ص	ṣ	ي	y
ـة ة	a *or* at	ـه ه	a *or* ah

Long Vowels

ا، ى	ā
و	ū
ي	ī

Short Vowels

ـَ	a
ـُ	u
ـِ	i

Common Nouns

تَلّ	Tall	دَيْر	Dayr
جَبَل	Jabal	عَيْن	‘Ayn
خِرْبَة	Khirbat	وادي	Wādī
جُرْف	Jurf	غَوْر	Ghawr

The International Conference on the History and Archaeology of Jordan

I	The History and Archaeology of Jordan from the Earliest Prehistoric Times to the End of the Ottoman Period	University of Oxford Oxford, United Kingdom	25–31 March 1980
II	Jordanian Environment: Geographical and Historical	Department of Antiquities ʿAmra Hotel Amman, Jordan	4–16 April 1983
III	Trade, Communications and International Relations throughout the Ages	University of Tübingen Tübingen, Germany	6–12 April 1986
IV	Sites and Settlement in Jordan	University of Lyons Lyons, France	30 May– 4 June 1989
V	Art and Technology throughout the Ages	University of Science and Technology Irbid, Jordan	12–17 April 1992
VI	Landscape Resources and Human Occupation in Jordan throughout the Ages	University of Turin Turin, Italy	5–10 June 1995
VII	Jordan by the Millennia	University of Copenhagen Copenhagen, Denmark	12–19 June 1998
VIII	Archaeological and Historical Perspectives on Society, Culture and Identity	The University of Sydney Sydney, Australia	9–13 July 2001
IX	Cultural Interaction through the Ages	Al-Hussein Bin Talal University Petra, Jordan	23–27 May 2004
X	Crossing Jordan	The George Washington University Washington, D.C., United States of America	23–28 May 2007
XI	Changes and Challenges	Paris, France	7–12 June 2010
XII	Transparent Borders	Humboldt University Berlin, Germany	5–11 May 2013
XIII	Culture in Crisis: Flows of Peoples, Artifacts, and Ideas	Florence, Italy	21–25 January 2019

Brita Jansen
Independent researcher

Brita Jansen

The Hellenistic Fortification of Seleukeia Gadara (Umm Qays): An Example for the Transfer of Military Architectural Expertise to the Koile Syria

Introduction

The walls of Gadara have been uncovered since 1992 as part of the work of the German Archaeological Institute (Hoffmann 2000). Important sections were investigated in archaeological excavations, while other parts were cleared by the Jordanian authorities during the construction of the new car park.

The building stands out in the region with its good state of preservation and the high quality of its ashlar construction. However, the fortification is of particular importance for research because it can be dated relatively reliably by stratigraphy. This is absolutely rare in Hellenistic fortifications, so that the construction can serve as an important reference for others. The results of the archaeological investigations and the building research have now been presented in a dissertation (Jansen 2020).

Location

Gadara, the modern Umm Qays, is located in northwest Jordan on the edge of a plateau bordered by the Yarmūk Valley, the Jordan Valley, and the Wādī al-ʻArab. At the eastern end of this plateau rises a hill about 35 m high. Here the Hellenistic fortress was strategically located. At this point, the northern Yarmūk valley and the southern Wādī al-ʻArab are close to one another, so that the ridge giving access to the plateau from the Jordanian highland is narrow and easy to defend. Far-reaching visual relationships in all directions justified the strategic importance, while the fertile plateau formed a secure basis for life.

History

Gadara is located in an area that had long been disputed between the Ptolemies and the Seleucids. After the battle of Ipsos in 301 BC, it had initially belonged to the Ptolemaic Empire. In 218 BC it was taken by the Seleucid Antiochos III. In this context, Polybius (5.71.3) called it "the strongest

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place in the region." Nevertheless, the sight of the Seleucid siege works was enough for the Ptolemies to surrender.

There is, however, no pre-Seleucid fortress known in the area. There are indications that the predecessor settlement of Gadara is identical to the Tall Zira'a in the Wādī al-'Arab south of Umm Qays (Dijkstra 2005). On this tall, mighty defensive walls from the Bronze and Iron Age were uncovered (Vieweger and Häser 2012). The name likely referred to a settlement on this tall until the Ptolemaic period, when it was transferred to a Seleucid re-foundation on the hill.

In order to secure the region, Antiochos first had to withdraw, but was then able to take it *ca.* 200 BC in a second attempt. The next mention of Gadara in the literary sources is when it was besieged at the beginning of the 1st c. BC by the Hasmonean Alexander Jannaeus (Flavius Josephus *Jewish Antiquities* 8.356). After ten months of siege, he succeeded in taking the fortress. But after a defeat against the Nabataean Obodas I, the Hasmoneans had to give up their newly conquered Transjordanian territories. During this time the fortress of Gadara was repaired. An inscription gives an account of this action, which a certain Philotas carried out together with the polis of the Seleuceans in the year 85/84 BC (Wörrle 2000). In combination with numismatic finds from Gadara (Noeske 2013: 139 fig. 5), it can be assumed that it was the late Seleucid ruler Antiochos XII who restored the fortress because he wanted to use it as a military base for campaigns against Hasmoneans and Nabataeans (Jansen 2020: 49), but it only lasted for a short time. In 83 BC Alexander Jannaeus succeeded in a second attempt to take over the Transjordanian territories including Gadara. The Hasmonean rule ends with the Roman takeover by Pompey in 64 BC. While the neighbouring cities are only mentioned to be liberated, Flavius Josephus reports that Pompey rebuilt the city destroyed by the Jews (*Jewish Antiquities* 14.75; *The Jewish War* 1.7.7). For Gadara, a new age begins, which is clearly shown by the beginning of coinage and a new era.

The tide turns again when Gadara is awarded to Herod in 30 BC. After his death it becomes part of the province of Syria. Historical sources then report that it is involved in the Jewish uprisings (Flavius Josephus *The Jewish War* 2.18.1). Possibly in the course of the administrative reorganization after the war, the Decapolis was founded as a union of the Poleis Hellenides, the Greek cities. As part of this alliance, Gadara experienced periods of economic and cultural prosperity, which are reflected in numerous monumental new buildings and the expansion of the city area far to the west (Hoffmann 2013: 19–27).

Layout and Architecture

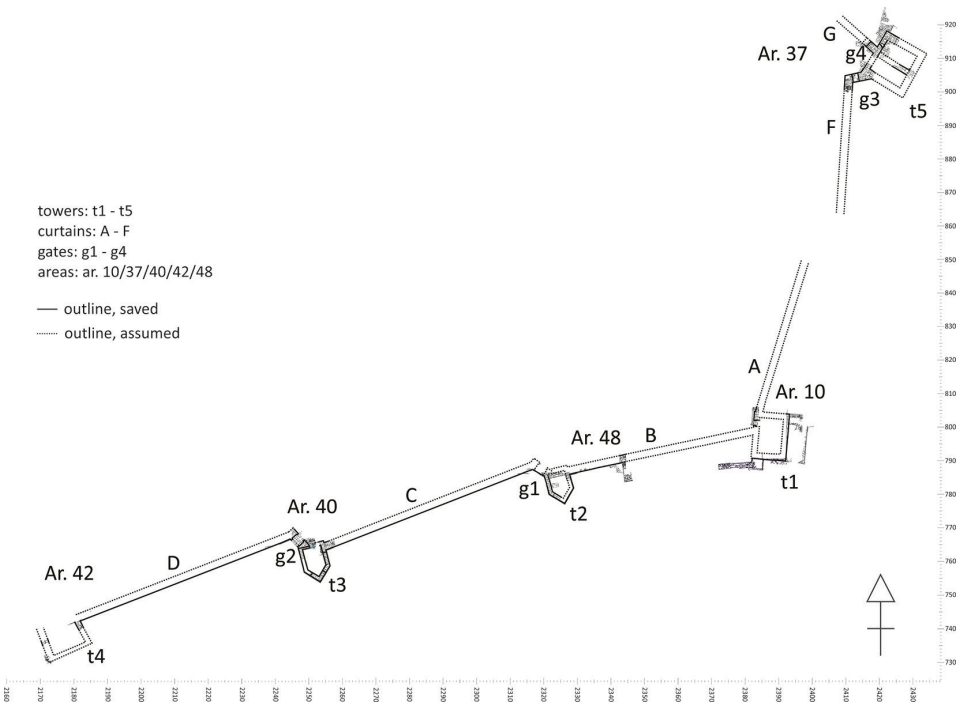
The topographical map of Gadara shows the Roman imperial city at its greatest extent, covering almost 30 ha. The Hellenistic fortress, on the other hand, was completely limited to the hill (Fig. 1). It covered an area of 4–5 ha only. The western and northern flanks of the Hellenistic fortification were covered by the Roman city expansion, so that their course can only be postulated. The 235 m long southern flank is well studied. Another corner tower is known from the eastern flank, so that its course can be retraced (Fig. 2).

The main feature of the southern flank is an indented trace with gates in the offsets, each protected by a tower. The angles are marked by rectangular towers. Thus, three rectangular towers are known with a side length between 10 and 15 m. The largest one is the north-eastern tower which is also the only one with an internal cross-wall. The two pentagonal towers of the southern wall are about 8 x 12 m.

In the offsets, gates are inserted. Another gate opens through the curtain on the other side of the north-eastern tower. The width



1. Seleucid fortification with suggested reconstruction (after Hoffmann and Bührig 2013: Beil. 1).



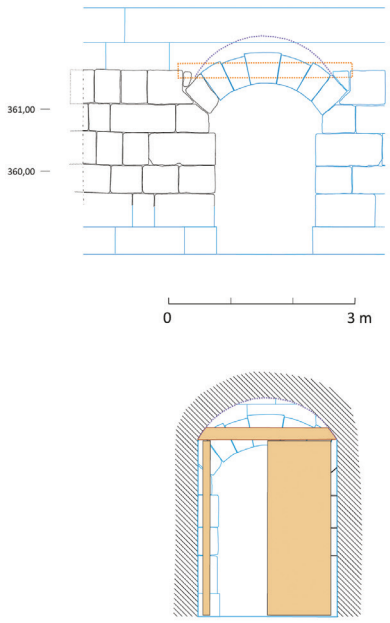
2. Outline of the southern and eastern flank.



3. Approach of a segmental arch over Gate 3.

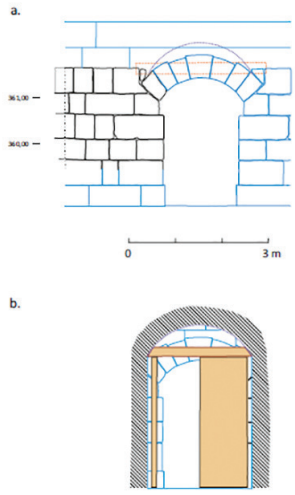
of the gates is between 1.8 and 2.6 m. From the gates next to the north-eastern tower we know that they were spanned by segmental arches (Fig. 3). The doorway itself was covered by a segmental vault (Fig. 4). From the discovery of two basalt-stones with bronze pivots in the western gate, we know that the gates were closed by double-winged doors. The recess for a bar in the northern jamb of the same gate proves that the doors could be locked with a beam.

Different techniques were applied for the masonry of the curtain walls and towers (Jansen 2020: 102–5). Pseudoisodomic and isodomic masonry are used. Differences in technology are not due to different construction phases, but are dependent on the thickness and function of a wall section. A more or less standardized stone size was used. The modular blocks



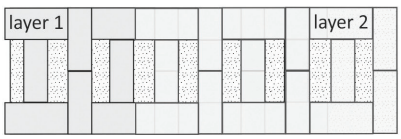
4. Reconstruction proposal for Gate 4: a. field side, b. city side.

could then be used as headers or as stretchers. The stretchers were partly set as orthostats, partly lying according to the geological stratification. An orthostatic arrangement was actually avoided, since the ashlars, in which the natural layering of the stone is directed outwards, are more resistant to attack by the enemy. But this special care was only observed on the particularly endangered rectangular towers, which could only be flanked on two sides by an adjacent tower. For other wall segments, more rational masonry forms were used.



5. Masonry techniques.





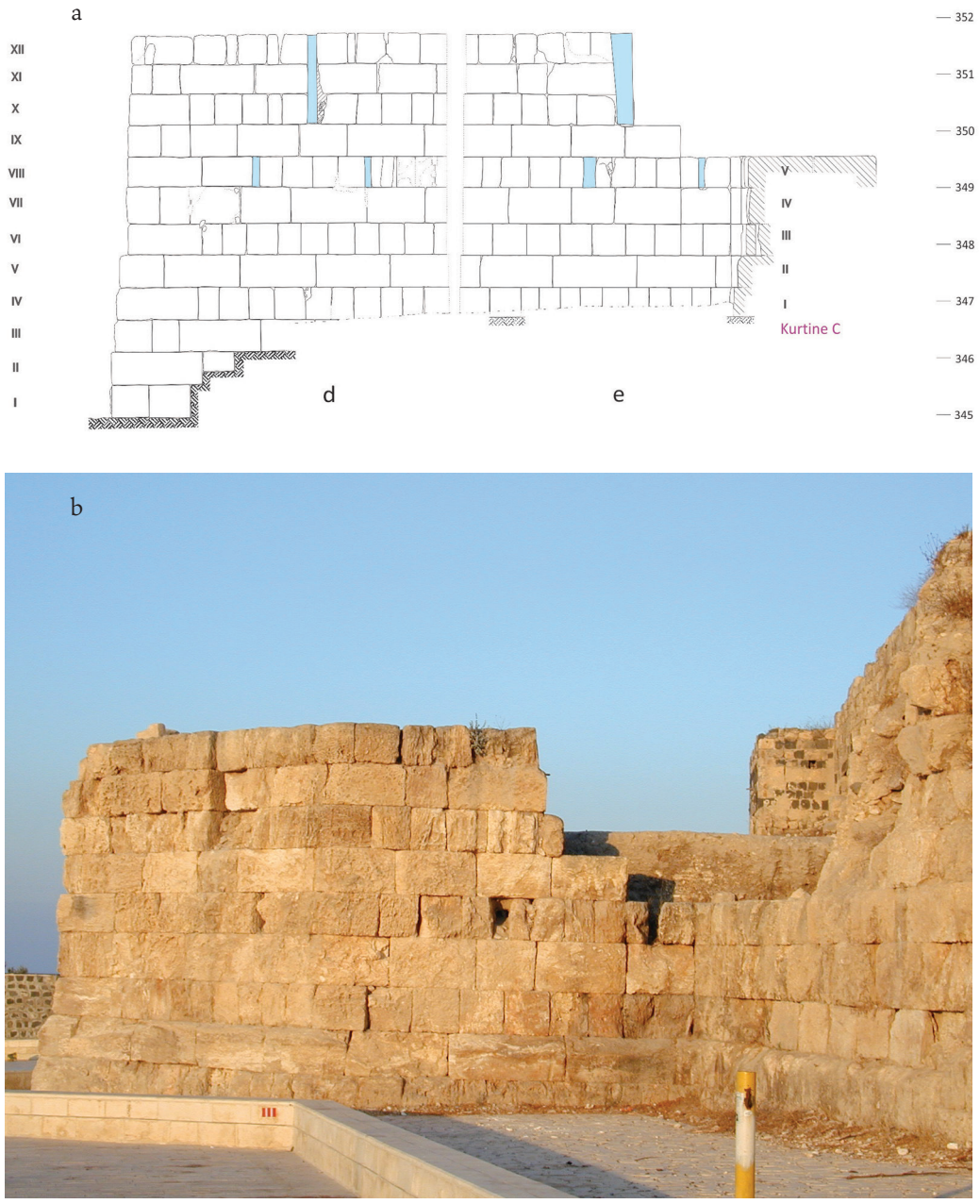
6. Curtain C: detail of compartment wall.

So, the walls of the towers are formed by layers of stretchers alternating with layers of headers (Fig. 5a, b). As the stretchers of the rectangular towers are lying, while the stretchers of the pentagonal towers are standing, the height of the layers varies. The tower walls are between 1.1 and 1.7 m thick. The curtain walls are 2.2 m thick (Fig. 5c). The protruding socle is made of layers of headers alternating with layers of stretchers. The masonry above the socle consists of regular layers of alternating headers and stretchers. Here, the walls are not massively layered through, but are designed as compartment walls (Fig. 6).

The length of the curtain walls is 56 to 67.5 m, so that they could be flanked well by the neighbouring towers. The pentagonal towers are well preserved so that we know that there existed two levels with loopholes, one with smaller openings of 57 cm, and an upper story with larger slits of 159 cm in height (Fig. 7a, b).

Military Function

It can be assumed that the smaller slits were used for standing archers and the larger slits for small torsion bolt shooters. There are hints that a third story existed, which most likely contained windows for catapults (Jansen 2020: 122–4). From the ground area we can conclude that the towers could host, beside archers, torsion bolt shooters and small stone catapults. The north-eastern tower with a slightly bigger foundation could have hosted medium stone throwers. These conclusions from



7. Tower 3 from the east.

the ground area can be compared with the stone bullets found during excavation. In total, 47 bullets were found. The biggest concentration of stone bullets was found around the north-eastern tower. They were all made of basalt and had a spherical form. Most likely they were intended to be used for catapults. From their weight, we can conclude that they were deigned to be used against persons and catapults.

Another element related to the military function were posterns which could be used for sallies against the enemy in front of the wall. There was a postern in the side wall

of both of the pentagonal towers (Jansen 2020: 124). Leaving the fortification through the narrow openings, the defenders could re-enter through the neighboring gate. Obviously, these posterns did not fulfill their task for long because they were blocked with masonry not long after their construction (Fig. 8). This might indicate that the commander did not have a sufficient number of soldiers to achieve the active strategy of defense on which sally ports rely.



8. Blocked sally port.

Origin of Military Architecture and Building Technology

Pentagonal Towers

The outstanding form of the pentagonal towers is regarded as typically Hellenistic. Their form was considered as being especially sturdy, and it aimed to increase the field of fire in the direction of the curtains they flanked (Fig. 9). But although the form was also recommended by the military theorist Philon of Byzantium, only a small number of examples are known. Therefore, this tower form is particularly well suited to our understanding of how the knowledge about poliorcetics and military architecture



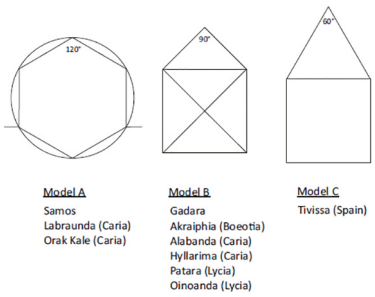
9. Tower 3 with Gate 2.

was imparted across these huge Hellenistic kingdoms.

I could find 13 fortifications with pentagonal towers beside Gadara, ignoring firstly examples from the Late Antique period (Jansen 2020: 152–7). The geographical frame stretches from Spain to Pakistan. Of all the towers published on a sufficient scale, I have examined their basic form, and it turned out that it is predominantly, and very precisely, based on geometric basic forms. Three different models can be identified (Fig. 10). Model C, which consists of a square with an equilateral triangle in front, can only be found in a single example in Tivissa, Spain. Model A is constructed on the basis of a regular hexagon, where the tip facing the curtain is omitted. The corner facing the enemy has an angle of 120°. Examples can be found in Samos, Labraunda, Orak Kale, and probably also in Kos. Most of the known pentagonal towers, including those in Gadara, are designed following Model B, which consists of a square with an isosceles, right-angled triangle in front. The distribution map shows an interesting concentration of similar constructions in the area of Lycia and Caria. A single example was identified in Akraiphia in Boeotia, which like Gadara follows the basic design very closely.

None of the fortifications in Asia Minor and Greece has been dated by stratigraphy. Based on historic or constructional reasons, dates ranging from the late Classical or Hellenistic periods have been proposed. Given the better dated towers in Gadara, we can propose a model for their distribution. We know that the fortification of Gadara was initiated by Antiochos III or his immediate successors. Also, the regions in Western Asia Minor were under Seleucid control after the Third Syrian War until Antiochos had to release them after the peace treaty of Apamea in 188 BC. And Boeotia belonged to the territory of Antiochos III as well, even if only for a short time in 192/191 BC.[1]

Given that we assume for Gadara that the construction of its fortification was initiated shortly after the Seleucid dominion in Boeotia, Caria and Lycia, it is most likely that the design of all these fortifications followed the same building code. These instructions must have been in the hands of the military architects of Antiochos III and his successors, and they must have contained a detailed description of the design of the towers, and probably also drawings.



10. Models of Hellenistic pentagonal towers.

Compartment Walls

Another characteristic of the wall that can be examined for the origin of its technique is the construction of the compartment wall with modular blocks, which was used for the curtain walls above the base (see Fig. 6). In the exterior view it results in a very regular header-stretcher masonry, which should correspond to the "emplekton" described by Vitruvius (Jansen 2020: 143–7).

Comparitive examples point in a different direction than the pentagonal towers. Direct comparisons for this construction technique can be found in the Syrian area, especially in the middle Euphrates

[1] The ground plan of the towers of Taxila is published only on a very small scale. Antiochus III probably reached Taxila with his campaign in India in 206 BC. But the role of the fortification there can only be investigated when its architecture is better known.

and in Ibn Hani near Laodikeia (Balandier 2008:109–12). The fact that the material with easily cut soft limestone is similar in these places might have promoted the comparable construction method. According to Claire Balandier, the technique was probably developed in the zone under Lagidic control and later adopted by the Seleucids. The reason that the technique was used especially in the construction of fortifications is certainly due to the rational, and at the same time stable, construction that can be created in this way. Compared to a filling masonry with irregularly inserted headers or with chains of headers at larger distances, a higher stability is achieved, but compared to a massively layered wall, material and working time are saved.

Segmental Arches and Vaults

A particularly unusual construction element of the fortress of Gadara is the segmental arches, for which there are no parallels in the region for this period. For later times, segmental arches and vaults are quite common both at Gadara and in the region in general. Thus, the passages of the monumental gate in Gadara were spanned by segmental vaults (Bührig 2008). And in tomb architecture in Petra, segmental arches became a popular motif for façade design.

But for the Hellenistic period, comparable buildings are still missing, so the origin of the architectural form has not yet been sufficiently determined. However, it is very likely that the form is derived from Ptolemaic architecture (Lauter 1971: 170–1). Since there are only a few remnants of Alexandria's buildings, the path of derivation is only incompletely known. But the influence of Alexandrian architecture on buildings such as Iraq al Amir or those in Petra can also be understood in terms of other decorative elements. It can therefore also be assumed that the segmental arches and vaults in Gadara are derived from buildings in the region built during the Ptolemaic period but which are unknown today.

Flow of Peoples and Flow of Ideas

Finally, a brief reference should be made to the topic of the conference. Fortifications were built in times of crisis, and constant armed conflicts led to the military installations playing a central role in urban architecture. The development of new offensive techniques during the Hellenistic period led to increasingly sophisticated adaptations of defensive architecture. In addition, the constant war campaigns of the Diadochoi and the Hellenistic kingdoms led to many people moving over great distances. The question is to what extent this flow of peoples also involved a flow of artifacts and ideas and what impact it had on the architecture and its role in the urban culture of Gadara.

First of all, the use of the exact same basic form of the pentagonal tower in Transjordan as in western Turkey and Greece testifies to a transmission of guidelines for military architects throughout the vast Seleucid Empire. It is not known whether the architects also moved around with the army, but at least there were written instructions that were spread throughout the empire.

A closer look at the pentagonal towers of Gadara and Oinoanda in Lycia (McNicoll 1997: 120–6) reveals that, although they have exactly the same basic shape, the buildings are constructed with different types of masonry. This shows the limits of the overriding requirements, since the choice of masonry depended to a large extent on the material available on site (Bessac 2016: 132).

Local stone material is not the only factor responsible for different variations of the same ground plan. Another factor could be the use of regional building techniques. The gates in Gadara and the temporary gate in Dura-Europos have exactly the same ground plan (Abdul Massih 1997: 48; Jansen 2020: fig. 45), but the one in Dura-Europos

was spanned by a semi-circular arch, while the gates in Gadara were spanned by a segmental arch. Presumably this is a local building tradition that is derived from Ptolemaic building techniques. The use of the efficient technique of the compartment wall, which may have been developed by builders on Cyprus or at the Euphrates, also shows that technical ideas were probably brought in by the builders. Some of them may have moved around with the army, while others were engaged locally.

Nevertheless, the result—the fortress of Gadara—demonstrates that ideas were transmitted globally but were modified according to the influence of interregional or local traditions.

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A Multifaceted Death: Funerary Portraiture in Roman Jordan

Introduction

The study of funerary portraiture in Classical antiquity has garnered long-overdue scholarly interest in recent years. This endeavour allows us, perhaps to a degree hardly attainable in other art historical and archaeological fields, to engage with the intimacies of ancient lived experiences. It also allows us to delve into the personal aspirations and modes of self-advertisement of the inhabitants of the Graeco-Roman Mediterranean, since, by definition, a funerary portrait was the image through which the deceased hoped to be remembered, at least nominally, for all eternity.

Despite a number of studies devoted to funerary portraiture in Palestine (Skupińska-Løvset 1983), northern Syria (Wagner 1976; Blömer 2014), southern Syria (Sartre-Fauriat 2001a), and Palmyra (Kropp and Raja 2014), the archaeological and art historical exploration of this phenomenon, to the extent of its full expression in the broader Roman Near East (and particularly in *Provincia Arabia*), had been, until recently, somewhat wanting in comparison to abundant and ever-increasing studies devoted to its manifold manifestations in Rome (Zanker 1975; Kleiner 1977; Walker 1985; Kockel 1993; Feraudi-Gruénais 2001), the Italian peninsula (Frenz 1985; Pflug 1989), the Western provinces (Braemer 1959; Faust 1998; Hope 2001; Carroll 2006), and in the Eastern Mediterranean, be it mainland and insular Greece (von Moock 1998; Lagogianni-Georgakarakou 1998), Asia Minor (Fıratlı 1964; Pfuhl and Möbius 1977/1979; Cremer 1991; 1992; Lochman 2003), Cyprus (Pogiatzi 2003), and Egypt (Parlasca 1966; Abdalla 1992; Corcoran 1995; Borg 1996; Riggs 2002; 2005). The dense and essential overview that K. Parlasca (1982) gave of funerary portraiture in the Hellenistic and Roman Near East did not, in this respect, sufficiently

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address portraits hailing from the province of Arabia or from the Decapolis.

This disinterest may be partially explained, on one hand, by the difficulties associated with access to the relevant material due to its geographical dispersion and the political turmoil that has characterised the region for several decades. On the other hand, there is a long-standing belief, still partially held among members of the scientific community, that a potent "aniconic" tradition defined the cultural and religious practices of the inhabitants of the geographical realms of southern Syria and northern Arabia and shaped their artistic sensitivities.[1] This relative dearth of published scholarship was admirably remedied, at least concerning Roman Arabia, by two major studies: A. Barbet and C. Vibert-Guigue's (1988/1994) monograph on the painting techniques and decorative patterns in the *necropoleis* of Abila-Quwayliba and T.M. Weber's (2002) exhaustive monograph on Gadara-Umm Qays, which comprised a detailed study of funerary portraits documented in the Decapolis, including a precious number of portraits kept in Jordanian private collections. These studies, nonetheless, only marginally addressed the sociological and anthropological *raison d'être* of funerary portraiture, or only engaged with this phenomenon through the prism of civic and regional dynamics, as their set purposes were, respectively, the study of tomb painting from a predominantly technical and stylistic perspective (including an investigation of the frescoes' architectural setting), and a reappraisal of Gadara's history and that of its surroundings through the diligent recording of its archaeological and architectural remains (including the sculptural environment of its sacred, public, and funerary spaces). Finally, a symposium held in Copenhagen in 2017 strove, among other aims, to explore and characterise the blossoming of funerary portraiture in Roman Greater Syria, one simultaneously shaped by a confluence of regional and supra-regional cultural interactions, and rooted in a centuries-old indigenous visual culture (Blömer and Raja 2019; Lichtenberger and Raja 2019). Hence, an evaluation of funerary portraiture in Roman Jordan, akin to that given by A. Lichtenberger and R. Raja, is called for. Ideally, such a study would (1) take into account the typological variety of these *monumenta* (stelai, busts, sarcophagi, statues, tomb façades and doors, and painted frescoes), (2) strive to delineate the social values that patrons sought to promote and the behavioural norms and ideals upon which such an iconography was built, and (3) re-evaluate these portraits in their archaeological context in order to shed light on funerary portraiture as a "lived experience", one that derives from and is constitutive of a religious and social mentality. This contribution aims to offer a general outline for such a project.

A Fitting Remembrance: Typological Variety within Funerary Portraiture

As elsewhere in the Near East, and in the broader empire, funerary portraits in Roman Jordan were displayed on an impressive variety of media. The choice of the commemorative monument (Gk. *mnēmeīon*), and particularly that of the portrait, was evidently determined by a combination of factors, such as the patron's personal taste and financial means, the varying access to material (marble, limestone, basalt, sandstone, etc.) and talent (sculptors and painters, and their more or less specialised workshops), and the architectural setting into which the funerary

[1] On aniconism in Nabataean culture, see Patrich 1990, with the reservations of Parlasca 1993; McKenzie 2004: 560. For the broader Near East, see Gaifman 2008; Nunn 2008. As a cultural phenomenon, aniconism seems to have been most prevalent in the cultic, rather than the private, sphere of representation, with the notable exception of the *nefesh* symbols, which will not be discussed here.

artefact was integrated. These different factors coalesced to produce a miscellaneous archaeological record of funerary portraiture in Jordan, since one encounters these images on tomb façades, sarcophagi, frescoes, and in the form of busts and even statues. Naturally, some tombs would have exhibited a combination of these artistic forms (for instance, a sarcophagus bearing a bust, set in an *arcosolium* whose outer panels were decorated with additional painted busts; see also Lichtenberger and Raja 2019: 143 n. 60, 147), which may illustrate the breadth of the typological and iconographic spectrum available for patrons to choose from. No evidence of funerary portraits that can be unquestionably dated to the Hellenistic period seems to have survived in the North Arabian realm, which is not to say that Hellenistic tombs in Jordan were devoid of sculptural ornaments: excavations conducted in the *necropoleis* of Gadara and its surroundings have brought to light statues of sphinxes, lions, and other feline creatures which were meant to protect the tomb from violation and desecration (Weber 2002: 188, 413–4 nr. pl. 28 pl. 46.D, 427, nr. pl 54 pl. 59.A–E), an apotropaic custom that would be perpetuated in Petra (and elsewhere in Jordan) until the Late Nabataean period—for instance, the "Lion Triclinium", aptly named on account of the two lions protecting its entrance (*BD* 452;[2] McKenzie 1990: 158–9 pl. 135)—and beyond (*e.g.*, in the vicinity of Gerasa the incised figure of a sphinx was noted on a tomb door: Lichtenberger and Raja 2019: 139–40).

Tomb Façades

The earliest funerary portraits to have survived in Jordan are still, for the most

[2] *BD* refers to the standard classification of Petraean tombs that follows the numbering in Brünnow and von Domaszewski 1904.



1. Obelisk Tomb (BD 35), detail. Petra, AD 40–70 (© B. Annan).



2. The Urn Tomb (BD 772), detail. Petra, third quarter of the 1st c. AD (© B. Annan.2013: Beil. 1).



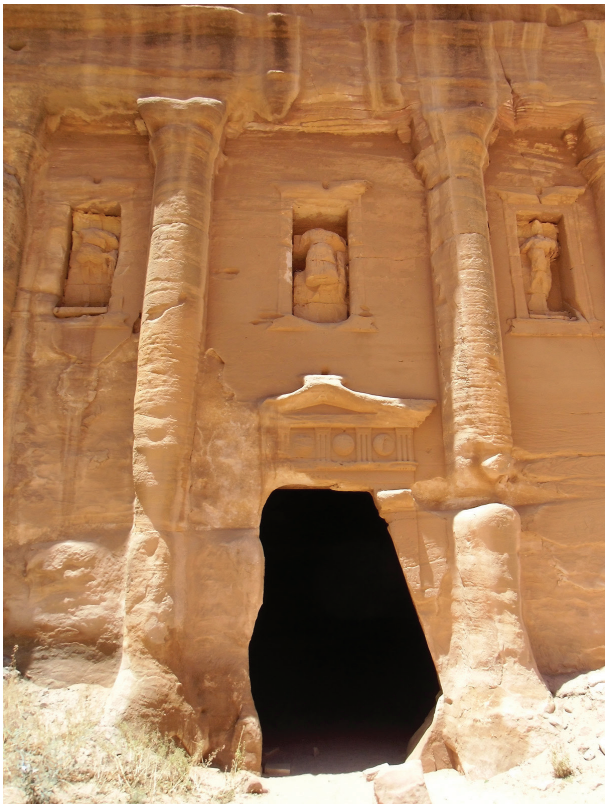
3. The Silk Tomb (BD 770), detail. Petra, first half of the 1st c. AD (© B. Annan).

part, on display on the rock-cut façades of the Nabataean capital of Petra, where six such images, heavily eroded, defaced or destroyed, are known, ranging from the late 1st c. BC to the late 1st c. AD. The first five are: (1) the Obelisk Tomb (Fig. 1; *BD* 35; Wadeson 2012 with earlier bibliography), where a draped figure is carved in a *naiskos* amid four monumental obelisks; (2) the Urn Tomb (Fig. 2; *BD* 772; McKenzie 1990: 144–7 pl. 91–7) where a slab bears the image of the owner of the tomb, perhaps a (yet to be identified) king (Wenning 2003: 135),[3] (3) the Silk Tomb (Fig. 3; *BD* 770; McKenzie 1990: 168–9 pl. 157d, 158e), on the façade of which are carved two heavily eroded reliefs, which may be interpreted as the Dioscuri—owing to the apparently mounted horseman on the left, and the eroded horse figure inserted between the male figure and the edge of the frame to the right—or alternatively, as officers of the Nabataean cavalry; (4) the so-called "Turkmaniyyeh" Tomb (Fig. 4; *BD* 633; McKenzie 1990: 167–8 pl. 159a–b), where two busts are set in a rather small niche above a long (and well-studied) Nabataean epitaph (Conklin 2004 with earlier bibliography); (5) the misnamed "Tomb of the Roman Soldier" (Fig. 5; *BD* 239; McKenzie 1990: 147–8 pl. 98–103)—misnamed since, in all probability, it predates the incorporation of the Nabataean kingdom into the Roman Empire—adorned on its lower order, between each pair of supports, with a *loculus* slab bearing a relief, the central one showing a male figure in military garb (no doubt a high-ranking officer in the Nabataean army,

[3] Regarding the dating of the tomb—third quarter of the 1st c. AD—S.G. Schmid has tentatively identified the portrayed individual as the Nabataean king Malichus II (AD 40–70 AD; Schmid 2013: 766–7).



4. The "Turkmaniyyeh" Tomb (BD 633), detail. Petra, mid-1st c. AD (© J. Norris).



5. The "Tomb of the Roman Soldier" (BD 239), detail. Petra, third quarter of the 1st c. AD (© J. Norris).

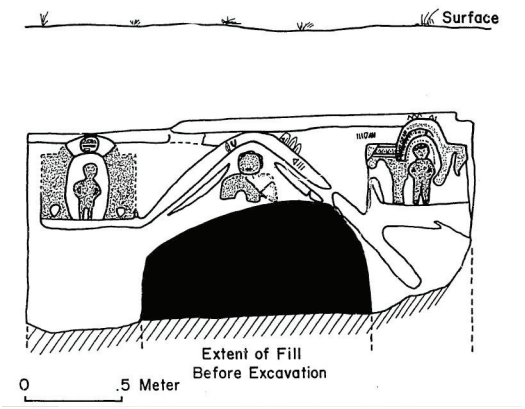
if not a member of the royal dynasty), while the lateral ones perhaps depict, once again, the Dioscuri (Wenning 2003: 142), rather than, as has long been held, the sons of the tomb founder (this assumption was first formulated in Brünnow and von Domaszewski 1904: 158–60). All of these portraits, unfortunately headless, seem to have suffered intentional mutilation in consequence of a pervasive iconoclasm championed in the subsequent centuries by the Christian and Muslim inhabitants of the region, as J.S. McKenzie has recently argued (McKenzie *et al.* 2013: 270–1), and this disfiguration has rendered any identification of the figures reputedly elusive, and largely dependent on individual researchers' subjective interpretations. In an unpublished study,[4] and in an attempt to set the "portrait" theory on firmer ground, L. Wadeson sought to establish a correspondence between the number of figures depicted on the façade—marking the prominence of their display on these façades—and the architectural configuration inside the funerary chambers. She noted that all of the tombs featuring portraits share topographical and architectural characteristics: they are all situated either along major routes or overlook the city centre; most of them belong to large funerary complexes and have Classical temple-like façades pierced with *loculi*, along with large interiors (equipped with *arcosolia*, a rare occurrence at Petra) that would have hosted ritual activities. All of these elements point to the elevated status of the tomb owners within Nabataean society, a position that might have earned them the privilege of being depicted on the façades (Wadeson forthcoming). Such a scholarly effort is praiseworthy, and brings fresh insights to the debate. Nevertheless, in the absence of new epigraphic or archaeological evidence, the uncertainty surrounding the identity of the portrayed individuals is bound to linger.

The sixth Petraean tomb (Fig. 6; *BD* 66 with earlier bibliography) was for the most part destroyed by heavy rains around 1847, and its appearance would have vanished completely were it not for a drawing sketched by the French scholar Léon de Laborde on the occasion of his visit to Petra in 1827 (1830: 57 pl. 51). This drawing gives a general view of the entrance of the Sīq, and little detail of the tomb decoration can be discerned (see the illustration in Brünnow and von Domaszewski 1904: I 232 fig. 263).

[4] I wish to warmly thank Lucy Wadeson for sending me her unpublished manuscript.



6. Tomb of Arrianos (BD 66), detail. Petra, 1st c. BC–1st c. AD (after Brünnow and von Domaszewski 1904: I fig. 263).



7. Façade of the "Tombeau aux bustes". Abila, 2nd c. AD (© M. Fuller).

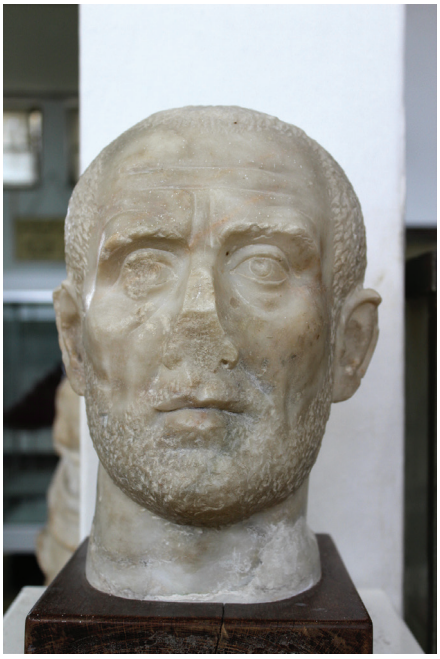
From what I can gather, the relief, carved on an arched lintel above the doorway, showed some piece of furniture (an altar? or a table bearing offerings?) set at the centre of the scene—or alternatively, a defaced figure—and two seated figures in the corners, one slightly taller than the other, the figure to the right facing outwards, while the shorter one to the left seems to pivot towards the viewer. One may certainly regret that no early explorer discussed, if only in passing, the subject of the relief, focusing instead on the accompanying Greek funerary epigram incised on the tomb's façade, which identified its owner as having been one Arrianos, a native of Petra, who died of an unspecified illness at the age of twenty-seven (*IGLS* 21, Jordanie 4 nr. 55). The scene in the lintel aligns, in terms of its composition and epitaph, with a family portrait, which would then have the parents sitting on each side, and Arrianos in the centre.[5]

[5] I am tempted to recognise two broken legs on the table, in which case de Laborde could have mistaken a statue base for a table—I have no doubt, however, that any interpretation here is highly hypothetical, if not fanciful.

Outside Petra, surviving funerary portraits carved on tomb façades are strikingly rare, as I am aware of only two specimens. The first was recorded in Abila-Quwayliba, where a bust, adorning the entrance of the aptly named "Tombeau aux bustes" (Fig. 7; Barbet and Vibert-Guigue 1988/1994: 59 fig. 41a), is shown under a sort of rudimentary pediment, flanked by small-scaled figures set in small niches, with their hands placed on their hips. The second relief, which has been somewhat overlooked in recent literature, can be admired on the façade of the Western tomb in the "Al-Kahf" funerary complex outside Amman (Fig. 8; Conder 1889: 122–4 pl. 16; Brünnow and von Domaszewski 1904: II 201–5 figs. 795–801), where a defaced bust, draped in a mantle and possibly holding a scroll in one hand, is carved in the tympanum, amid a dense network of intertwined floral motifs. A second bust may be distinguished on the wall of the vestibule formed by an arch, above the doorway. A niche set above the entrance to the hypogea, if contemporaneous with the tomb in its first phase, could have housed a statuette (or a



8. Façade of the Western tomb in the "Al-Kahf" necropolis. Philadelphia, 2nd c. AD (after Brünnow and von Domaszewski 1904: II fig. 801).



9. Marble head of a male figure. Philadelphia-Amman, first half of the 3rd c. AD (© B. Annan).

sitting statue). The iconographic program's visibility, and consequently, the impression it made on visitors and passers-by was certainly enhanced by the architectural conception of the tomb itself, which one accessed through a deep excavated sunk court or *dromos*.

Sarcophagi

Sarcophagi constitute a second category of monuments which often bore funerary portraits, whether carved in the round on lids or in relief on the short and long sides of coffins, following a trend that gained momentum from the reign of Trajan onwards (Wrede 1990; Pasquier 2016: 111). While the wealthiest patrons would have had their marble sarcophagi brought over great distances and, one can safely assume, at considerable cost from specialised workshops in Attica or Asia Minor,[6] citizens of lesser means, who notwithstanding wished to emulate these affluent patrons, would commission native sculptors to carve sarcophagi in local limestone or basalt, some of which would, on occasion, feature portraits on their long or short sides. One may mention here a couple of basalt sarcophagi from the 2nd or 3rd c. AD. The first, from Kharga (Fig. 10; Weber 2002: pl. 117.C), has two busts in a recessed panel, male on the left and female on the right, each clad in a *chitōn* underneath a *himation*, and can be dated to the Severan period on account of the lady's coiffure arranged after that of Septimius Severus' wife Julia Domna. The second, from Irbid (Fig. 11; Lenzen and McQuitty 1988: 269 pl. XLVII, 1; Weber 1993: 70 n. 262; Weber 2002: pl. 117.D), features on its long side rectangular crudely draped busts on either side of a blank *clipeus*, characterised by small heads with ill-defined features atop elongated necks.

A number of these locally-produced

[6] See, for instance, an Attic lid with a reclining couple in the Archaeological Museum of Umm Qays: Kintrup 2016: 294–5 nr. 263 pls. 63–4 with earlier bibliography; Lichtenberger and Raja 2019: 144–5. See also a male marble head, which could have belonged to a reclining figure on a sarcophagus lid in the Archaeological Museum of Amman: Fig. 9; Weber 2002: 510–1, nr. D 11 pl. 153.A–D with earlier bibliography.



10. Basalt sarcophagus decorated with a pair of busts. Irbid, first half of the 3rd c. AD (© B. Annan).



11. Basalt sarcophagus decorated with a pair of busts. Irbid, 2nd–3rd c. AD (© B. Annan).

sarcophagi, nevertheless, bear testimony to an admirable level of craftsmanship, and denote an intention of verisimilitude, as evidenced by a sarcophagus found in Abila-Quwayliba (Fig. 12; Koch and Sichtermann 1982: 575 n. 33 fig. 590; Barbet and Vibert-Guigue 1988/1994: 115–6 figs. 32–36; Weber 1993: 70 pl. 12,1; 2002: pl. 117.A–B), on which a mature man, sporting a *paludamentum* that covers his torso, is



12. Sarcophagus with bust and winged putti. Abila, Tomb Q4, AD 180–220 (© B. Annan).



13. Gabled lid with a relief of a reclining figure. Basalt. Gadara, 3rd c. AD (after Hoffmann 2000: fig. 41).

represented in bust-form between a couple of rosettes and a pair of torch-bearing winged *Erotes*. Another sarcophagus from Gadara-Umm Qays is noteworthy in that the deceased is represented reclining on a gabled lid (Fig. 13; Weber 1993: 78 n. 23; Hoffmann 2000: 227 fig. 41; Weber 2002: 450 nr. sk 2 pl. 83.D), after the "mixed kline-roof type" or "'gemischten' Typus" (Cambi 2016), a visual construction for which we may (despite it being sparsely attested in the *corpora* of sarcophagi in the Imperial Near East) point to parallels in Nysa-Scythopolis (Baisan) and Ascalon (Asqalan) in Palestine (Mazor and Paran 2018) and Nebi Shīt in Lebanon (Fani 2005/2006).

Stelai

Image-bearing stelai seem to have derived from their archaic antecedents, *i.e.* plain stone slabs set vertically in the ground to signal the presence of a tomb as a consecrated

locus. Most stelai bore an epitaph in Greek, Latin, Aramaic, or North Arabian scripts, usually mentioning the name and immediate genealogy of the deceased and their age, or for the more elaborate ones, an epigram lamenting the loss of the relative and extolling his or her virtues and qualities. Portrait stelai would have been displayed upright within the funerary enclosure, yet very few, if any, of these documents, which would have been easily displaced by looters or upon the reuse of the tomb, were found in their original archaeological context. Worthy of mention are the limestone stele of Diodora, daughter of Herakleitos, from Pella-Ṭabaqat Fahl and dated to the 2nd or 3rd c. AD, whose decapitated bust shows a *chitōn* ornamented with *clavi*, on the surface of which are indicated, in peculiar fashion, round breasts with visible nipples above a *tabula ansata* on which is carved her brief epitaph (Fig. 14; Mittmann 1970: 179 nr. 15 pl. XVI fig. 31; Ibrahim 1988: 66; Weber 1993: 62–8 pl. 7.2; 2002: 484 nr. B 4 pl. 119.D) and the uninscribed basalt stele of an officer from Gadara-Umm Qays, dated to the 2nd c. AD (Fig. 15; Weber 1993: 63 n. 208 pl. 10:1; 2002: 446 nr. pl 101 pl. 60.D; Gharib *et al.* 2017: 228, 230 fig. 6), whose figure, interrupted above the knees, is set in a rectangular frame under a pediment adorned with a rosette: a cloak (*sagum*) fastened with a round brooch (*fibula*) on his right shoulder, and under which one can distinguish the belted *pteryges*, covers his torso.

Busts

The bust is, by far, the most widespread and favoured form of funerary portraiture in the imperial Near East and



14. Basalt stele of Diodōra. Pella, 2nd–3rd c. AD (after Weber 2002: pl. 119.D).

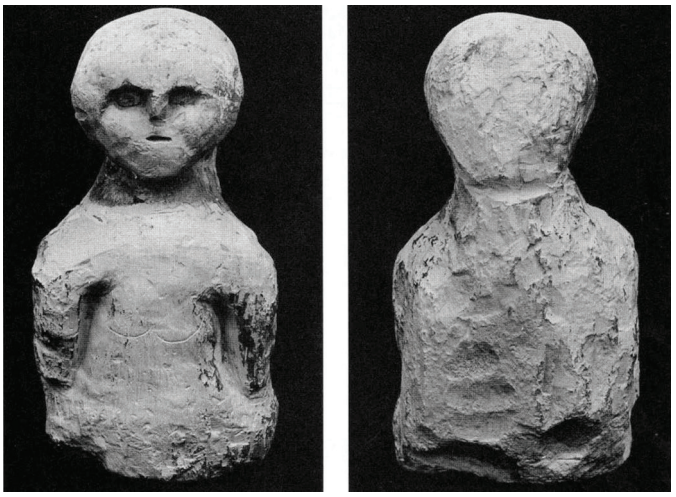


15. Basalt stele of a soldier or veteran. Gadara, 2nd c. AD (after Gharib et al. 2017: fig. 6).

particularly in Roman Jordan, where I was able to gather no less than 130 specimens. Indeed, the bust form was, in many respects, a most suitable image-bearer: (1) its production did not require, *most often*, as we will see, too specialised a training; (2) it could be acquired for a *relatively* modest cost; (3) its format could accommodate the architectural setting of the tomb (whether it was placed free-standing in or above the burial niche: Lichtenberger and Raja 2019: 144); and (4) its appearance evoked, to some extent, the full-figure statuary's three-dimensionality, so that a bust must have functioned, more often than not, as a stand-in for a statue. Most of the busts found in the necropoleis in Jordan are rather rudimentary: the bust of Theodōros, from Abila-Quwayliba, dated to the 2nd or 3rd c. AD (Fig. 16; Weber 1993: 66 n. 231; 2002: 475–6, nr. A 33 pl. 111.A–B), is characterised by an oval-shaped head with a flat face, slanting eyebrows, closed eyelids, thin nose, narrow lips and monstrously widened chin, resting on a massive cylindrical neck and a block-like torso lacking any indication of anatomical features. One can hardly believe that the author of such a portrait sought to reproduce the appearance of a particular individual, or to individualise the image through physiognomic characteristics, yet the patron must have judged it sufficiently expressive as to have it stand *in lieu* of the deceased, whose identity is given by the brief epitaph carved on the torso: *Θάρσει, Θεόδωρε* ("Be brave, Theodōros"). A second bust—contemporaneous, uninscribed, and of the same provenance (Fig. 17; Weber 2002: 475 nr. A 31 pl. 112.A–D)—features an abstract bust with rather bloated forms, deep-set eyes, and arms that are merely delineated through shallow carving under the armpits: the only hint at the deceased's gender is given by faintly incised breast



16. Limestone funerary bust of Theodōros. Abila, 2nd–3rd c. AD (after Weber 2002: pl. 111.A–B).



17. Chalk female funerary bust. Abila, 2nd–3rd c. AD (after Weber 2002: pl. 112.A–D).

contours (which might have been added at a later stage of its existence). Such "crude" portraits are attested all over the Roman Empire, and strikingly similar items have been unearthed, for instance, in Baelo Claudia in Hispania (Jiménez Díez 2007) and in Kenchreai, the eastern port of Corinth (Rife *et al.* 2007: 162 fig. 14). One may pause here to ponder what "added value", so to speak, in terms of prestige and symbolic performance, such generic portraits brought to the "commemorative equation". Perhaps, in such cases, the mere inclusion of a portrait—independent of the likeness (in the sense of *eikōn*) it might have borne to its model, or of its "truthfulness"—was a statement in and of itself, a proclamation of status, of cultural sophistication, in other words, of *savoir-vivre* or rather, *savoir-mourir*. It also serves, from an art historical perspective, to illustrate how this "portrait habit" permeated a rather wide segment of society. The unflattering aspect of these crude portraits should not, however, obscure the fact that this phenomenon was essentially confined to the social circles of the most affluent citizens of the Decapolis, since these portraits were most often displayed in hypogea and monumental tombs, the very construction of which represented a substantial investment. Furthermore, the bust form was sufficient—indeed, most effective—in its commemorative function, in that it reduced the deceased's identity to two elementary components: the name (epitaph) and the face (image)—Lat. *nomen* and *vultus*; Gk. *onoma* and *prosōpon*—which were, for the Classical mind, the two ultimate seats of individuality (Frontisi-Ducroux 1995).

Wall Painting

An additional mode of funerary self-representation allows us to gain a glimpse of a fleeting—indeed, long lost—reality, in which the ancient viewer's senses must have revelled, which is that of a colourful antiquity. While in Sidon on the Phoenician coast, we know of some Late Hellenistic or Early Imperial painted stelai (Gubel 2002), no such documents have yet been found, to my knowledge, in Jordan where painted funerary portraits most often adorn walls on the edges of *loculi* and *arcosolia* within funerary enclosures. One particular archaeological site, Abila-Quwayliba, has provided us with a wealth of such documentation (Barbet and Vibert-Guigue 1988/1994, *passim*).

Remarkable among those Abilene portraits is the bust, painted above a *loculus* in the eponymous tomb H3 ("tombeau du Vieil Homme"), of an elderly man shown



18. Framed portrait of an elderly figure. Abila, 2nd c. AD (© Cl. Vibert-Guigue).



19. Portrait of an elderly lady in a wreath. Abila, first quarter of the 3rd c. AD (© M. Fuller).

above an elaborate garland of flowers and beneath two festoons of red, yellow, and green floral motifs, and set in a floral frame against an ochre background (Fig. 18; Barbet and Vibert-Guigue 1988/1994: I 42 nr. 13, 223–6 fig. 111). He is dressed in a white tunic into which is sewn a red *clavus*—no doubt some insignia of his social rank, one that is yet to be clarified—his white hair, moustache, and beard, his receding hairline, and wrinkled forehead attest to his old age. Another partially preserved painting, in the tomb H60, shows in a floral medallion a woman whose face, with its greying hair and sagging flesh, seems to exhibit features of old age (Fig. 19; Smith and Mare 1997: 313 figs. 11–2). Old age is a notable feature in a body of portraits, whether in the Near East or the wider Roman Empire, as it is a frequent subject of ridicule in Classical literature and was only reluctantly expressed in portraiture (Fuchs 2008, with earlier literature in n. 5), despite the wisdom and moral authority such traits would have conventionally conferred upon the depicted individual. Indeed, the ancient sitter often underwent rejuvenation in portraiture, yet the youth to which the portrait lays claim to is often belied by the advanced age mentioned in the epitaphs. In comparison,



20. Pair of painted portraits under loculi. Abila, 2nd c. AD (© A. Barbet).

two (unpublished?) portraits painted on the edges of *loculi* in the tomb H4 (Fig. 20) undeniably depict a young man and a young woman, whose remains must have been deposited in the niches above. One wonders whether they were relatives, given their side-by-side depiction, and the slight resemblance to one another that can be detected in their portraits?

Miscellanea

In addition to the categories of funerary portraiture discussed above, one encounters a few documents that, though seeming



21. Tomb door decorated with a bust on its lintel, detail. Irbid, 2nd c. AD (photo by Rami Tarawneh; CC BY-SA 3.0; commons.wikimedia.org/wiki/File:Archaeological_Museum,_University_of_Jordan_41.JPG).

unica, may hint at a wider typological palette of funerary portraiture that would have been in use in antiquity. Furthermore, when considered in a regional perspective, we find that these monuments are not as isolated as it might appear *prima facie*.

An altar, for instance, from Philadelphia-Amman, is adorned with busts on its sides, one of them representing a Hermes *psychopompos*, hence favouring the monument's funerary purpose (Weber 2002: pl. 161.A–D). While this portrait-bearing altar finds no immediate parallel, to my knowledge, in Roman Jordan, one may point to substantial *corpora* of such documents in Rome (Boschung 1987), the Western provinces (Kleiner 1987), and even the Hauran (*e.g.*, Abdul-Hak and Adul-Hak 1951: 65 nr. 26; Dentzer and Dentzer 1991: 126 nr. 5,39 pl. 8.265 nr. 5,40 pl. 8.602), the Ledja (al-Maqdissi 1984: 11 fig. 11), and Dmeir near Damascus (Weber 2006: 32 nr. 12 pl. 8 a–d, with earlier bibliography). Given the central importance of sacrificial rites in the pagan mortuary rituals (whether Greek, Roman, or North Arabian), it is certainly not surprising to encounter such image-bearing altars upon which, in all probability, no such rites were performed.

A tomb door, found in Ham south of Irbid and currently on view in the garden of the archaeological museum of the University of Jordan (Fig. 21; Shraideh and Lenzen 1984: 299 pl. LVII; Weber 2002: 189 n. 1445; Annan 2019: 430–1 figs. 5–6), exhibits on its lintel the armless bust of a young man, carved in high relief, between two elaborate rosettes, while the door jambs are adorned with a crawling snake—which, as an apotropaic creature, protects the tomb and, given its chthonic nature, communicates with the Underworld—and a long torch—perhaps mirroring the one visitors must have carried into the hypogeum, but also an allusion, according to F. Cumont (1949: 48–50), to the "rebirth" of the deceased through the illumination of the abode of the dead. The youth, bare-breasted—and this very

nakedness holds heroic undertones—with his head turned frankly to the right, seems to emerge from the flat stone, and this vivid sculptural treatment must have struck with poignancy the passer-by. Similar depictions of the deceased, prominently featured on the door lintels of funerary complexes, have been documented in Tyre (Dunand 1965: 12 pl. VII.1) and in the Jewish necropolis of Besara-Beit Shearim in the Lower Galilee (Avigad 1976: 81–2 fig. 33 pl. XXVII.2 pl. XXIX.5).

Among all categories of images, free-standing sculpture was apparently, in the Imperial Near East, the form deemed least suitable for funerary portraiture, a matter that has not been, to my knowledge, properly addressed, and that still needs clarification. Are we to deduce from this scarcity that the form was too closely associated with official portraiture (*i.e.*, that of emperors, governors, and high officials) and honorific practices (statues of benefactors)? Or did it perhaps resonate too inappropriately with cult statues (Gk. *agalmata*) for it to be tolerated in a funerary context without infringing on the sacred privilege owed to the gods? Or was it simply perceived as too presumptuous? Perhaps, alternatively, the architecture of the tombs itself did not provide the material conditions for the erection of statues within the funerary chambers. Rarity, however, does not equate vacuum, and some exceptions suggest that sculpture in the round was not an unknown phenomenon in the city of the dead. In the Jordanian realm, if we are to exclude niches carved in the façades, whose dimensions may suggest their having housed statues, I know of only two examples of funerary portraits in the round, both of which have been discussed by T.M. Weber. The first, carved in basalt, was found in Abila-Quwayliba and is now kept in the courtyard of the archaeological museum of Irbid (Fig. 22; Weber 2002: 190, 466 nr. A 3 pl. 99.B; Lichtenberger and Raja 2019: 141). The head, which might have been worked separately, has not survived. The male figure, clad in a *chitōn* and draped in a *himation*, stands on his left leg, the right leg being slightly bent. The deceased's left arm, enveloped in the loop of his cloak, is bent across his chest, his left hand perhaps originally clenching the hem of his mantle, with the fabric marking several angular creases as it crosses the body and covers the slightly bent right arm, from which it hangs freely in long and thick folds, an attitude consistent with the so-called "arm-sling" or *Normaltypus* pose (on which, see below). The second statue, which was discovered in 1998 in the northern necropolis of Gadara-Umm Qays (Weber 2002: 190, 427–8 nr. pl 55 pl. 72.E), apparently adopts this same



22. Basalt male funerary statue. Abila, 2nd–3rd c. AD (© B. Annan).

pose, despite a greater liberty taken in the treatment of the draping of the cloak. Though fragmentary (the head, the right arm, and the feet along with the plinth are missing), this sculpture is most interesting in that its initial display, based on its *in situ* context, may be recovered, and it is therefore likely to provide evidence, if not for a cult of the dead, then at least for commemorative rites held around the portrait statue, the details of which will be dealt with below.

Having briefly surveyed the typological variety of funerary portraits in Roman Jordan, an attempt will now be made to extract from this corpus the social discourse conveyed by the iconography, and to delineate the values that patrons were keen on promoting through this imagery.

Thus Have I Lived: Themes and Social Values through the Lens of Funerary Iconography

Delving into this corpus, one cannot fail to notice an impressive recurrence across media (whether the portraits were displayed on frescoes, sarcophagi, stelai, or in the round) and a remarkable persistence over the centuries of a number of iconographic schemes that were seemingly attached to specific roles, genders, and social configurations, thus forming a consistent repertoire shared, as we will see, across the Eastern Mediterranean and beyond.

Arm-Sling

The most common scheme for male figures is that conventionally known as the "arm-sling", "bound-elbow" or *Normaltypus* pose, which is first adopted in the portrait statue of the Athenian orator Aischines in the Early Hellenistic era (Fehr 1979: 16–24; Lewerentz 1993: 18–57; Filges 2000: 101–8; Masséglia 2015: 96–9), and which consists in having one's body enveloped in the *himation*, with one arm brought over the chest and draped in the loop of the mantle. A favoured attitude in honorific statuary, meant to embody the ideal citizen, one actively involved in the public affairs of his *polis*, yet that can demonstrate self-control (Gk. *sōphrosynē*), the *Normaltypus* is abundantly attested in funerary iconography, into which it must have migrated not long after its inception, since we encounter it repetitively on Hellenistic stelai from Asia Minor (Pfuhl and Möbius 1977/1979, *passim*) and Syria (for instance in Sidon: Gubel 2002: 97–8 nr. 89 and in Antioch: Bel *et al.* 2012: 334–5 fig. 324). In Jordan, this scheme, illustrated by the two funerary statues discussed above, reverberated across the typological spectrum, as we find it in an abbreviated format on numerous busts (*e.g.*, in Gadara, Fig. 23; Weber 2002: 414–5 nr. pl 30–2 pl. 47), thus highlighting the patron's intention to encapsulate its honorific symbolism "at low cost", so to speak.



23. Basalt funerary bust. Gadara, 2nd–3rd c. AD. (after Weber 2002: pl. 75.A).

Women Draped in Death

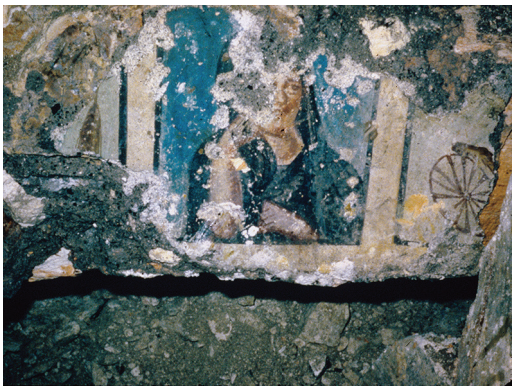
While men were commonly placed in the *Normaltypus* pose, no specific scheme seems to have been associated with portraits of women in Roman Arabia, since, most often, they were represented in bust form with their heads potentially veiled (therefore rendering it difficult to identify the famous Herculaneum Women types, ubiquitous in statuary elsewhere).

Noteworthy is the absence in our corpus of some female attributes, such as the spindle and distaff which were widespread in northern Syria (Wagner 1976, *passim*) and Palmyra (Sadurska and Bounni 1994: 189; Cussini 2005: 37–8), and the absence of the depiction of mothers holding their children in their arms, such as can be found in southern Syria (Sartre-Fauriat 2001a: 265–6 fig. 355; Weber 2006: 30–1 nr. 9 pl. 6.a nr. 10 pl. 6.b, 40 nr. 19 pl. 14.b).[7] However, other popular schemes do occur, such as the so-called "Penelope scheme", which consists, for a female figure, of having the head slightly bent, with the cheek resting against her clenched fist (Settis 1975: 13–6; Balty 2000: 11–2). The gesture, which can be traced back, in its earliest manifestations, to 5th c. BC Greek Classical iconography, evidently alludes to the pensive and melancholic posture of Odysseus' wife, and metaphorically, to her exemplary fidelity to her husband. In the Jordanian realm, it is featured, in one of its variants, on a framed painted female portrait in the Abilene tomb Q13 (Fig. 24; Barbet and Vibert-Guigue 1989/1994: I 183; II pl. 105b, VII.1). A female portrait bust, perhaps from Gadara (Fig. 25; Weber 2002: 440 pl. 67.E with earlier literature), holds a mirror against her breast, again a recurrent attribute of women in the Graeco-Roman world (Balensiefen 1990). Indicators of the depicted individual's gender seem to have been widely understood to patrons and sculptors, as one frequently notices on otherwise abstract busts the inclusion of breast contours or jewellery and, for male figures, beards (Lichtenberger and Raja 2019: 146).

Funerary Banquet

The banquet motif, whereby the portrayed is shown reclining on a couch, sometimes in the company of a relative or servants, is one of the most persistent and ubiquitous schemes in ancient art, as some of its earliest occurrences can be traced back to 7th c. BC Assyrian reliefs (Dentzer 1982: 56). From its eastern origins, it went on to diffuse throughout the

[7] Note, however, on a male bust in Gadara, the rare depiction of a child's face: Weber 1993: 82 n. 52 pl. 12:2; 2002: 443 nr. pl 93 pl. 79.A.



24. Painted portrait of a lady. Abila, first half of the 2nd c. AD (© A. Barbet).



25. Basalt female bust shown holding a mirror. Gadara (?), 2nd –3rd c. AD (© B. Annan).

visual culture of the entire Mediterranean world over the following millennium, and became a favoured mode of representation, particularly in the funerary sphere (see most recently: Draycott and Stamatopoulou 2016; for the Roman world: Dunbabin 2003). In Roman Arabia, some patrons chose to depict themselves in this manner, whether in the round on sarcophagus lids (*cf.* the Attic sarcophagus in Gadara-Umm Qays, mentioned above), or in frescoes, as in an (unfinished?) fragmentary banquet scene showing a mature man reclining on a *klinē*, with a table (Lat. *mensa tripes*), a *thymiaterion*, and a *cantharus* set in the foreground (Fig. 26; Smith and Mare 1997: 313 fig. 13). No consensus has yet been reached among scholars as to the ancient viewers' reception of the banquet scene motif, some interpreting it as an allusion to the blessed afterlife that the deceased were destined to enjoy in the hereafter, while others favoured a worldly and 'retrospective' reading—namely that the scene either depicts the meals enjoyed during the deceased's lifetime, or those in which relatives would partake during commemorative ceremonies, perhaps in company of the deceased, whose presence was materialised via their image (Dunbabin 2003: 109). Whichever interpretation one chooses to retain, the banquet scene inevitably exuded prestige, leisure, and opulence.

Poets Draped in Death?

A great number of images show the deceased grasping a scroll (Lat. *volumen*) in one hand,[8] an attribute which, once again, and in the absence of epigraphic testimonies which may explain its significance, has

[8] For instance, in Roman Jordan, on exclusively male busts from Gadara-Umm Qays: Weber 2002: 415 nr. pl 33 pl. 58.E, 430–2 nr. pl 61 nr. pl 63, pl. 63.A–F, 439 nr. pl 83 pl. 76:C–D, 444 nr. pl 96 pl. 75:B and Gerasa-Jerash: Lifshitz 1963: 91 pl. 8 A.



26. (Unfinished?) banquet scene painted in an arcosolium. Abila, 3rd c. AD (© M. Fuller).

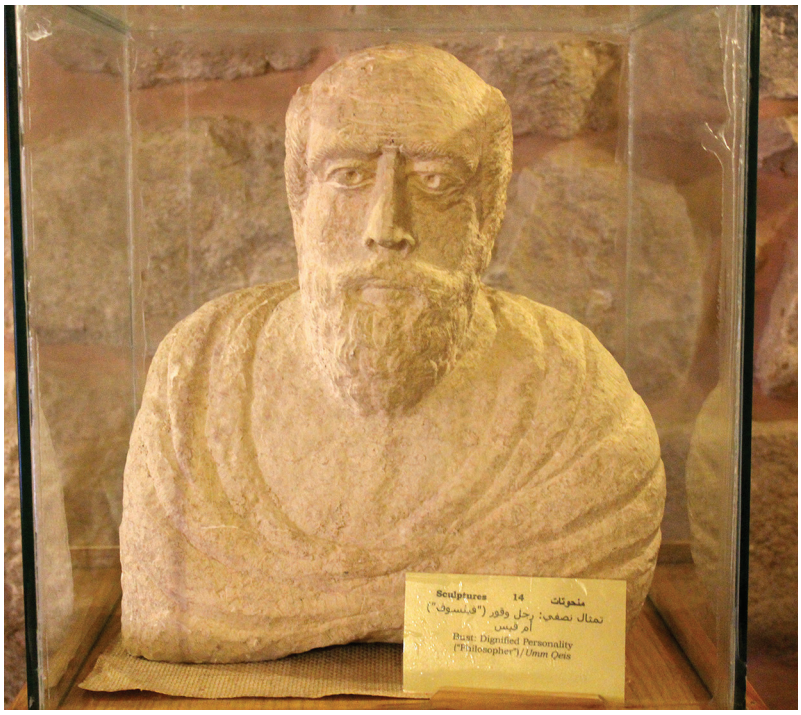
divided art historians over its interpretation, some seeing in it a reference to the deceased's will (*i.e.*, an explicit sign of the testator's accomplishment of his familial, social and religious duties), others as an allusion to the portrayed person's philosophical and literary inclinations. The first interpretation has recently received substantial arguments in a dense article by J.-Ch. Balty (2016) who connected the recurrence of this attribute in the exceptionally rich corpus of 3rd c. AD funerary stelai commemorating military personnel of the *legio II Parthica* (stationed in Apamea-Qal'at al-Madhiq in Northern Syria) with the numerous epitaphs inscribed on these same stelai. Balty notes rather interestingly that the only specimens that do not feature this attribute do specify in the texts the portrayed individual's intestacy, thereby favouring an identification of the *volumen* with the testator's will.

The latter interpretation, which has long been held as the most likely, certainly has its own iconographic proponents when combined with other visual and epigraphic elements. Unique in this sense in Roman Jordan is a splendid (and unfortunately lost) elaborately framed relief from as-Ṣalt that was originally inserted into the back wall of a monumental tomb, above a sarcophagus facing the entrance. The relief shows a man, bare-chested with the exception of a *himation* draping the left side of the torso and on which run deep curvilinear folds, holding a scroll in his left hand (Fig. 27; Hadidi 1979: 131 pl. XLIX; Barakat 1980; Weber 1996: 517; 2002: 189–90). This styling, combined with the well-trimmed beard and the receding hairline (Zanker 1995: 224), is consistent with a particular type of representation, namely that of the learned man or *pepaideumenos*, following which one would liken oneself, through particulars of dress, hairstyle, posture, and attributes, to archetypal representations of philosophers (Borg 2004). This iconographic phenomenon spread across the



27. Limestone relief of a bare-chested man. As-Salt, 2nd–3rd c. AD (© Th. M. Weber).

Empire in the course of the 2nd and 3rd c. AD, having received powerful impetus from the cultural movement known as the Second Sophistic (Anderson 1993). Another funerary bust, perhaps from Gadara-Umm Qays (Fig. 28; Weber 2002: 416–7 nr. pl 37 pl. 49.A–D), with its long beard and bald head, is similarly evocative of portraits of philosophers, and denotes its owner's intent to advertise himself as such. Certainly one may expect to find in this cultural milieu a desire to portray oneself as a servant of the Muses, since the cities of the Decapolis were famous in antiquity for having produced eminent philosophers, sophists, poets, and orators (Graf 1992; Gatier 1993: 20–5; Sartre 2001: 294–9, 867–71), and several (male) individuals in nearby Ḥawrān are indeed praised in their epitaphs for their



28. Limestone bust of an elderly man in the guise of a philosopher. Gadara (?), 2nd–3rd c. AD (© B. Annan).



29. Painted panel of a female figure holding a codex and a stylus. Abila, early 4th c. AD (?) (© A. Barbet).

oratory skills, their intellectual abilities, and their philosophical leanings (Sartre-Fauriat 2001b: 209–10). Surely, the significance of the *volumen* as an attribute varied, and both readings (intestacy and learning), in addition to a few more, must have been valid depending on the context of representation, as had been eloquently pointed out by H.-I. Marrou (1938: 190–1; see also Borg 2004: 162–3; Balty 2016: 85–6).

Although the scroll, as a sign of a literate education (Gk. *paideia*), was, in Classical portraiture, predominantly the prerogative of men, it could on occasion be featured in female portraits (Bielman 2003). In Abila, a Late Antique fresco in the tomb Q1 shows the full figure of a young woman facing the viewer and writing with a *stylus* on an open *codex* (Fig. 29; Barbet and Vibert-Guigue 1988/1994: I 78 pl. 13.a pl. I.1; Lichtenberger and Raja 2019: 145 fig. 9.17).[9] Did such attributes, again, refer to her will, or were they an indication of her perfected *paideia*? If we consider the adjacent and opposite panels adorning the same tomb, and which were apparently devoted to different episodes or facets of this woman's life,[10] then we are tempted to support the second interpretation.

An inspection of the funerary corpus of Roman Jordan brings to light a number of phenomena that characterised these art forms: the recurrence—indeed, near hegemony—of these iconographic schemes reflect a visual reification of social and gender roles that must have necessarily been at odds with lived realities, yet were nevertheless mirrored and complemented by the laudatory lexical repertoire of epitaphs: men were unfailingly portrayed as wise and prudent individuals, devoted fathers and model citizens, while women were praised for their beauty and modesty, and depicted as chaste and faithful wives or loving mothers (Sartre-Fauriat 2001b). Also notable is the absence, in the Jordanian and wider Near Eastern corpus of funerary portraiture, of any iconographic reference to the deceased's crafts and professions, as if one was chiefly valued by his fellow citizens, in the Near Eastern societies of the Imperial period, for one's moral conduct, public benefactions, and active involvement in one's civic community (Rey-Coquais 2002: 263–4), in contrast to what can be observed in the Western provinces, where freedmen took pride in advertising their trades (Zimmer 1982).

Lest you Forget Me: Echoes of Funerary Commemoration in the Archaeological Record

Finally, upon examining this material, the essential and increasingly central issue in current art historical approaches to ancient art must be addressed, namely the display context of portraits and the ways in which it shaped the ancient viewing experience. In a funerary context, our understanding of this display context (the recording of which having often been frustratingly omitted in early excavation reports) would also seek to reconstruct the commemorative rites that were performed around the portrait, a task rendered most delicate by the heavy looting that for centuries has afflicted tombs and *necropoleis* in the region. Nevertheless, by drawing upon Classical literary sources, archaeological and iconographic testimonies in neighbouring regions, and Jordan's own documentary evidence, one may hope to achieve an understanding of these rites.

Communities and individuals in the

[9] For similar figures holding *codices* in the catacombs of SS. Peter and Marcellinus in Rome, see Roberts and Skeat 1983: pl. VI, and on a portrait medallion from Flavia Solva in the province of Noricum, see Dolenz 2001: 86 fig. 3.

[10] The first shows her holding two palm leaves, perhaps in reference to some victory in a contest; the second depicts her presenting the viewer with an open *volumen*; and on the third she holds two objects in her hands, either *paterae* or a *crotalum* (Barbet and Vibert-Guigue 1988/1994: I 78–9; Skupińska-Løvset 2001).

Greek and Roman worlds were very much concerned, if not obsessed, with perpetuating one's memory *post mortem*, and funerary portraiture was but one form through which this perpetuation could be achieved. Indeed, the portrait, as the deceased's double—his *imago*—must have triggered an emotional response in the viewer, but as the recipient and seat of the ancestor's memory, it was also owed posthumous honours, materialised through sacrificial rites, which is why Roman jurists defined the tomb as a *locus religiosus* or *locus sacer* (Laubry 2012). Commemorative rites and familial commensality, integral components of the funerary portrait's purpose, would take place on particular occasions, such as the deceased's birthday or the anniversary of his or her death, and on calendar days devoted to the dead. Traces of such ceremonies (such as tableware and cooking ware, lamps, stone benches, wells, ovens, adjoining gardens, etc.) are often recorded in funerary precincts.[11]

During the American excavations at Abila, headed by H. Mare, a terracotta incense burner which must have been used during sacrificial rituals was found in tomb H 59 (Fig. 30).[12] Other items that belonged to the sphere of ritual activities are evoked in painting: *thymiateria* (*e.g.*, in the 'Tombeau des Candélabres' at Abila: Barbet and Vibert-Guigue 1989/1994: II pl. III.4), or torches (as on the tomb door from Ham discussed above). Visitors to the tomb would have also brought offerings to the dead. Such an offering scene is depicted, in my view, on a fresco painted on the back wall of an *arcosolium* in the luxurious tomb H 60 (Fig. 31; Smith and Mare 1997: 312 fig. 10).



30. Terracotta incense burner. Abila, 2nd–3rd c. AD (© M. Fuller).

This early 3rd c. AD painting shows two draped figures, their heads possibly girded with floral wreaths, standing between high candelabras and slightly turned towards each other: the male figure on the left presents the female figure, no doubt his relative, with a garland of flowers which he holds by both ends, while the woman extends her arm towards him, holding an indistinct object in her hand (a small bouquet of flowers?). The scene is strongly reminiscent of the *collocatio*, or lying-in-state, relief from the famous early 2nd c. AD Tomb of the Haterii that lay outside Rome, which shows a mourner standing over the dead woman (probably



31. Painted *arcosolium* showing two figures between candelabras. Abila, 3rd c. AD (© A. Barbet).

[11] For commemorative ceremonies in the Greek world, see Garland 2001: 104–20; in the Roman world, Scheid 2005: 161–88; in the Nabataean world: Perry 2016; Perry 2017, with earlier bibliography.

[12] I wish to thank Michael J. Fuller for bringing this find to my attention and for sending me photographs of the object.



32. Pair of painted female mourners. Abila, 2nd–3rd c. AD (© A. Barbet).

Hateria), about to place a similar garland on her bier (Trimble 2018: 335–6 fig. 12.8 with earlier bibliography). A lost Pompeian stucco relief that once adorned a mausoleum, sketched in the 19th century by J. Overbeck, is somewhat more explicit in that it represents a mourning woman placing *taeniae* on a child's (?) skeleton seen lying on a pile of rubble (Overbeck 1884: 419 fig. 221). Another Abilene painted panel in tomb Q 14 (the so-called "Tombeau des Femmes Voilées"), represents, in a frame over a Corinthian capital, two female figures wrapped in ochre brown mantles, whose faces are unfortunately disfigured (Fig. 32; Barbet and Vibert-Guigue 1989/1994: I 182, 189; II pl. 97 pl. 106.a pl. VI.4). Their afflicted attitude, with their stiff pose and right arms bent over the chests, suggests that they are mourners rather than the deceased, and the fact that they were depicted alone, and not in a funeral procession (as on the Amiternum and Haterii reliefs: Flower 1996: 93–8 pl. 5–6; Bodel 1999), implies that they were relatives of the deceased rather than professional wailers hired to

conduct the lamentations (Lat. *Praeficae*: see Kudlien 1995).

One of the most eloquent documents attesting to rites involving the funerary portrait is provided by the aforementioned basalt statue from Gadara-Umm Qays, which was found lying before a rock-cut tomb. In the immediate vicinity of the recess into which the plinth of the statue was set, excavators found an altar and a circular cavity that a libation bowl would have fit into, and from which runs a narrow drain for liquid offerings (Weber 2002: 381 fig. 101; Lichtenberger and Raja 2019: 141). Benches were also carved in the rock around this installation to accommodate the bereaved. The statue, in its initial setting, conspicuously stood at the tomb entrance, and the tomb itself was located on a high promontory overlooking the Yarmūk Valley on one side, and the Sea of Galilee on the other: the scenery itself no doubt lent the whole monument prestige and majesty and, in this context, the statue must have been invested, in addition to its commemorative function, with a *quasi*-cultic quality.

Conclusion

As it currently stands, the corpus of funerary portraiture I have assembled in Roman Jordan numbers 219 items. Out of this number, 95 hail from Abila and 62 from Gadara. As has been noted by T.M. Weber (1993: 69–70) and A. Lichtenberger and R. Raja (2019: 139, 142), these two cities concentrate the main body of Roman-era funerary portraits in Jordan, while the citizens of Gerasa, for instance, seem to have favoured plain sarcophagi decorated with pelta shields (Lichtenberger and Raja 2019: 140). Certainly this discrepancy among Decapolitan cities in regards to funerary portraiture cannot be solely ascribed to the varying intensity of archaeological surveys and exploration, but must have reflected a marked preference among the inhabitants of these two cities for funerary self-representation, and one may detect, upon closer inspection, idiosyncratic and *polis*-specific trends in this art form (Lichtenberger and Raja 2019: 147). Moreover, the recurrence of a finite number of iconographic schemes and attributes (*Normaltypus*, Penelope, *volumen*, etc.), which can be observed throughout the Graeco-Roman Mediterranean, allows us to appreciate the extent to which the Classical visual language (*koinē*) permeated Decapolitan aesthetics, and found vivid echoes within Nabataean culture.

The meticulous recording by excavators of funerary artefacts deposited in the tombs, and their systematic integration in art historical analysis, could further shed light on the manners in which the funerary portrait was incorporated into mortuary processes and commemorative practices. Furthermore, the architectural reconstruction of funerary complexes, such as that of the "Tomb of the Roman Soldier" achieved by the *International Wādī Farasa Project* (Schmid 2012 with earlier bibliography), may circumscribe the display context of these images, and narrow down the audience for which they were intended. Finally, the most recent and stupendous discovery of painted frescoes in the provisionally named "tombeau du Fondateur" in Capitolias-Bayt Rās (see Aliquot *et al.* in this volume), is a potent testimony to the fact that the Jordanian soil still withholds evidence that is bound to further our understanding of an art form that was essential to personal self-perpetuation, for as Cicero put it (*Philippics* 9.4.10), "the life of the dead is set in the memory of the living".

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Machaerus: A Gospel Scene in the Light of Historical Archaeology

The Transjordan (Perean)/Judean fortress of Machaerus (Gk. Μαχαιροῦς, meaning 'sword') was built by the Hasmonean Alexander Jannaeus in *ca.* 90 BC, destroyed by Aulus Gabinius in 57 BC, then transformed into a royal palace and city by King Herod the Great in *ca.* 30 BC, and ultimately destroyed by King Aretas IV in AD 36. From its hilltop location to the east of the Dead Sea, Machaerus could provide a view all the way to the Temple of Jerusalem, Mas'ada, Jericho, and even to Alexandreion. Pliny the Elder (*Natural History* 5.15.16) acknowledged that "Machaerus, next to Jerusalem, was once the most strongly fortified place in Judea", in a unique strategic location, overlooking the Dead Sea and the west bank of Judea. Historical events at the fortress are narrated by Josephus (*e.g.*, *Wars of the Jews* 1.167–74, 2.485–6, 7.171–7; *Antiquities of the Jews* 13.416–8, 14.89–97). The account given by him that Herod Antipas had John the Baptist imprisoned and executed at the fortress (*Antiquities of the Jews* 18.116–9) is in alignment with the descriptions of the Gospels of Mark (6.14–29) and Matthew (14.1–12), and it was also confirmed by Eusebius (*Church History* 1.11.4–6). Combining the information given by Josephus and the Gospels, it can be determined that Machaerus is the historical scene of the tragic birthday banquet of the Tetrarch Herod Antipas, and the place where Princess Salome danced. It is important to emphasize that Machaerus was the only royal palace of King Herod that was inherited by Antipas; therefore, it was the best symbol of his Herodian legacy and a perfect place for his birthday party. Mount Machaerus is just 30 km from the Baptism Site (the traditional site of Bethany-beyond-the-Jordan), where, according to the Gospel of John (1.28, 10.40), the Baptist had his ministry. During a period of occupation by Judean rebels, the fortress was destroyed by the Romans in AD 71 (Josephus *Wars of the Jews* 7.190–209).

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1. The historical sites of the Gospels that can be verified by archaeological evidence in the Holy Land.

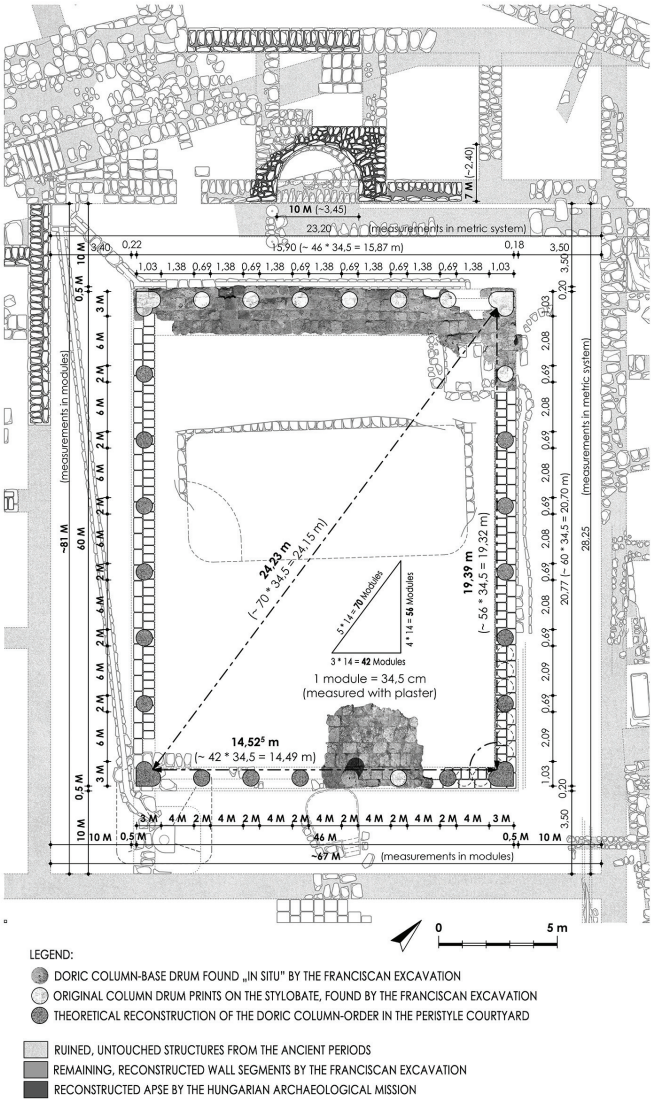


2. Helicopter photograph (2004) of Machaerus in the first rays of the rising sun, towards the Dead Sea, Bethlehem and Jerusalem in the background (courtesy of the American Center of Research, the Jane Taylor Collection).

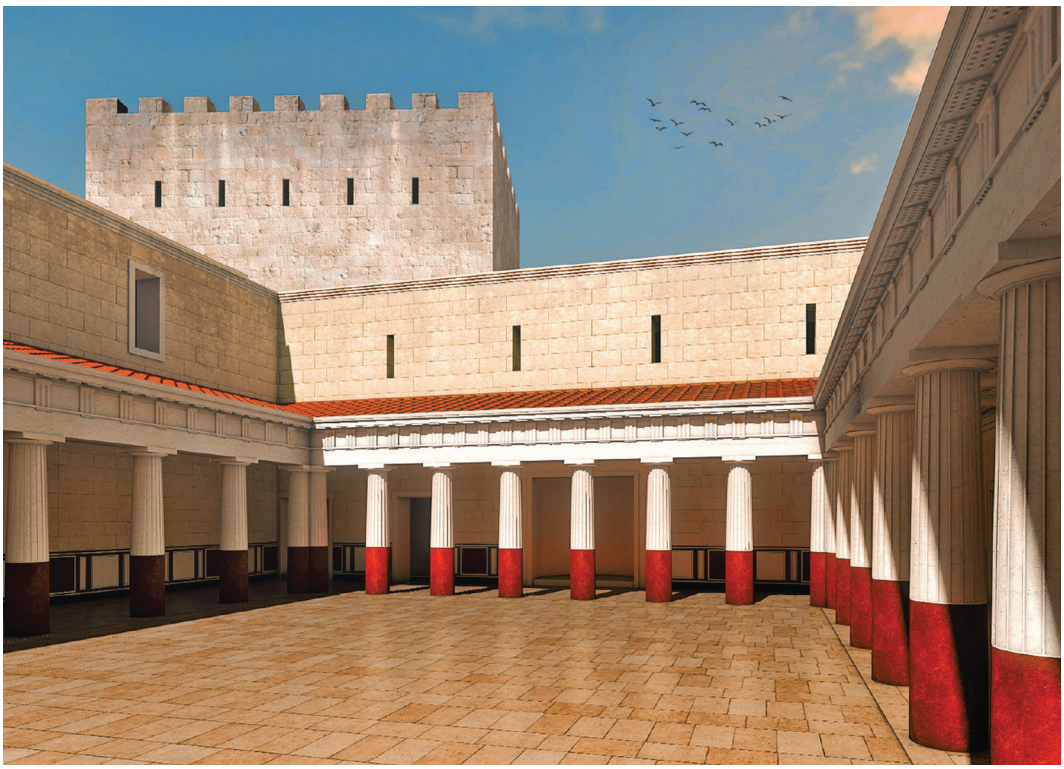
The above historical sources are in full harmony with the archaeological research of the historical site (Figs. 1–3). The first 50 years of excavations (1968–2018) were conducted by three academic institutions (1968: Southern Baptist Theological Seminary; 1978–1981 and 1992–1993: Studium Biblicum Franciscanum; since 2009 onwards: Hungarian Academy of Arts), and revealed the complete fortified Herodian royal palace. In addition to the theoretical architectural reconstruction, it was even possible in 2014 (with clean anastyloses) to re-erect an Ionic column in the Apodyterium Hall of the Herodian bathhouse and a Doric one in the peristyle of the royal courtyard of the King and the Tetrarch Herod. The Roman siege by the Legion X Fretensis had a similar circumvallation wall with campuses around the citadel like at Mas'ada, and an unfinished agger-ramp. These remains were discovered by August Strobel in 1965, published in 1968, and surveyed in detail in 1973. The lower city of Machaerus was discovered by Felix-Marie Abel OP in 1908 and partly excavated by Virgilio Corbo OFM in 1981. The architectural legacy, the archaeological materials (including epigraphic, ceramic, and numismatic evidence) all confirm the detailed description of Josephus; there is no contradiction anywhere: the historical references all align



3. The citadel of Machaerus with the two re-erected Herodian columns and the Dead Sea in the background. View from the north-east.



4. The complete layout of the Herodian Lithostrotos-courtyard of the Machaerus royal palace is properly described with the ancient architectural alignment system.



5. The architectural reconstruction of the Royal Court of the King and the Tetrarch Herod in Machaerus. The architectural space, the colors, and pavement stones were sophisticatedly reconstructed, thanks to the surviving built legacy of the Doric peristyle courtyard.

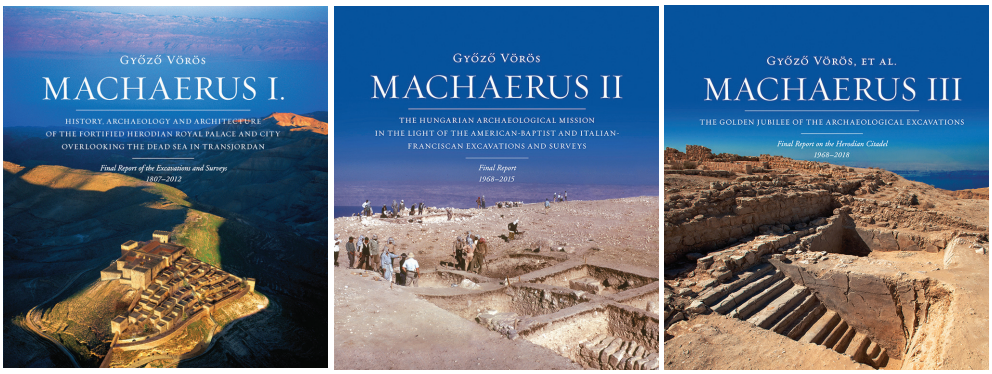
with the archaeological evidence. Its once magnificent 660 m^2 royal courtyard, with its still *in situ* apsidal throne niche in the symmetry-axis, had to be the historical place in the Gospel scene, the birthday banquet of Antipas; thus, Machaerus was also the Golgotha of Saint John the Baptist (Figs. 4–6). The first three excavation final reports (*MACHAERUS I–III*) on the first 50 years (1968–2018) were published by the author in Milan (Vörös 2013; 2015; 2019) at Edizioni Terra Santa (Figs. 7–9).

His Royal Highness, Prince El-Hassan bin Talal, wrote in 2014 that Machaerus is "so much more than a fascinating archaeological site. It sits in the landscape of religious memory as a testament and place of pilgrimage". However, Machaerus is even more than this, as it is also a historical place, which is ripe with the ancient past of the Hasmonean and Herodian royal dynasties, though it had witnessed three times complete destructions: twice by the Romans (57 BC and AD 71), and once by the Nabataeans (AD 36). As it is well known, military or natural destructions typically provide highly valuable and essential information for archaeological research. As a result, the Machaerus citadel is a time capsule of history from *ca.* 90 BC until AD 71, as it was never occupied before or after a century and a half.

The first 50 years of archaeological excavations (1968–2018) verified that all references from the contemporary historical sources concerning Machaerus (*e.g.*, various passages in Strabo, Pliny the Elder, Josephus, and the Gospels; Vörös 2013: 16–43) are



6. The reconstructed royal settlement had an upper city (the citadel) and a lower city with a well-preserved surrounding wall, which housed (from 30 BC until AD 36) the entourage of the royal court, the Herodian household, during the reigns of the father and the son, the King and the Tetrarch Herod. According to our understanding, the lower city had to be the historical place where John the Baptist suffered a political house arrest by Antipas, in the company of his disciples. The superimposed 3D architectural model sits on a helicopter photograph (APAAME_20171001_REB- 0071), and viewed towards the south.



7–9. The covers of the first three archaeological excavation final reports on Machaerus.

not simply textual references, but they are in alignment with the actual archaeological evidence of the historical site as well. In the light of this archaeological evidence, it is certain that on the hilltop of Machaerus there was a Hasmonean fortress that was converted into a once magnificent fortified Herodian royal palace. There, a third

fortification was erected after the Nabataean destruction, which was ultimately destroyed by the Legion X of the Roman Emperor Vespasian. The AD 71 monuments of the circumvallation siege of the Fretensis, including the unfinished agger-ramp, are still present at the site.

Historical archaeology is a unique form of archaeology that deals with places, things, and issues from the past when written records can inform and contextualize the cultural material. These records can both complement and conflict with the archaeological evidence found at a particular site. However, as previously mentioned, we have not found any conflict between the historical written sources and the archaeological legacy of the historical site of Machareus. Machaerus is an authentic, historical place of the Gospel scenes of the Holy Land. Like Bethlehem, Jericho, or Jerusalem, its built legacy and cultural heritage confirms, complements, and contextualizes the relevant historical sources. As a result, Machaerus is a sacred archaeological site, which firmly stands on the map of history (Fig. 10).

According to the contextual references of Josephus and the Gospels, among the ancient walls of the historical place of Herodian Machaerus (during *ca.* 30 BC and 36 AD), five important characters of the Gospels were living: (1) King Herod the Great (who killed the Children of Bethlehem: Matthew 2.16), (2) his son the Tetrarch Herod Antipas (who excommunicated Jesus



10. A cloudless (reconstructed) space-photograph image of NASA, taken of the Holy Land from a southern satellite. The dominant geographical place of Machaerus and its royal Dead Sea port of Callirhoe, opposite Jerusalem, are clearly legible. The imprisoned John the Baptist sent his disciples to Jesus in Galilee, probably to Capernaum (Matthew 11.2–6; Luke 7.18–23).

from the Jews by handing him over to the Romans: Luke 23.8–12) with his second wife, (3) the Hasmonean Princess Herodias and her daughter (4) Princess Salome; and finally, (5) John the Baptist, the precursor of Jesus Christ.

Some may say that Princess Salome is not a Biblical figure, as her name is only acknowledged by Josephus (*Antiquities of the Jews* 18.5.4). The same is true for the identification of the Biblical site of Machaerus (*Antiquities of the Jews* 18.5.2). However, the historical names of Salome and Machaerus became integral parts of the early Christian tradition and collective memory, as already in the *Church History* (1.11.4–6) *ca.* AD 324, Eusebius confirmed Machaerus, and we may find the name and the depiction of the historical Salome (the daughter of Princess Herodias), in AD 62 on authentic coins as well (when she became the consort-queen of Chalcis and of Armenia Minor).

In the meantime, for historical archaeology (that is not a religious discipline by its nature), there is no higher authority for the history of the Early Roman period of the Holy Land than the historian of the Flavian Roman Imperial dynasty: Josephus. It has been established that Machaerus is an authentic, historical place of the Holy Land, like Bethlehem, Jericho, or Jerusalem. In the meantime, unlike Machaerus, the latter three have never disappeared from the maps. To appreciate the real, historical value of Machaerus, we have to see the brief overview of the other Gospel scenes as well.

We have several settlement-names in the Gospels, and outlining them, we have to emphasize that the names of Rome, Athens, Alexandria, or Damascus are not mentioned. The Gospels are Levant-focused holy scriptures, concentrating on the Land of Jesus. However, we hear about geographical or foreign city names, which are all well-known and are easily identifiable on the maps of historical archaeology, such as Babylon, Cyrene, Decapolis, Egypt, Galilee, Idumea, Iturea, Judea, Lake of Tiberias, Ninive, Perea, Samaria, Sea of Galilee, Sarepta, Sidon, Syria, Syro-Phonicea, Trachonitis, and Tyros.

Meanwhile, in the Tetrarchy of Philip we hear about Abilene (Abila city or district of Syria) and Caesarea Philippi, both of them well known. But the historical places of Bethsaida or the Mount of Transfiguration (Hermon?), are uncertain and their locations are tentative.

We have many more problems in Galilee. We hear about Gennesaret (Ginosar), Capernaum (Kafr Nahum), and Tiberias, which all stand firmly on the map of historical archaeology. But the locations of Dalmanuta, Cana, Chorazin, Nain (Naim), and Nazareth are all settlements that can only be traced back to Byzantine or Crusader traditions and their locations are not definitely known. I would like to emphasize that I do not doubt that it is possible that these traditional sites are identical with the ancient historical settlements that are mentioned in the Gospels. I only remind the reader that with the limits of historical archaeology, and our archaeological information in 2018, they cannot be put yet on our historical archaeology map of the Gospels. Also, even though we hear about Sychar (Jacob's Well) in Samaria, which is located 76 m (249 ft) from Tall Balata in the eastern part of the city of Nablus (within the grounds of the Bir Ya'qub Greek Orthodox monastery), the identification of this exact place is also a Byzantine tradition.

We have several names in Judea, like Aenon near Salim, Bethany, Bethany-beyond-the-Jordan, Bethlehem, Bethfage, Efraim, Emmaus, Jericho, Jerusalem, Bethesda, Getsemani, Gabbatha, Golgotha, Mount of Olives, Siloam, Sion, and Rama. There are also others, with completely unknown locations among them, like Arimathea, Gomora, Kariot (Sicarii?), or

Sodoma. However, concerning the rigorous requirements of historical archaeology, we can only put the names of Bethlehem, Jericho, and Jerusalem (with Bethesda and Siloam) on the map. There is no doubt about the places of the Temple Mount or the Kidron Valley, but the other places are traditional sites; we do not have *opus delicti* archaeological evidence in our hands to prove their Gospel-scene identities like we do for Machaerus.

Jesus also taught in the cities of the Decapolis, but only two are mentioned by name: Gadara and Geraza (both were rediscovered and identified by Ulrich Jasper Seetzen, like Machaerus). We do not want to engage with the issue that they are connected to the same Synoptic-tradition and miracle of Jesus: for historical archaeology the point is that both cities stand firmly on the map on the east bank of the holy river of Jordan.

In the Sermon on the Mount, Jesus speaks about an enigmatic hilltop city: "A city built on a hill cannot be hidden. No one after lighting a lamp puts it under the bushel basket, but on the lampstand, and it gives light to all in the house" (Matthew 5.14–5). Jesus also identified John as a Shining Lamp: "He was a burning and shining lamp, and you were willing to rejoice for a while in his light" (John 5.36). According to human logic, in the Sermon on the Mount, Jesus spoke in a coded way about John, who was imprisoned in Machaerus and "cannot be hidden" from the people. But these kinds of thoughts are simply speculations: they are not compatible with historical archaeology, which deals exclusively with concrete textual references and archaeological evidence.

There is only one archaeology, which has to be the same in Damascus, Amman, Tall Aviv and Jerusalem. One common archaeology that may relate to history, or may not. Consequently, historical archaeology is much more than "religious memory". It is tangible evidence of history, something the doubting Apostle Thomas wanted to have. Archaeology, which sheds light on the Gospels, is an academic field, where the faces of the doubter and sceptical researchers of sacred archaeology in the Holy Land can be compared with the characters of the apostles in Caravaggio's famous painting: *The Incredulity of Saint Thomas*. As the Doubting Thomas said: "Unless I see the nail marks in his hands and put my finger where the nails were, and put my hand into his side, I will not believe it" (John 20.25).

Historical archaeology (like the natural sciences) is for both religious and non-religious people. It is about history, where you can visit reality, like in the famous story of the Chinese painter about the connection between imaginative fantasy and reality. The ancient Emperor of China heard of a brilliant, genius painter in the countryside of his empire. He commanded that the great painter be brought to his imperial court, where they met. The Emperor commanded him to paint a landscape, which was not a dreamland, but the genuine, true reality. The painter received three months to execute the palace-wall-size canvas-image. After the three months, the Emperor came to see the artwork, and became very angry, saying: "I have to command to kill you, as you painted a simple sea-side landscape of fantasy with rivers, valleys and a royal castle on one of the hilltops, but not the Reality!" The painter in a very humble way, modestly and quietly answered: "I am terribly sorry, Your Imperial Majesty", as he stepped into the painting and disappeared behind the hills. The photographs and drawings on the Machaerus-landscape in the trilogy of the academic monographs (Vörös 2013; 2015; 2019) are similarly connected with the historical reality of the Gospel scene as this ancient Chinese painting in this fascinating story. Consider this passage:

> As he [Jesus] was now approaching the path down from the Mount

> of Olives, the whole multitude of the disciples began to praise God joyfully with a loud voice for all the deeds of power that they had seen, saying, "Blessed is the King who comes in the name of the Lord! Peace in Heaven, and glory in the highest Heaven!" Some of the Pharisees in the crowd said to him, "Master, order your disciples to stop." He answered, "I tell you, if these were silent, the stones would shout out."
>
> As he came near and saw the city [of Jerusalem], he wept over it, saying, "If you, even you, had only recognized on this day the things that make for peace! But now they are hidden from your eyes. Indeed, the days will come upon you, when your enemies will set up ramparts around you and surround you, and hem you in on every side. They will crush you to the ground, you and your children within you, and they will not leave within you one stone upon another; because you did not recognize the time of your visitation from God" (Luke 19.37–44).

Jesus spoke in *ca.* AD 33 about the stones and the destruction of the city "when your enemies will set up ramparts around you and surround you, and hem you in on every side". He spoke about the holy city of Jerusalem, and prophesized its destruction in AD 70, which he had foreseen 37 years earlier. The same fate happened in Machaerus a year later during the late fall of AD 71 or during the winter of AD 71/72, with the circumvallation siege of the Fretensis.

The destruction of Jerusalem and its Temple was viewed as a divine punishment, "because you did not recognize the time of your visitation from God". At the same time, we may read about the army of Antipas and the Herodian city of Machaerus, when, as a divine retribution, the complete army (and the most important stronghold) of Antipas was also destroyed "as a punishment of what he did against John, that was called the Baptist: for Herod slew him". However, the first destruction of Machaerus was not at the hands of the Romans, but already three years after the words of Jesus, in AD 36, by the Nabataeans.

> So, they [the Nabataean King Aretas IV Philopatris and the Jewish Tetrarch Herod Antipas] raised armies on both sides, and prepared for war, and sent their generals to fight instead of themselves; and when they had joined battle, all Herod's army was destroyed by the treachery of some fugitives, who, though they were of the tetrarchy of Philip, joined with Aretas's army. […] Now some of the Jews thought that the destruction of Herod's army came from God, and that very justly, as a punishment of what he did against John, that was called the Baptist: for Herod slew him […] Herod, who feared lest the great influence John had over the people might put it into his power and inclination to raise a rebellion, (for they seemed ready to do anything he should advise,) thought it best, by putting him to death, to prevent any mischief he might cause, and not bring himself into difficulties, by sparing a man who might make him repent of it when it would be too late. Accordingly, he was sent a prisoner, out of Herod's suspicious temper, to Machaerus, the castle I before mentioned, and was there put to death. Now the Jews had an opinion that the destruction of this army was sent as a punishment upon Herod, and a mark of God's displeasure to him (Josephus, *Antiquities of the Jews* 18.5.1–2).

Josephus never again spoke of the Herodian city and the magnificent royal palace of Machaerus, since after the death of



11. HRH Prince El Hassan bin Talal with the author and his wife in June 2019 in the courtyard of the former Crown Prince's Palace (Courtesy of the Royal Court.)

King Agrippa I (AD 44) it became a simple "Roman garrison", as he called it later. The archaeological excavations in Machaerus proved that upon the citadel ruins of the Herodian royal palace, a Roman garrison was erected, and today the most visible part of this monument is the polygonal surrounding wall, which overruns the destroyed Herodian walls (Vörös 2015: 138–9). The stratigraphical examinations of the excavations in the citadel of Machaerus confirmed this assumption with clear archaeological evidences (Vörös 2015: 502–3). It was also possible to date precisely the destruction of the Fretensis to AD 71 (–72?), when they destroyed the Roman garrison (but not the Herodian palace) that was taken by the Zealots in AD 66.

Concerning the Herodian building stones, Jesus made two important comments. On one hand, he established that "if these [the disciples] were silent, the stones would shout out". As a simple archaeologist, naturally I understand it in a certain allegoric way that even the stones may bear witness about Jesus and the Gospels. Obviously, the stones of Machaerus impart a historical reality to the Gospel scene, as H.Em. Cardinal Gianfranco Ravasi keenly observed in the Foreword of *Machaerus III*:

> "In that palatine area that overlooks the Dead Sea, and where now archaeology has revealed in its entirety the relics of its past, even in the pulsation of its ancient daily existence, an act of abuse of power was committed, in all of its brutality" (Vörös 2019: 18–9).

Yes, the stones of Machaerus, even in their fragmented physical reality, bear witness to the "ancient daily reality". On the other hand, the second of Jesus' comments concerning the Herodian stones of Jerusalem is more prosaic: "they will not leave within you one stone upon another". And after the destruction of the Nabataeans in AD 36 and the Romans in AD 71, we are witnessing a third destructive wave today, not only in Syria or Iraq, but in Machaerus by looters. They do not attack only the sacred ruins of Machaerus, but target all the ancient cultural heritage and archaeological legacy of the kingdom, including Petra, Geraza, or

Gadara. It is the responsibility of the royal Hashemite Family to act, as H.R.H. Prince El-Hassan bin Talal (Fig. 11) wrote after his Machaerus visit:

> "We are honoured to act as custodians of sites such as Mukawir. These great remnants of other ages enable the adherents of the Abrahamic Faiths to explore their common roots and to share their stories with pilgrims and travellers from the global human family." (Vörös 2015: 15)

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Wādī ʿAgalāt Winery: A Model for Long-Term Planning and Investment in Agriculture in the Petra Area

A Question at the Beginning

Have you ever asked yourself where the monumental, rock-cut staircase at the western end of Little Petra is leading (Fig. 1)? When I first visited Little Petra in 1991, I was told by my archaeologist friends that it was the rear entry used by the traders from Petra to receive the caravan leaders. Years later, when I climbed up this staircase, I reached a narrow passage and then another staircase leading down. At the bottom of this staircase, I found myself in a wādī bed and decided to follow it downstream. After around 400 m, I reached its lower end and realized that its outlet into Wādī Bayḍa was an extremely narrow drop-off with a width of only 1.2 m and a height of 19 m (Figs. 2–3). There was absolutely no rear access to Little Petra from this side, and the monumental staircase at the western end of Sīq al Bārid must have been built for completely different reasons!

Introduction

The discovery of the Wādī ʿAgalāt Winery was a side benefit of my research of Petra's hydraulic system. In 2001, surveying the runoff water retention systems built by the Nabataeans in the Bayḍa area, mainly inside Little Petra, I climbed along a very narrow fault leading from the main Plaza inside Sīq al Bārid, parallel to its southern cliff westwards. It led me again into the wādī bed at the bottom of the previously mentioned staircase at the end of Sīq al Bārid. During my survey on this visit, I recorded several water installations and a well preserved, partially still backfilled and not fully cleaned wine press at the eastern end of the wādī. By asking people from the Amarin village, I learned that the name of this wādī was Wādī ʿAgalāt. As my research focus at that time was not yet on wine production, I did not proceed with further research in Wādī ʿAgalāt. So the western wine press was first

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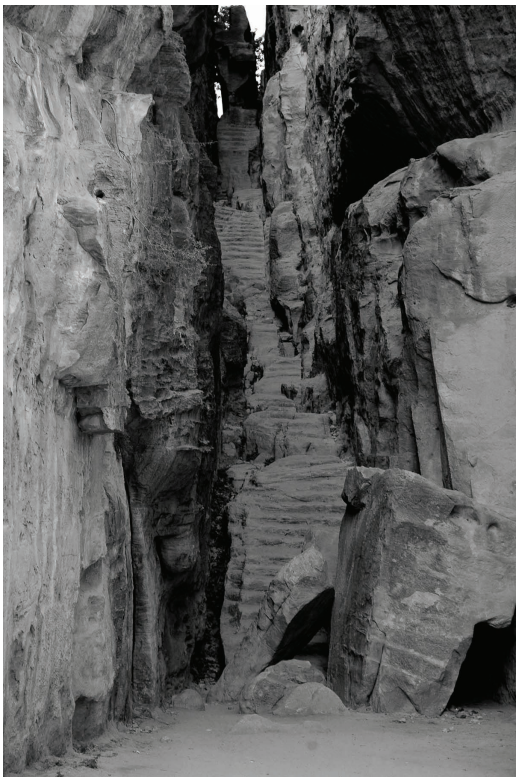


1. View of the monumental staircase hewn into the bedrock at the western end of Little Petra (U. Bellwald).

published by Zeyad al Salameen (2004: 176) in 2004. From 2010–2017, I conducted more and intensified surveys in Wādī ʿAgalāt which revealed the existence of an extended winery occupying its full extension from the western inlet to the eastern outlet and from the northern to the southern cliffs. In 2007, I entered into a co-operation with the Baʿja Survey Project of the University of Miami, directed by David Graf, in order to integrate my private research about Nabataean wine production into a more extended and comprehensive research project. During the "3rd International Conference on Petra and the Nabataean Culture," David Graf presented the general research results and reflections of the project, hence for these aspects I refer to his contribution in this volume. My



2. View from the outlet of Wādī ʿAgalāt down to Wādī Bayḍa. The drop-off has a height of 19 m (U. Bellwald).



3. View onto the very narrow drop-off from Wādī ʿAgalāt into Wādī Bayḍa. It has a width of only 1.2 m (U. Bellwald).

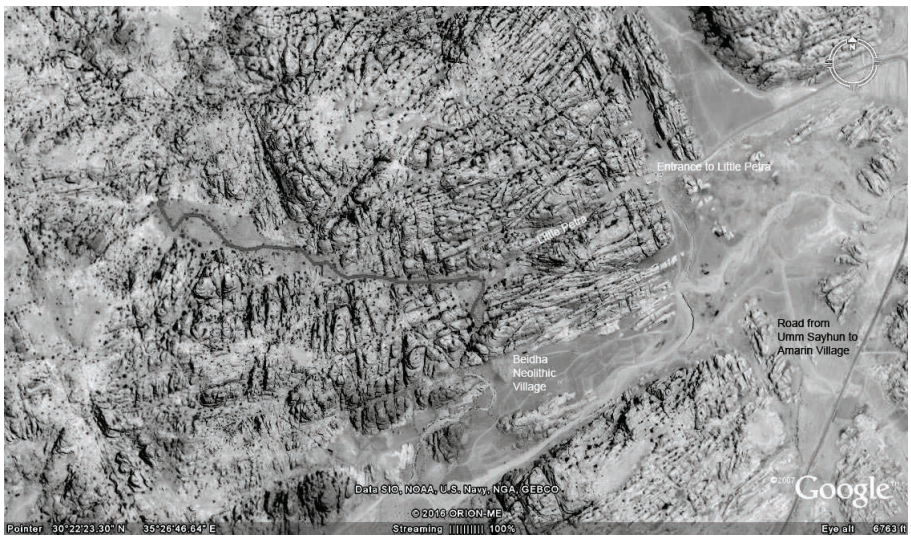
contribution will present the Wādī ʿAgalāt Winery as one of the most elaborate models of agriculture through its terracing of the Petra area, and furthermore it bears witness to long-term planning and investment in the field of agricultural production. The presentation of the preliminary results of the Wādī *ʿAgalāt* Winery Project presented here is an interim report, providing insight into an archaeological work in progress, including a prospectus for future work.

The Location of Wādī ʿAgalāt

Wādī ʿAgalāt is located to the west of Sīq al Bārid or Little Petra. It is a "deadlock"-wādī with no walkable entrance or exit. It is almost oriented west-east, its lowest section sharply diverting south in direction to the drop-off into Wādī Bayḍa. Its upstream end lies at a height of 1,097 m, its outlet at 1,074 m. The level of Bayḍa below the drop-off is at 1,055 m. The entire length of Wādī ʿAgalāt measures 1.19 km, its width differs from a maximum of 130 m to a minimum of 10 m. The topography of Wādī *ʿAgalāt* is characterized by two extended pans at the western and the eastern end and a meandering wādī bed in-between with alternating widths (Fig. 4).

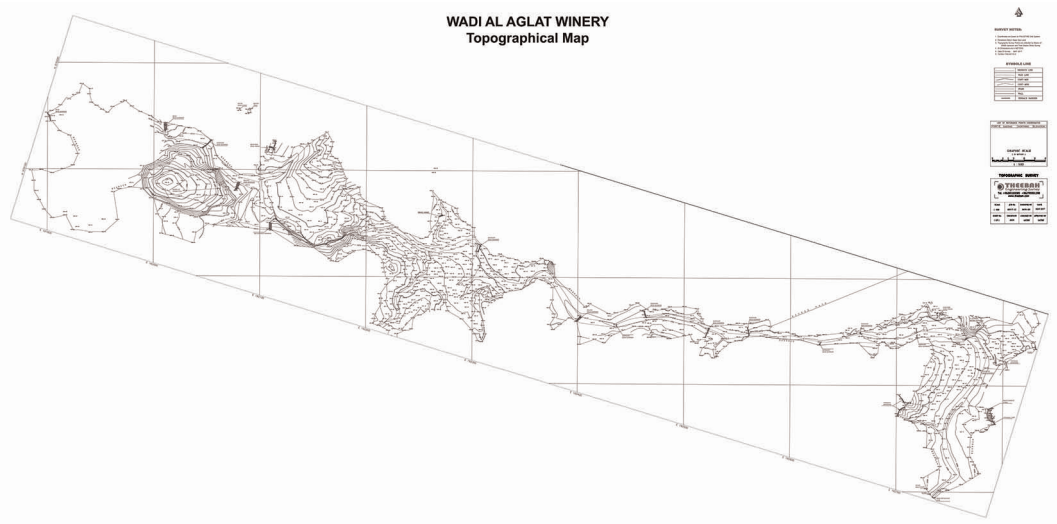
The Results of the Surveys 2010–2017

In the course of field work from 2010–2016, all the visible archaeological remains in Wādī ʿAgalāt were meticulously documented by photographs, drawings, and GPS-localization. In May 2017, the entire area of Wādī ʿAgalāt was mapped and all visible archaeological remains were recorded in the topographical contour-line map in the scale of 1:500 (Fig. 5). The details of the main archaeological elements were mapped in the scale 1:50. The field work and the mapping from 2010–2017 revealed the existence of an extended



4. Satellite view showing the location of Wādī ʿAgalāt with the course of the wādī bed highlighted in black. The dots at the upstream and downstream end of the wādī bed indicate the highest and the lowest points. The isolated dot west of Bayḍa Neolithic Village indicates the bottom of the drop-off between Wādī ʿAgalāt and Wādī Bayḍa. The grey surface highlights the extension of the former winery (extract from Google Earth; key by U. Bellwald).

winery occupying the full extension of Wādī ʿAgalāt from the western upstream end to the eastern outlet and from the northern to the southern cliffs. In an initial step for the set-up of Wādī ʿAgalāt Winery, the outlet of the wādī bed into Wādī Bayḍa was completely barred by a retention dam of solid masonry with a height of 4.9 m, a width from 98 cm to 170 cm and a thickness of 69 cm (Fig. 6). The blocks of the masonry



5. Topographical map of Wādī ʿAgalāt (original scale 1:500) showing the location of all archaeological remains recorded (drawing by Theebah, ʿAmmān).



6. View onto the crest of the retention dam closing the drop-off towards Wādī Bayḍa (U. Bellwald).



7. Frontal view at the niche sanctuary chiseled out of the western cliff flanking the dam (U. Bellwald).

were accurately embedded in grey hydraulic lime mortar in order to prevent any water from running off. In the western cliff, the dam is flanked by a niche sanctuary framed by pilasters and an altar with three footings for the insertion of betyloi, both directly hewn into the bedrock (Figs. 7–8). My research on the hydraulic infrastructure of Petra has revealed that almost all solid dam constructions, either flash-flood retention dams, diversion dams, or storage dams were



8. View from north onto the altar with three footings for the insertion of Betyloi, chiseled out of the western cliff flanking the dam (U. Bellwald).

accompanied by niche sanctuaries (Bellwald 2003: 81–4; 2008: 76–86). It may be assumed that the niche sanctuaries accompanying dams or aqueduct bridges were installed with the aim of asking selected gods or goddesses to prevent the construction from being damaged by natural disasters. That no other hydraulic structure in the entire Petra area is accompanied by a niche sanctuary and an altar at the main dam at the outlet of Wādī ʿAgalāt into Wādī Bayḍa demonstrates how much care was invested in the set-up of this specific winery. By holding back the material dissolved by winter rains from the rock formations surrounding the wādī, the construction of the dam led to the natural deposition of the soil sediments required for the growing of the vines. By identifying the human intervention in the construction of the main retention dam of Wādī ʿAgalāt, its actual topography proves to be a completely artificial, man-made landscape. In its original form, the wādī bed was much steeper and narrower and there were no farmable surfaces along its banks.

Upon the completion of the accumulation of upstream sediments from the main retention dam, the course of Wādī ʿAgalāt was further terraced for facilitating the planting of vines. A sequence of 17 wādī barriers was built along the course of the wādī bed, upstream from the main retention dam. A wādī barrier is a facility built for containing runoff water and for reducing its outflow velocity. Furthermore, barriers have the duty to increase the upstream surface



9. View of the well preserved northern section of the downstream face of the main wādī barriers at the northern foot of the rock outcrop bearing the ruins of the farmstead. The frontal view shows well the typical construction method of wādī barriers, well-dressed ashlar blocks set up as dry masonry without mortar (U. Bellwald).



10. View from north onto the well preserved section of the same wādī barriers (U. Bellwald).

level by building up sediments. In order to withstand the water pressure from upstream, barriers are constructed in dry masonry, without any mortar in the joints, allowing the water to seep through the voids. Based on their location, outlet, and dimensions, three categories of wādī barriers can



11. View from west of the stratigraphy of the sediments built up upstream from the main wādī barriers shown here above, exposed by erosion after the partial collapse of the construction. Below the scale the ruins of some older buildings may be detected (U. Bellwald).



12. Panoramic view from north into the pan at the upstream end of Wādī ʿAgalāt by the wādī barrier built at the outlet of Wādī ʿAgalāt. From this pan the Nabataeans were not only able to accumulate the required fertile soil covering the former rock surface, but also created a vast plane surface for establishing the vineyard (U. Bellwald).

be distinguished in Wadi ʿAgalāt. The two main wādī barriers had an original height of approximately 3 m and a thickness of up to 2.5 m. They are located at the inlet and the outlet of the extended wide pan at its western upstream end and led to the accumulation of huge sediments, creating an extended, even area for cultivation (Figs. 9–12). They still stand nowadays to a height of 2.5 m, but have partially collapsed with the result that the runoff water in wintertime has locally washed out the accumulated sediments to the original surface of the bedrock. Such recent erosion allows an impressive "x-ray" insight into the stratigraphy of the sediments. The most impressive stratigraphic profile can be seen at the foot of the rock outcrop bearing the ruins of the farmstead (Fig. 11). Ruins of masonry at the bottom of the profile prove that Wādī ʿAgalāt was used by humans even before the installation of the winery. Originally, the three major wādī barriers had almost the same dimensions as the main wādī barriers, but they were not





13–14. View of the downstream face of two well preserved average wādī barriers in the central section of Wādī ʿAgalāt. The photographs show that the abutments of the construction touch the bottom of the cliffs. The dry masonry of these wide barriers with limited height has been erected with the same well-dressed ashlar blocks as in the main and major wādī barriers (U. Bellwald).

erected for accumulating huge, extended sediments, but for taming the outflow speed of the runoff water. They are all located in steep, curvy sections of the wādī bed. Two of them are located immediately downstream from the rock outcrop bearing the ruins of the farmstead where the wādī bed has the course of the sharp S.

Along the sections of the wādī bed with a limited width and a rather gentle slope, a sequence of 12 average wādī barriers was built. These barriers had a height of about 1.2 m; their width depended on the width of the wādī bed, as they completely closed it from the northern to the southern cliff. The thickness varies from 1 to 1.5 m (Figs. 13–14). As the main and the major wādī barriers, the average ones were built with well-dressed ashlar blocks of local sandstone. The sequence of the average wādī barriers changed the course of the wādī bed into a stepped cascade with a gentle slope, reducing the outflow velocity of the runoff water tremendously in order to protect the vines from being damaged by erosion of the fertile soil. As the average terrace barriers used both cliffs as their abutments, they closed the wādī bed over its complete cross-section, hence the gently outflowing runoff water reached all rows of vines planted on both embankments.

In the wide areas at the upstream and downstream ends of Wādī ʿAgalāt, the slopes reaching up to the bottom of the flanking cliffs have steeper slopes compared to the lower areas built up by artificial sedimentation due to the construction of the wādī barriers. In order to secure the plants in these higher locations from being washed down, terrace barriers were built. Terrace Barriers are also constructions in dry masonry, erected along slopes like contour lines in order to decrease



15. In steeper areas where runnels risked sluicing out the terraces, they were reinforced by terrace barriers of which six have already been detected and surveyed (U. Bellwald).



16. One of the most thrilling discoveries were the still very visible artificially modeled terraces worked out by simply stepping the ground with rakes or similar tools along which the vines were planted. Instead of vines, nowadays Mediterranean onions are growing on the terraces (U. Bellwald).

the gradient by dividing the slope into a sequence of stepped terraces. The sediments accumulated upstream of the terrace barrier absorbed a great part of the runoff water and stored it, fostering agricultural production. Furthermore, terrace barriers stabilize the soil and hence prevent surface erosion. During the various surveys, three sets of terrace barriers were recorded with a total of six single walls. In future seasons of the project, it is likely that more such terrace barriers will be discovered, as some of them may be have been buried by debris washed down during winter floods. One buried terrace barrier was recently exposed in an angle of the western cliff close to the outlet of the wādī bed into Wādī Bayḍa (Fig. 15). All the visible and recorded terrace barriers were not built with well-dressed ashlar blocks, but with flat sandstone hunks collected from the surface in the area where they were erected. Between the terrace barriers, and in areas with a very gentle slope, the ground was prepared for planting the vines by simply terracing the soil with rakes or similar tools. Due to the very remote location of Wādī ʿAgalāt, a great number of these ground terraces are preserved and still visible today (Fig. 16).

Two huge wine presses in the wide eastern and western pans of the wādī allowed efficient processing of the grape harvest. The eastern wine press is located at the inlet from the narrow central section of the wādī into the wide eastern pan; it is inserted into a rock terrace at the bottom of the northern cliff. As it is occasionally used by Bedouins as a drinking trough for goats, it has partially been cleaned, but nevertheless the original bottom of all its basins is not yet visible. The eastern wine press consists of an extended, square treading platform which was also used as a pressing basin. From the treading platform, the must flowed through a valve into the rectangular filter basin, from where another valve conducted it into the

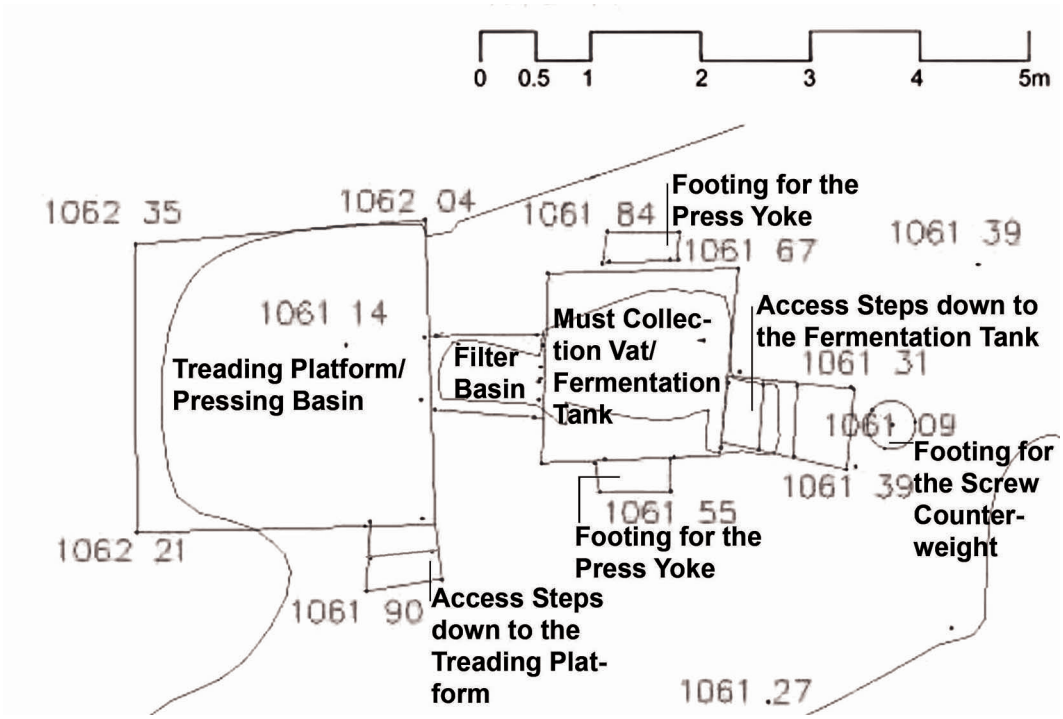
fermentation tank. Two sets of stairs gave access to the bottom of the treading platform and the fermentation vat. Absolutely exceptional are the well preserved footings of the wooden press construction on both sides of the fermentation vat and on the eastern side of its access stair. The two rectangular indentations on both sides of the fermentation tank were made for anchoring the yoke keeping the long press beam in its position, whereas the circular cut in front of the stair was used as a foundation for the counterweight of the wooden screw for pulling the beam down (Figs. 17–18). These footings hence allow a rather precise reconstruction of the wooden press mechanism (Figs. 19–20). The dimensions of the almost square fermentation vat are 1.65 x 1.75 m; its depth from the bottom to the inlet valve from the filter basin may be estimated to 1.8 m. Therefore the fermentation vat had a capacity per pressing process of 4,331 L.

The western wine press is located on the northern slope above the wādī bed, opposite the hilltop with the ruins of the farmstead. From its various single elements, only the huge square treading platform/filter basin is actually visible; all the other basins and installations are still completely buried (Figs. 21–22). Similar to the eastern press, the western one also has footings for the anchorage of the wooden press mechanism. As both wine presses in Wādī ʿAgalāt have huge and deep treading platforms where the grapes were crushed by foot, the must could be stored together with the skins and the stems of the grapes for a while before being conducted into the filter basin. By such a procedure the must was able to absorb the dye from the skins and hence got a red color. It is therefore most probable that the Wādī ʿAgalāt Winery produced mainly red wine.

Hydraulic installations in the close neighborhood of both wine presses assured a sufficient supply of runoff water for the needs of the wine making process. The most impressive such installation is a retention dam located at the eastern embankment of the wādī bed south of the eastern wine press. It closes the western section of a long and narrow fault parallel to Sīq al Bārid. The dam is 3 m wide and still stands up to a height of 2 m, but originally it was at least 1 m higher. Its masonry is 60 cm thick and set up with well-dressed ashlar blocks, fully embedded in grey hydraulic mortar (Fig. 23). The



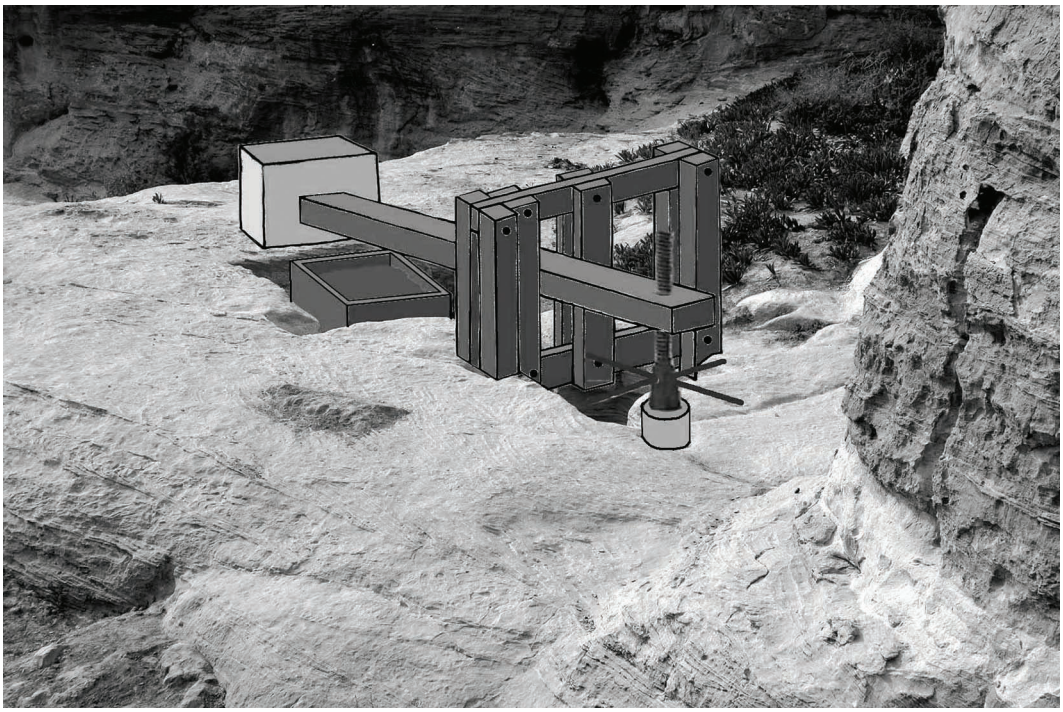
17. View from east onto the eastern wine press with a treading and pressing basin, a filter basin, a must collection, and a fermentation vat (U. Bellwald).



18. Plan of the eastern wine press with the keys to its single elements (Plan: Theebah; key: U. Bellwald).



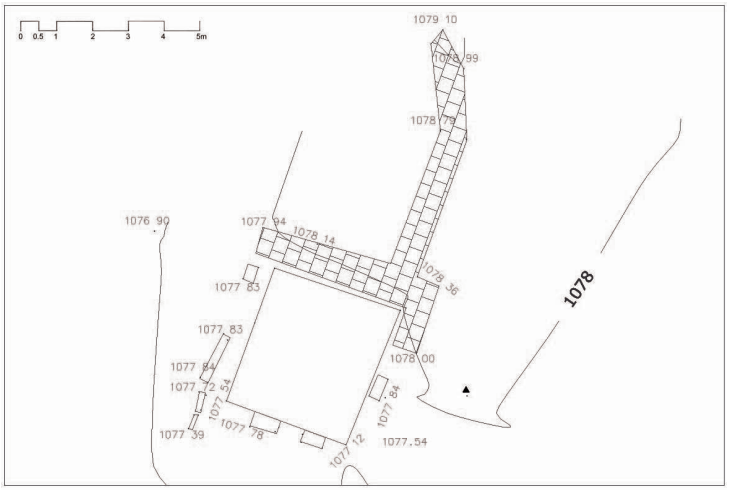
19. View from southeast at the eastern wine press (U. Bellwald).



20. The same view showing a reconstruction of the wooden construction for the press with the yoke, the press beam and the screw-counterweight mechanism for pulling it down (U. Bellwald).



21. View from north onto the western wine press with an extended treading and pressing basin, surrounded by footings for anchoring the wooden press construction. The filter basin, the must collection, and fermentation vat are still buried (U. Bellwald).



22. Plan of the western wine press (drawing by Theebah).



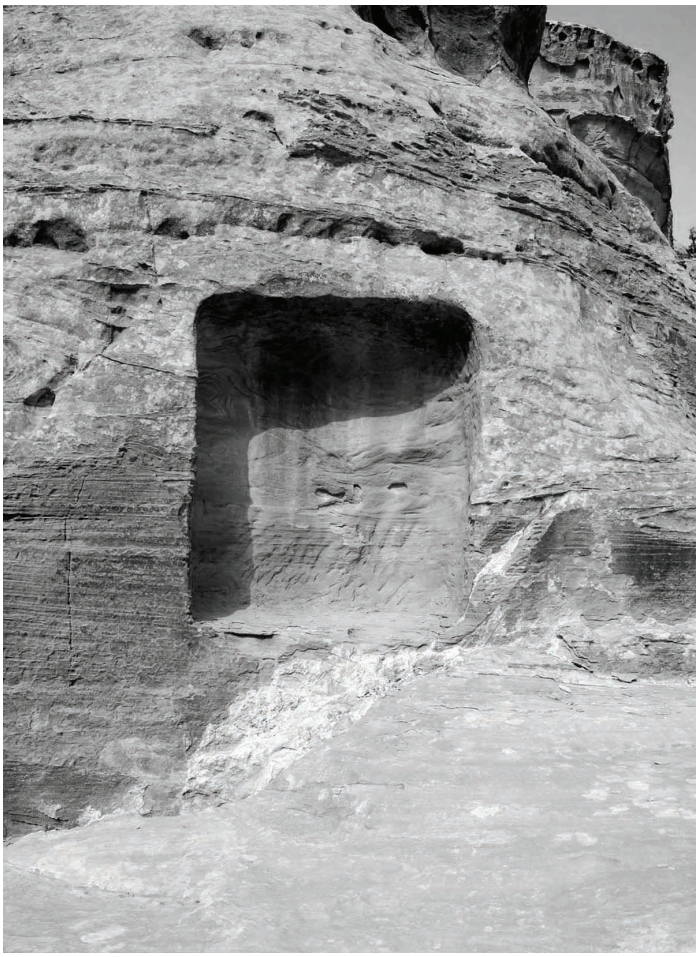
23. The retention dam for storing runoff water south of the eastern wine press. It closes a long and narrow fault running parallel to Sīq al Bārid (U. Bellwald).



24. View from west at the rock outcrop at the northern abutment of the dam with the stair winding up to its crest in an elegant S-shaped line (U. Bellwald).



25. Cistern hewn into the bedrock at the foot of the northern cliff above the western wine press (U. Bellwald).



26. Niche sanctuary located to the west of the cistern (U. Bellwald).



27. Panoramic view from north over the wide, even uppermost part of Wādī ʿAgalāt. The ruins of the farmstead are located on the hilltop framed by trees. At the bottom of the hill the ruins of one of the main wādī barriers may be seen (U. Bellwald).

extended catchment basin upstream of the dam had a length of approximately 400 m, hence it allowed for the storage of at least 2500 m^3 of water. To give access to the water reserve in the catchment basin, a stair was hewn into the rock outcrop at the northern abutment of the dam. It winds up to the crest of the dam in an elegant S-shaped line (Fig. 24). On a rock outcrop opposite the eastern wine press, the partially eroded remains of a working platform with a cistern and a hand washing basin are preserved. At the



28. Close view from north at the rock outcrop with the ruins of the farmstead on its hilltop (U. Bellwald).



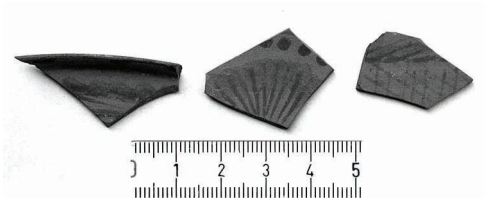
29. View from west onto the ground of the hilltop with blocks from the collapsed walls scattered across the surface. Among the blocks scattered on the surface, a well preserved door-jam may be detected (U. Bellwald).

foot of the northern cliff above the western wine press, a huge cistern is hewn into the bedrock, accompanied by a great niche sanctuary some meters further westwards (Figs. 25–26).

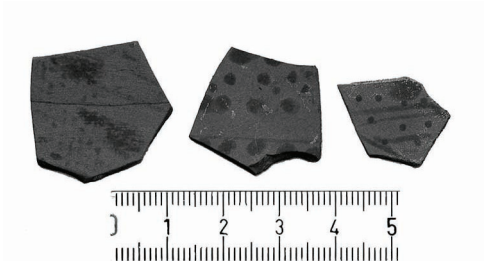
On top of a hill overlooking the wide, even uppermost part of Wādī ʿAgalāt, the ruins of a large farmstead could be identified, which most probably served as the administrative and logistic center of the winery. Actually only small sections of walls may be detected on the ground, therefore no attempt of an even schematic reconstruction may be given, but as the blocks from the collapsed walls are spread all over the entire hilltop, it may be assumed that the building occupied the full plateau (Figs. 27–29).

Dating the Wādī ʿAgalāt Winery

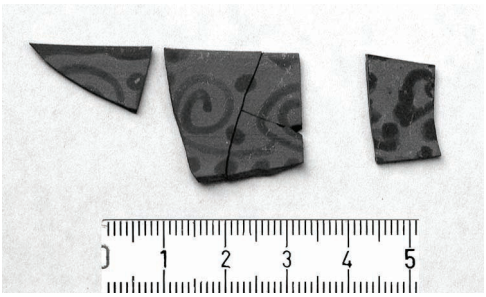
As no excavations have been undertaken in Wādī ʿAgalāt, all attempts to date its construction time and the period of use can only be based on pottery sherds that were collected from the surface around the wine presses and inside the ruins of the farmstead. Interestingly, the pottery results are the same for all three locations. Based on the chronology of the Nabataean fine



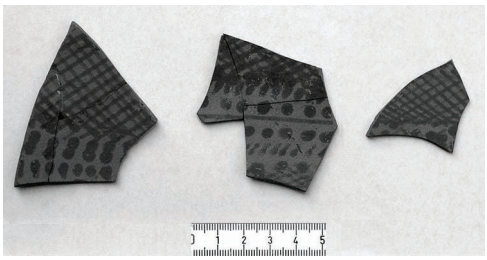
30. Fragments of painted fine ware bowls of sub phase 2b, dated to the last quarter of the 1st c. BC (U. Bellwald).



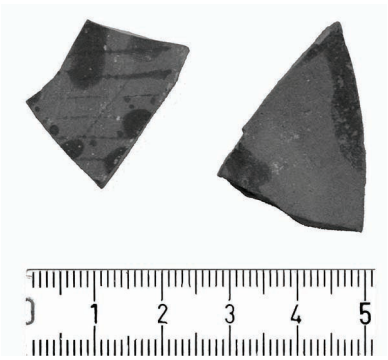
31. Fragments of painted fine ware bowls of sub phase 2c, dated to AD 0–20 (U. Bellwald).



33. Fragments of painted fine ware bowls of sub phase 3b, dated to AD 70–100 (U. Bellwald).



32. Fragments of painted fine ware bowls of sub phase 3a, dated to AD 20–70 (U. Bellwald).



34. Fragments of painted fine ware bowls of sub phase 3c and 4, dated to the 3rd c. AD and the first half of the 4th c. AD (U. Bellwald).



35. Satellite view showing the entire area of Bayḍa and Wādī ʿAgalāt with the marking of the most important elements connected with wine production:

(1) Wine presses in the Wādī ʿAgalāt Winery; (2) Wādī ʿAgalāt retention dam for storing runoff water during winter rains for irrigation in summer time; (3) Maintenance stairs giving access to the catchment basin behind dam 2; (4) Main retention dam closing the outlet of Wādī ʿAgalāt into Wādī Bayḍa; (5) Sequence of average wādī barriers in Wādī ʿAgalāt for damming up the runoff water to the height of the vines; (6) Staircase connecting Little Petra with Wādī ʿAgalāt; (7) Little Petra; (8) Visitors parking for Little Petra; (9) Intersection to Little Petra from the main road–Umm Ṣayḥūn Waste Water Treatment Plant–Wādī ʿArabah; (10) Neolithic settlement of Wādī Bayḍa; (11) Wine presses in the eastern and southern Wādī Bayḍa area; (12) Main cistern for the water supply of the wine presses; (13) Farmstead of the Wādī ʿAgalāt Winery; (14) Mansion excavated by the American Center of Oriental Research; (15) Cisterns to the vaulted rock chamber; (16) Terrace barriers in Wādī Bayḍa (satellite view courtesy of D. Comer; key by U. Bellwald).

ware pottery established by S.G. Schmid, the earliest sherds represent sub-phase 2a, dated to the third quarter of the 1st c. BC. Only a few sherds from this phase have been found. Many more of the collected sherds represent sub-phase 2b, dated to the last quarter of the 1st c. BC (Fig. 30). The largest number of sherds represent the sub-phases 2c–3b, which can be dated to the full extent of the 1st c. AD (Figs. 31–33). Only very few sherds represent the sub-phases 3c and 4, dating to the 3rd c. AD and the first half of the 4th c. AD (Fig. 34, Schmid 1996; 1997; 2000). Absolutely no sherds dating to a period after the earthquake of AD 363 were found. The unpainted fine ware and the coarse ware sherds confirm this dating (Gerber 1994; 1997). It may therefore be proposed that the Wādī ʿAgalāt Winery was established in the third quarter of the 1st c. AD and had its prime period of production in the 1st c. AD. From the 2nd c. AD to the middle of the 4th c. AD, the winery was still under operation, but most probably on a more modest level. The winery in Wādī ʿAgalāt was abandoned after the earthquake

of AD 363, which destroyed, at least partially, the wādī and terrace barriers and led to the complete collapse of the farmstead.

Conclusion

Without any doubt, it can be stated that the winery in Wādī ʿAgalāt, as presented here, is one of the most elaborate models of agriculture through its terracing of the Petra area. Furthermore, it bears witness of a long-term planning and investment in the field of agricultural production. Preliminary estimations have shown that the accumulation of sediments upstream from the main dam and the main and major wādī barriers took around 30 years. The entire surface for the cultivation of vines, resulting from the terracing of the wādī bed, ultimately covered an area of 5 ha, which equals an annual yield of around 30,000 L of wine, based on the numbers given by Lucius Junius Moderatus Columella (AD 4–70) in *De Re Rustica* (3.3.2–3, 9.2; written *ca.* AD 64). To answer the question asked at the beginning of my contribution, it must be highlighted that the winery in Wādī ʿAgalāt is exclusively accessible from Little Petra. Hence the monumental, rock-cut stair-case at its western end was uniquely built to provide access to the winery. Therefore, it is obvious that the winery and the rock-cut tri- and biclinia in Little Petra have to be seen as one unit (Fig. 35). This makes it very improbable to consider Little Petra as the office suburb for the traders from Petra, but it might have served as a highly sophisticated banquet area for wine tasting, promotion, and selling. The cooperation of the Wādī ʿAgalāt Winery Project with the Baʿja Survey Project of the University of Miami, directed by David Graf, has allowed us to shed new light on the wine production of the Nabataeans and its socio-economic aspects. As the wine production is concentrated in the Bayḍa-Baʿja area, and considering the long-term planning and investment into undertakings like the set-up of the Wādī ʿAgalāt winery, it is likely that wine production was a royal monopoly with a governmental director as superintendent of the wines, equal to the "Praepositus Vinorum" of the Roman emperors (Schwinden 1996: 49–60). His offices and his residence could well have been in the luxurious mansion Patricia and Pierre Bikai excavated on the elongated rock outcrop just to the East of Sīq al Bārid (Bikai *et al.* 2008).

Future Research

In 2020, we plan to execute a certain number of soundings in the area of the wine presses, upstream in the main, major, and average wādī barriers and in the farmstead. More trenches will be opened in the area of the well preserved terraces where the vines were planted. Hopefully, these soundings will provide us with sufficient organic material, with remains of vines (roots, branches, stems, grape pips), allowing us to engage in extended archaeobotanical research in order to get information about the species of vines planted in the Wādī ʿAgalāt winery. Maybe at the end, we will even be able to determine the region from which the vines were originally imported. For these investigations, we will cooperate with the archaeobotanical institute of Zurich University under the direction of Dr. Cristiane Jacquat. For the determination of the origin of the vines, we will cooperate with the archaeological institute of the University L'Orientale at Naples under the direction of Prof. Romolo Loreto. For the soil analysis, our expert will be Prof. Bernhard Lucke from the Friedrich-Alexander University at Erlangen-Tuebingen.

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A Possible Military Brewery in the Trajanic Fort at Hauarra (al-Ḥumayma), Jordan

During 25 years of excavation and research at the Trajanic fort of Hauarra on the Arabian frontier, our team has highlighted the association of a revolutionary fortification design with traditional Roman planning procedures. The fort was built immediately after Trajan's conquest of the Nabataean kingdom in AD 106, adjacent to the Nabataean village of Ḥawara, halfway between Petra and Aqaba (Fig. 1). The garrison was intended to monitor the local water supply and the civilian settlement, along with traffic on the *Via Nova Traiana* and the caravan routes that converged on the site (Fig. 2; Oleson 2007; 2009; 2010: 57–60; 2019; Oleson *et al*. forthcoming). An inscribed altar from the *vicus* suggests that the fort was manned by a vexillation from the *Legio III Cyrenaica* (Oleson *et al*. 2002: 112–6). Another vexillation of that legion was stationed at Hegra, 400 km to the south, one that maintained close connections with the Hauarra garrison (Fiema and Villeneuve 2018). From the start, the Hauarra fort probably was garrisoned as well by a unit of *equites dromedarii*. At 3.1 ha, the area of the fort is appropriate for a garrison of about 500 men (Fig. 3).

The fort and its interior structures were carefully laid out in modules of the Roman foot, according to a system centuries old (Oleson 2017). The rectangular fortification, however, was provided from the start with 24 square projecting towers, apparently the earliest known Roman example of this type of military plan, previously thought to be a development of the later 3rd c. AD. Excavations at the Hauarra fort between 1993 and 2005 documented the *principia, praetorium, horreum,* barracks, water-supply system, latrine, and a craft area that most likely contained a brewery. This paper will focus on the possible brewery, which would be the first such structure identified within a Roman fort, as opposed to an adjacent civilian settlement. Sherwood directed the

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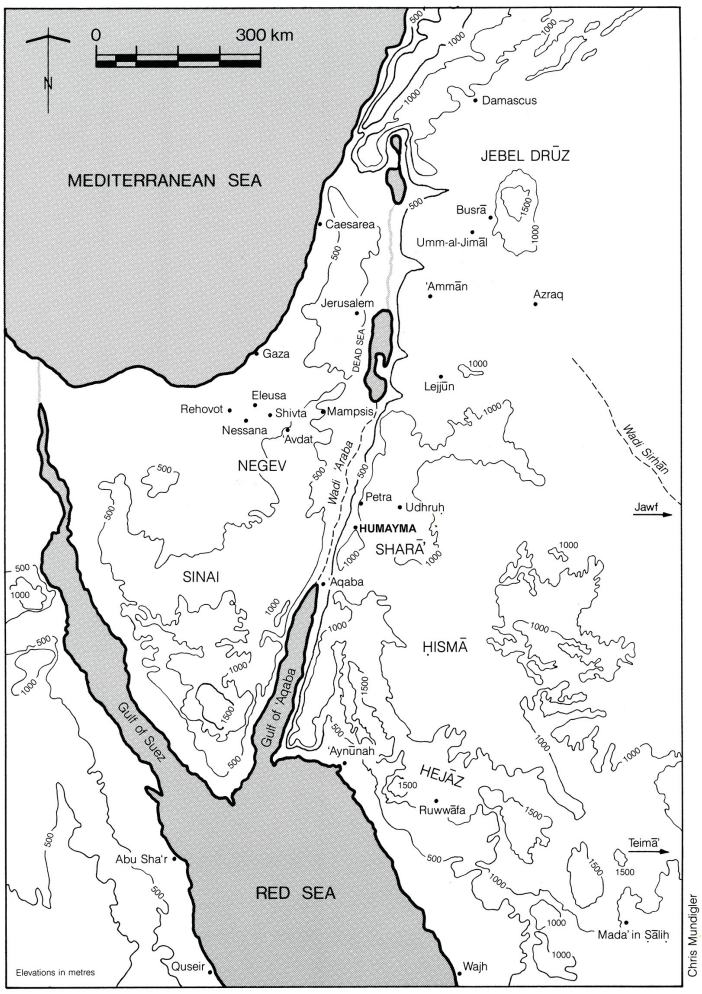
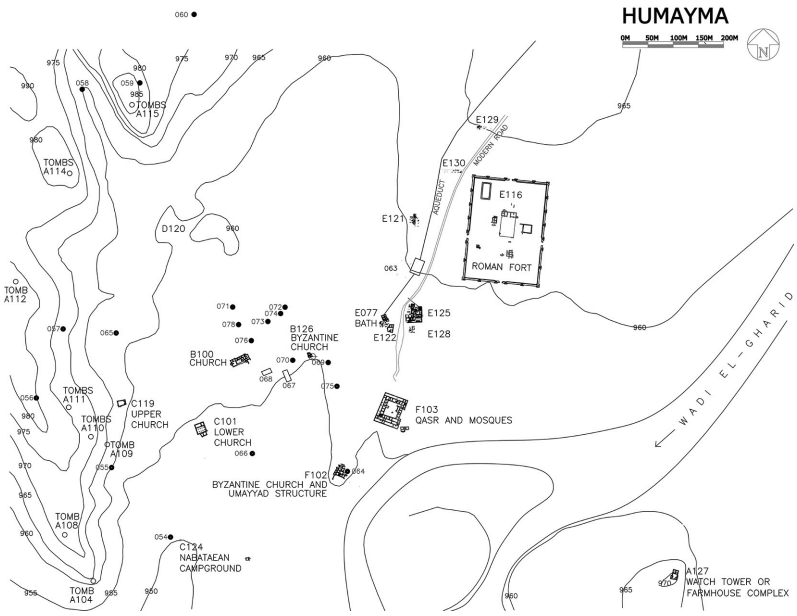
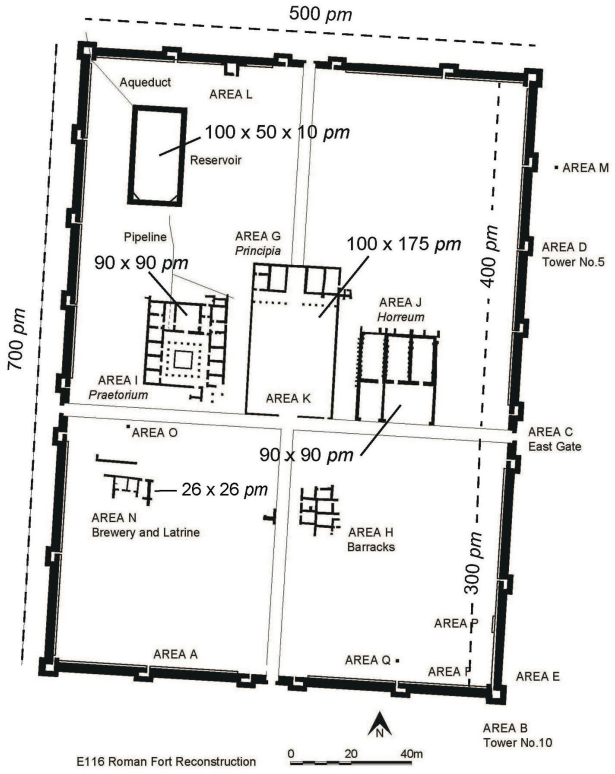


1. Location of al-Ḥumayma in the Middle East.



2. Plan of the site of al-Ḥumayma.

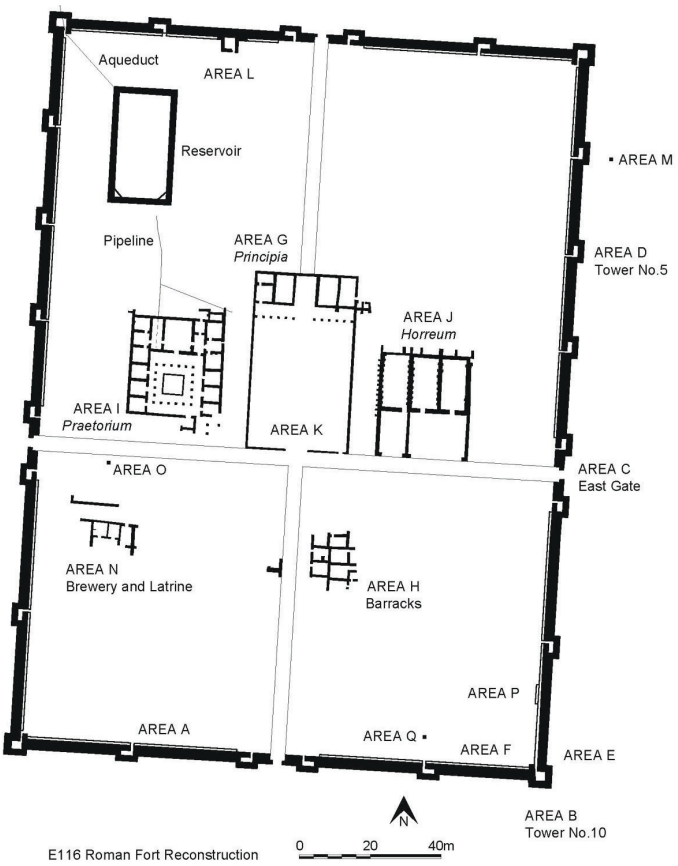
3. Reconstruction plan of the Roman fort at al-Ḥumayma, with indication of modules.





4. Aerial photograph of fort and settlement. Photo: Jane Taylor, J93-2-98.

excavation of the structure and worked with Oleson on the interpretation of its function. Some of these structures inside the walls, including the brewery, went out of use during the reign of Diocletian, after which the earlier garrison was replaced by a smaller force, probably a unit of local camel-mounted archers, the *equites*



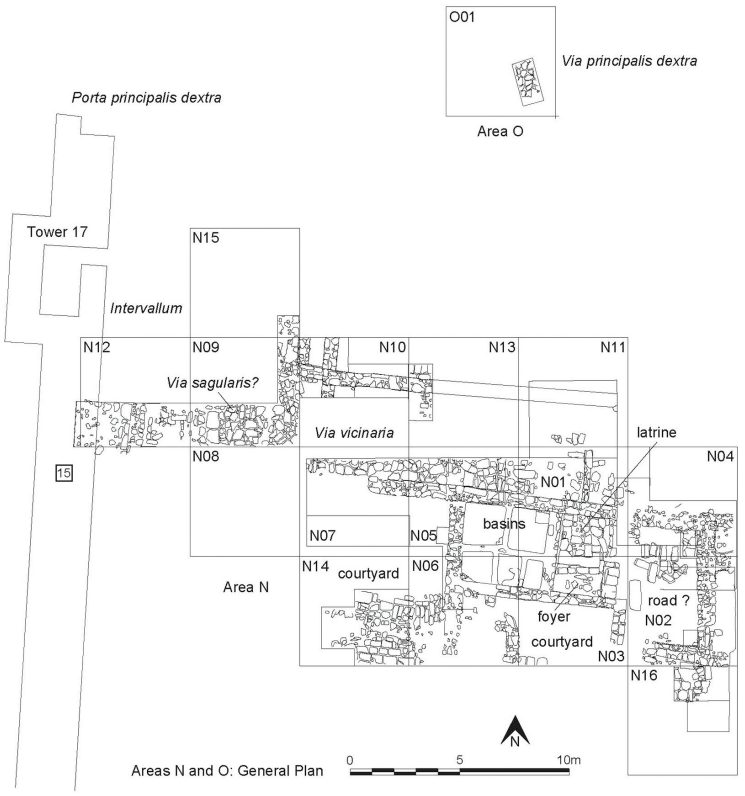
5. Reconstruction plan of Roman fort at al-Ḥumayma.

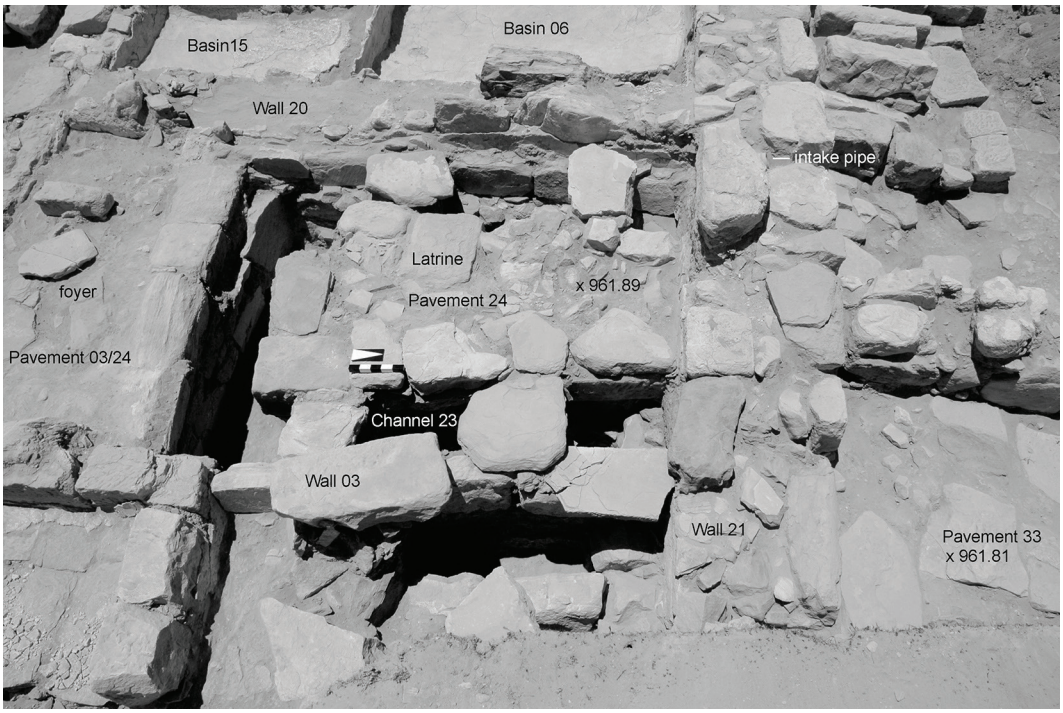
sagittarii indigenae mentioned in the *Notitia Dignitatum* (*Orientis* 34.25; Oleson 2010: 51, 54–5). The garrison was withdrawn altogether in the late 4th c. AD, most likely as a result of the earthquake of AD 363, and many of the tumbled blocks were salvaged to build the houses and churches of the thriving Byzantine community of Hauarra.

Given its isolated location in a hyper-arid environment, provisioning the fort must have been a challenge (Fig. 4). Water was obtained by diverting part of the outflow of the pre-existing Nabataean aqueduct into a reservoir inside the walls. At least some of the wheat and barley required for the military diet could have been obtained from local fields irrigated with run-off water, and poultry and pigs appear to have been supplied locally as well, to judge from the faunal remains. Fresh oysters and dried fish were brought in from Aila (Aqaba) 80 km away on the Red Sea, but cheese may have been produced locally from sheep milk. Supplying wine, however, apparently remained a problem. Sherds of wine amphorae are infrequent at the site, only one small winepress has been identified in the region (Oleson 2010: 149–50), and the hydrology and climate are not conducive to grape production. The character of a structure inside the fort, however, suggests that beer was being brewed on site for the soldiers, providing a nutritious and inexpensive beverage based on local grain. Brewing enhanced the character of the scanty water supply without wasting any of it, and beer was a customary beverage for soldiers.

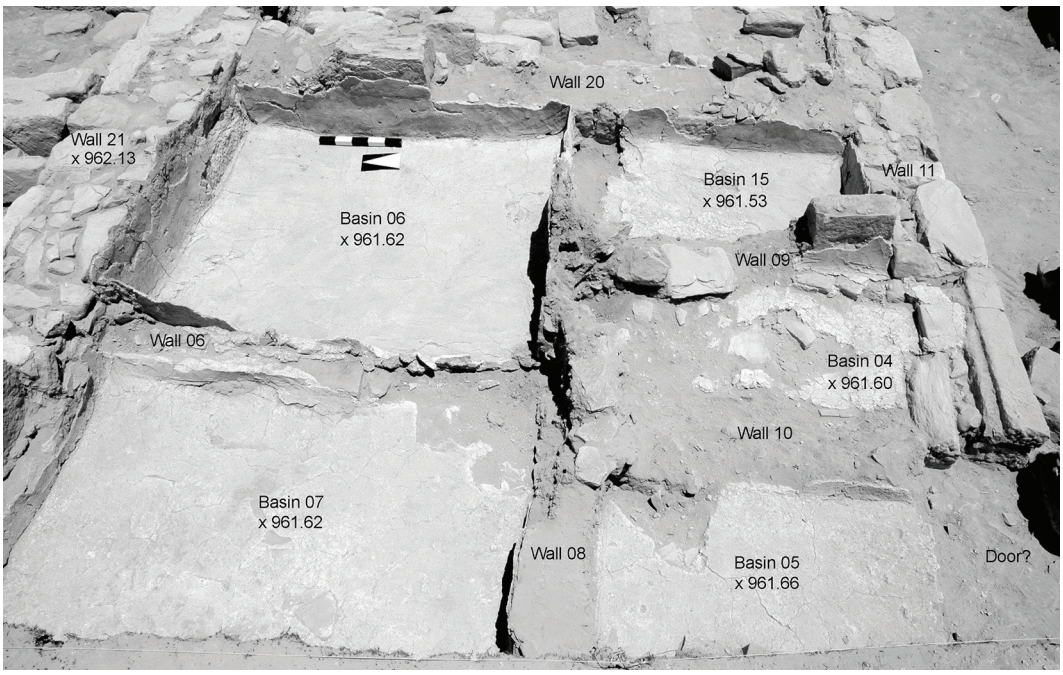
A substantial square structure (*ca.* 7.78 m, 26 pm on a side) in the southwest

6. Plan of Area N structures.

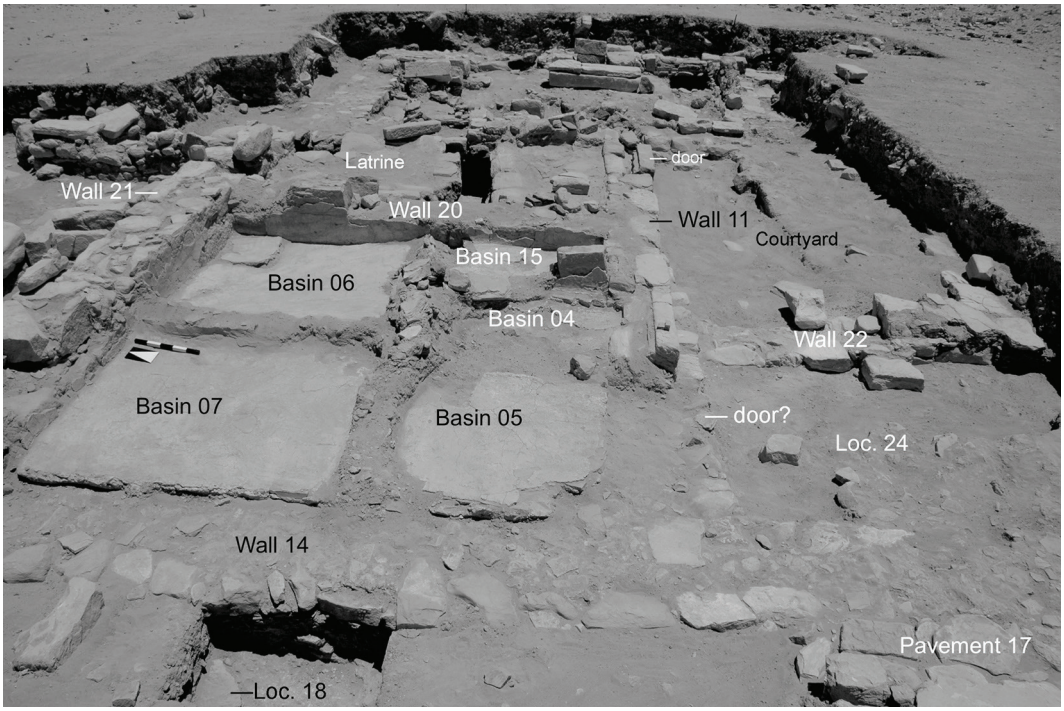




7. View of latrine from east.



8. View of brewing basins from west.



9. View of brewing basins, latrine, and south courtyard from east.

quadrant of the fort (Area N) contained the latrine and craft area along with a courtyard on the south, *ca.* 3.2 m (10.8 pm) wide N/S (Figs. 5–6). The small latrine, accessed through a shallow foyer on the south, consisted of a central paved area surrounded on three sides by a trench (Fig. 7). No seating survived, but several slabs bridging the channel may have supported wooden seats or facilitated squatting. The small room (*ca.* 2 x 2.5 m) probably could have accommodated only six or eight clients at once. Water was supplied to the trench through a terracotta pipe.

Latrines are well-documented in Roman forts (Petrikovits 1975: 106), and another small latrine was found at Hauarra in association with the 2nd c. Roman bath building outside the fort (Reeves *et al.* 2017: 106–22, esp. 113–4 fig. 7). The installation immediately west of the latrine, however, is more difficult to interpret (Fig. 8). The single large room, roughly 3.7 m square, contained five basins built of mortared rubble and plaster, each originally about 30 cm deep, with a total capacity of approximately 3,890 L. There were two large basins along the north wall and three smaller basins along the south wall. All the interior basin walls, made of thick plaster facing mudbrick and cobbles, bond with each other and abut the outer, more substantial enclosure walls. The thick plaster lining is smoothed over the joints between walls and floors. The basins belong to a single construction phase at the time the fort was built in the early 2nd c. AD and appear to have gone out of use in the late 3rd c. AD, when the fort was briefly abandoned. There was an access door in the southwest corner of the room, off the courtyard, and movement around the room was probably arranged by means of planks set on the basin walls. Both the latrine and basin room faced south on a courtyard (Fig. 9).

What was the function of these basins? Their use as grain bins is unlikely, since there was a large granary in the fort. They are also not well designed for water storage or distribution. Roman craft processes that involve shallow basins include fulling and laundering cloth, dyeing, fish-salting and *garum* production, fish breeding, olive oil or wine production, preparing or levigating clay, leather processing, and the brewing of beer (Wilson 2003: 445–6). Some of these applications can be rejected immediately. Fish-salting and *garum* production would have been impossible without a constant source of fresh fish, and the use of the tanks for fish breeding is also impossible because of problems with water supply, ambient temperature, and aeration. There is little evidence for olive or vine growing at Hauarra in the Roman period, and in any case the heavy foundation stones for pressing the fruit are absent from the site. Use of the basins for levigating clay for ceramic production can be rejected due to the absence of any evidence for pottery production at the site, undoubtedly because of the lack of good local sources of clay or fuel. Interpretation of the basins as dyeing vats should also be rejected, since that implies as well the production of textiles, a very unlikely activity in any Roman fort, much less a small, isolated frontier outpost.

Proximity to the latrine might suggest use of the basins for fulling cloth—in the sense of cleaning existing textiles rather than finishing newly woven cloth for use—since human urine was an important ingredient in the wet process used to remove oil and grease from wool (Moeller 1976: 20, 96). At Hauarra, the latrine could have been dedicated to defecation while urine was collected in amphorae or other containers propped up in the foyer, which were then carried across the common southern courtyard to the entrance to the basin room. In the initial stages of fulling or cleaning cloth, workers trod the cloth in similar basins in a mixture of urine and fuller's earth, then rinsed them with water. It would have been difficult, however, to

provide water to such a hypothetical fulling establishment in the desert environment of al-Ḥumayma. The most likely solution is the portage of water on donkey panniers from the fort reservoir to an opening in the north wall. There are several other objections to interpretation as a fullery: the basins seem too fragile for such heavy work, and the function is out of place in a fort. But most of all, the continuing supply of water to basins holding almost 4,000 L would have been a problem at Hauarra, since the industrial process rendered the water unsuitable for any further use. The same set of objections can be made to interpretation of the installation for processing leather, another polluting process.

Brewing is another craft relevant to soldiers that involves the use of basins. Like the two crafts mentioned above, it requires large amounts of water, but unlike them, nearly all the input water can later be consumed as a beverage. The means of transporting water to the basins remains unknown, but there may have been a dedicated pipeline not yet discovered, or draft animals may have brought it in with leather bags. In the standard practice used in the Eastern Mediterranean in antiquity, barley or wheat was placed in a tank and moistened so that it sprouted (malting). After a few days the malted grain was dried. Along the European frontiers this procedure generally took place in an oven. No oven was found in Area N, but in the desert climate of Hauarra drying could have easily taken place in the sun, on the pavement of the south court, or in the larger Basins 06 and 07. The dried malt could have been used immediately or stored until needed, at which point it was mixed in a tub of water for fermentation, sometimes with the addition of mash from a previous batch to speed up the process. Once the desired degree of alcohol was reached, the liquid was dipped out and strained into containers for short-term storage or for immediate consumption. Assuming a height of *ca*. 0.35 m for the walls, Basin 05 would have had a capacity of approximately 680 L, Basin 04 approximately 48 L, Basin 15 approximately 350 L. The northern Basins 06 and 07 were larger, each with a capacity of approximately 1,019 L. The total capacity was approximately 3,890 L. If the malting took place in one of the larger basins, the fermentation in the other larger basin, and the drying of the malted barley in the courtyard, the finished brew could have been moved with buckets into the three smaller basins to settle and clarify before being dipped into large jars for distribution to the troops. If each of the production stages took two days and all the basins were continually in use, such a brewery might have produced approximately 3,000 L of a soupy kind of sour beer every week. For a military unit consisting of about 500 men, this would have provided each soldier with approximately one litre of beer a day, a reasonable ration. As noted above, the unit in the Hauarra fort was a detachment from the *Legio III Cyrenaica*, and after a century of residence in Egypt, that legion had become a dedicated group of beer-drinkers. Papyri record the provision of beer in their rations.

This type of simple brew—appropriately termed *bouza* in Arabic—has been produced in rural Egypt since the Early Bronze Age (Lucas and Harris 1962: 10–6; Curtis 2001: 132–3, 370–1; Nelson 2005: 23–4). The process is similar to, but less complicated than, that used in Belgium since the 15th century to produce "lambic" beer in open tanks that collect natural yeasts from the air (Van den Steen 2011). In present-day rural Egypt, the procedure for producing *bouza* is very similar to the recipe in the 4th c. AD alchemical author Zosimus Panopolitanus. Coarsely ground wheat is made into loaves that are lightly baked, then mixed in water with a quarter proportion of malted wheat and a starter from a previous batch of *bouza*. After fermenting from one to three days,

the soupy mixture is sieved, resulting in a mildly-intoxicating drink providing both calories and vitamins (Morcos *et al.* 1973).

Sherds from wine amphorae are uncommon in the fort, so it is likely that beer, a typically Near Eastern beverage, filled the need for a comforting and nutritious drink. As long as there was adequate water from the aqueduct and sufficient stores of locally grown barley or wheat, the production of beer would have been a simple method for enhancing the quality of the food supply at an isolated post. The leftover mash would have made a welcome supplement to the diet of the camel mounts in the fort and of the pigs raised nearby for meat. Roman soldiers in both the Near East and Europe were accustomed to beer as a drink, sometimes issued as rations, as recorded for units near Oxyrhynchus in Egypt (*Oxyrhynchus Papyri* 12.1513) and at Vindolanda in Britain (Nelson 2005: 56–68). The *Legio III Cyrenaica*, of course, had come to the *Provincia Arabia* from Egypt, where beer was a standard drink for soldiers. Taking all factors into consideration, interpretation of the basin room as a brewery constructed along with the other structures within the fort walls soon after AD 106 seems the best solution for this installation.

No breweries seem as yet to have been identified inside other Roman forts, despite documentary evidence for beer as a military ration at Vindolanda and in Roman Egypt (Birley 1977; Bowman and Thomas 1994: nos. 186, 190, 482; 2003: nos. 581, 628; Nelson 2005: 65–77; Bridger 2018). In the early 2nd c. AD, Flavius Cerealis, the Prefect of the Vindolanda fort, wrote a letter requisitioning supplies, which fortunately survives: "My fellow soldiers do not have beer (*cervesam*), which I ask you to order sent" (Bowman and Thomas 2003: no. 628). A *cervesarius* (brewer) is also mentioned in the Vindolanda tablets (Bowman and Thomas 1994: no. 182.14; 2003: no. 581.6, 17). Another tablet (Bowman and Thomas 1994: no. 190) mentions the purchase of significant quantities of beer (*cervesa*) along with other rations, such as barley, vinegar, and wine. A structure in the *vicus* adjacent to the Vindolanda fort has been identified as a brewery; it contained two ovens for roasting the sprouted grain but lacked any brewing tanks (Birley 1977: 45–6). Another brewery, in the *vicus* associated with the 2nd c. AD *castellum* at Regensburg-Großprüfening contained a spring, well, oven, and a (2.4 x 2.8 m) waterproof tank (Boos 2010). A fermenting tank with "residues of black beer," is said to have been found in 1911 during the excavation of a Roman camp near Alzey, in the state of Rhineland-Palatine, but it is unclear whether or not it was found inside the fortifications (Dornbush 2006). It may well be that in northern Europe forts could rely on production of beer in the associated civilian settlements, where it was the customary drink. At Hauarra, where there is no evidence the local Nabataean population was accustomed to beer, there may have been no alternative to production within the fort itself.

In conclusion, we would like to address an obvious deduction regarding the proximity of brewery and latrine. The brewery was not a place for serving beer, an activity that brings with it the need for an adjacent lavatory. The beer would most likely have been consumed in the barracks, where the members of each *contubernia* group assembled to prepare and consume their rations. As in Roman forts elsewhere, there were most likely other, larger latrines convenient to the barracks area, perhaps along the *intervallum*, a strip of land just inside the fortification wall. This interpretation of the basins in the Hauarra fort may not be correct, but we feel it best fits the available evidence. We hope that archaeologists working on Roman military sites throughout the Roman world will keep their eyes open for similar installations.

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Pictorial Graffiti Associated with the Soldiers and Civilians of the Roman Garrisoned Town of Hauarra

Introduction

Ancient graffiti have been the subject of great attention in recent years for their ability to inform us about the interests and beliefs of past inhabitants of archaeological sites (Langner 2001; Baird and Taylor 2011; Keegan 2014). At the site of al-Ḥumayma (Roman Hauarra; Nabataean Ḥawara) in southern Jordan, ancient graffiti have been found at various locations inside the ancient settlement and on the adjacent hills and ridges. Further analysis has resulted in some of these graffiti being assigned to specific chronological periods in the site's history. The goal of this paper is to examine pictorial graffiti visible when this Nabataean-founded town was garrisoned by Roman soldiers to see what they reveal about the lives of Hauarra's military and civilian populace. The paper will begin by defining terminology and explaining how the graffiti can be related to the site's chronological periods. The focus will then shift to an examination of four particular archaeological contexts where graffiti were visible (i.e., created or pre-existing) at the time of the Roman garrison. Finally, commonalities and differences in the graffiti will be examined across the site in order to address graffiti's significance to understanding Hauarra's military and civilian inhabitants.

The archaeological site of al-Ḥumayma is located in the Hisma desert of southern Jordan about halfway between Petra and Aqaba. The site is located on the western side of the Hisma's desert plain where it meets a row of sandstone hills (Fig. 1). Most of the buildings of the ancient settlements (including the Nabataean-early Islamic communities and the Roman fort) were located on the desert plain. Other activity areas (including quarries, tombs, rock shelters, and religious sites) were located on the adjacent hills (Jebel Qalkha and Jebel al-Ḥumayma) and on two sandstone

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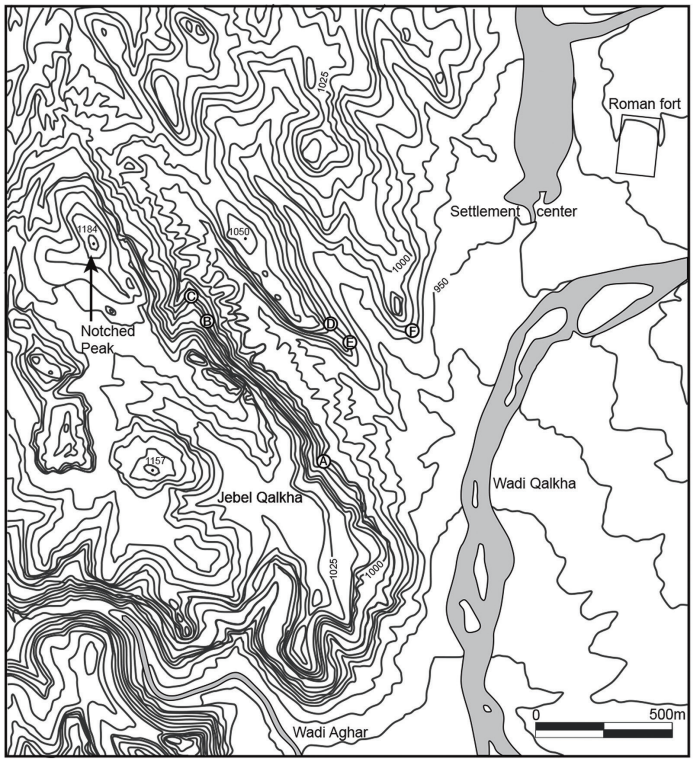


1. Topographic map of al-Ḥumayma showing the Roman fort and settlement center on the plain, Jebel Qalkha with its notched peak, and the two intervening ridges. A: Servant of Ḥawara Site; B–C: Cascading Plateau Site; D: Commemoration Cliff; E: Flat Top Activity Area (A. Walsh, J.P. Oleson, M.B. Reeves, C.A. Harvey).

ridges that lay between Jebel Qalkha and the town. Three decades of archaeological work (summarized in Oleson *et al.* 2015) have resulted in five primary occupational phases being identified at this site: 1) temporary Palaeolithic and Neolithic activity areas on the hills and ridges, 2) the Nabataean town (1st c. BC to early 2nd c. AD), 3) the Roman-Byzantine town (early 2nd to mid-6th century) and fort (early 2nd to 4th century), 4) an early Islamic estate (mid-6th to mid-8th century), and 5) sporadic occupation up to present day.

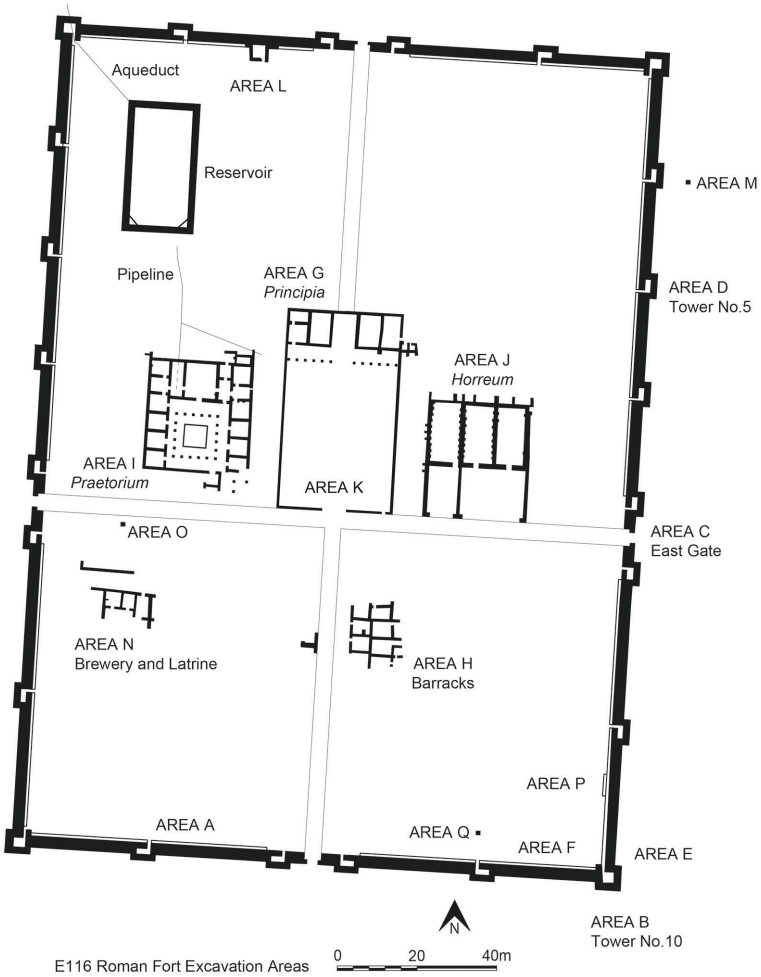
This paper will focus on the graffiti contemporary with the Roman and Byzantine garrisons in the 2nd to 4th centuries. For simplicity, this period will henceforth be referred to as "Roman." As to the identity of these troops, inscriptions from the fort and *vicus* record the presence of legionary detachments from the Legio III Cyrenaica and possibly the Legio VI Ferrata in the 2nd and 3rd centuries (Oleson *et al.* 2002). The *Notitia Dignatum* reports that an indigenous mounted unit (*equites sagittarii indigenae*) was stationed here in the 4th century (*Oriens* 34.25; Oleson 2010: 54).

At al-Ḥumayma graffiti have been found both in the buildings of the ancient settlements and on rock surfaces in the hills and ridges. Following recent academic conceptualizations, graffiti are defined for the purposes of this paper as images, texts, or symbols added to a surface that was not originally intended to receive them (cf. Langner 2001: 12; Chanitois 2011: 193; Baird and Taylor 2016: 18). The surface can be manufactured or natural, and the graffiti can be added on top (by ink, paint, charcoal, etc.) or cut into the surface (by scratching or abrading). Pictorial graffiti are the non-textual subset of graffiti that include images on manufactured and natural surfaces that have also been referred to as rock art,

petroglyphs, pictograms, pictographs, and dipinti. They can range from simple symbols (e.g., a Christian cross or a tribal marker) to complex narrative scenes. For the purposes of this paper, only the graffiti likely produced or seen by the site's Nabataean and Roman populations will be discussed.

Dating graffiti is often challenging. In the case of the graffiti to be discussed here, there are, fortunately, clues provided by some graffiti's location, associated texts, relative darkness of patina, spatial overlap, and content. For example, graffiti found on internal wall plaster in the Roman fort should date to the time of the fort's occupation or, at least, to when its walls were still standing. As for content, a graffito showing a Roman standard bearer probably dates to the time of the Roman garrison and an image of a pagan god most likely pre-dates the dominance of Christianity and Islam at this site. Other imagery is more difficult to date so individual contexts must be considered. As will be discussed below, two particular sites in al-Ḥumayma's hills seem to contain concentrations of Nabataean and Roman graffiti. One is a vertical rock face where Nabataean and Greek texts surround a standard bearer's graffito. The other graffiti concentration appears on a horizontal panel carved into a homogenous stratum of whitish sandstone. One last site to be discussed here is hypothesized to have both Nabataean and Roman graffiti based on its subject matter.

The rationale for considering the Nabataean and Roman graffiti together is that these are the graffiti that would have been seen by the residents and visitors of Hauarra's 2nd to 4th century garrisoned community. This perspective also allows us to examine other garrisoned communities in the Near East and Egypt for comparable imagery. There are several garrisoned communities in this region where pictorial graffiti have been found including Dura-Europos (Syria), Mons Claudianus (Egypt), 'Ayn Gharandal (Jordan), and Hegra (Saudi Arabia). Due to the unusual circumstances of Dura-Europos' burial and abandonment, its graffiti corpus of 1,400 texts and images is one of the largest and best known from the Roman Empire and the largest for any Roman garrisoned community (Goldman 1999; Baird 2011). Most of it dates to the time of the Roman garrison (Baird 2011: 54) and was in places used or guarded by soldiers, including military offices, living spaces, towers, and the main gate. Although the 1920s–1930s excavators only recorded 124 examples of the pictorial graffiti they encountered, this corpus is rich and diverse (Goldman 1999). Notable themes include gods and goddesses, religious offerings, cities, shrines, temples, altars, standing humans with weapons and standards, horse-mounted archers and lancers, horse- and camel-riders, hunting scenes, standing, reclining, and dancing figures, wild and domesticated animals, birds, snakes, and ships. Most of it was found on interior walls. A much smaller corpus of pictorial graffiti was found at Mons Claudianus (a 1st to mid-3rd century quarry site administered by the Roman army) inscribed and incised onto pottery sherds (Tomber 2006). Again, the themes are similar: riders on horses, a camel, gods and people, altars, and wild animals. Charcoal graffiti found on the interior walls of the 4th century garrison's bathhouse at 'Ayn Gharandal (Jordan) include images of camels, a boat, and humans (Darby and Darby 2015: 462, 465–6). The excavator of the main gate at Hegra suggests that Greek graffiti on the gate's interior walls were written by soldiers (Villeneuve 2015: 40–2); by extension, the pictorial graffiti carved into its threshold stone were likely either carved or seen by soldiers on guard duty. The imagery here includes two right footprints, a stylized palm leaf, and a possible game board (Villeneuve 2015: 42, 74 fig. 43). As will be discussed below, the graffiti dating to the time of Hauarra's Roman garrisoned community display similar themes.



2. Plan of Roman fort (courtesy of J.P. Oleson).

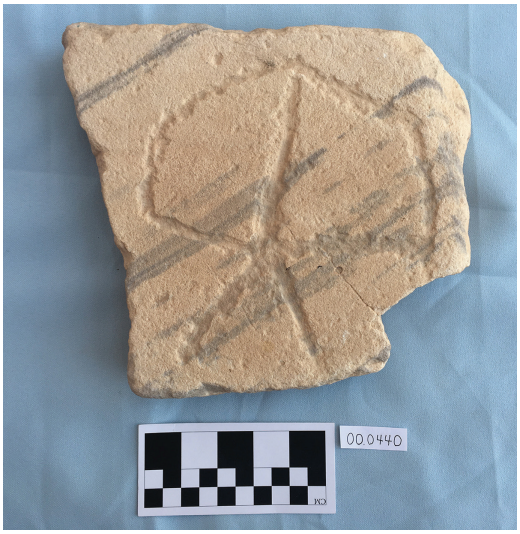
Although graffiti have been found at many locations at al-Ḥumayma (e.g., Oleson 2010: 145–7, 157–61; Reeves 2015; 2019b: 145–7; Reeves *et al.* 2018), only four sites have been selected for the present study. These are the sites where the evidence most strongly suggests that graffiti there would have been visible at the time of the Roman garrisoned town. They are the Roman Fort, the Commemoration Cliff, the Cascading Plateau Site, and the Servant of Ḥawara Site. Each will now be discussed in turn.

Graffiti in Hauarra's Fort

Ancient graffiti (both pictorial and textual) have been found in several locations inside Hauarra's fort (Fig. 2): on fallen wall plaster in offices at the back of the *principia* (headquarters building, Area G), on wall plaster and a paving stone in the *praetorium* (commanding officer's house, Area I), on ceramic sherds in the barracks (Area H), on wall plaster and ceramic sherds from the brewery and latrine (Area N), and on stones in the fort's perimeter wall. These graffiti were created by drawing onto plaster in black and red, incising into plaster with a sharp point, and pecking or abrading into stone surfaces. The only languages used are Greek and Latin, as seems typical for official spaces in an eastern Roman fort (cf. Baird 2011: 60). All of these graffiti will be fully



3. Graffito of rider on wall plaster from the fort's *principia* (courtesy of J.P. Oleson).



4. Graffito pecked into a floor slab from the fort's *praetorium* (M.B. Reeves).

discussed and illustrated in the forthcoming final report on Hauarra's fort (Oleson *et al.* in preparation), which contains reports on the pictorial graffiti prepared by J.P. Oleson and M.B. Reeves. The following overview contains information from those reports.

Pictorial graffiti have been found in the fort's *principia*, *praetorium*, brewery and latrine, and on the perimeter wall. The largest concentration comes from two offices at the rear (north end) of the *principia*. Approximately 250 fragments of displaced wall plaster found here retain markings done in black charcoal or possibly ink. Given their fragmentary state and the presence of only single lines on most pieces, Oleson has been able to posit interpretations for just under 20 of these. Yet, even with this small sample, it is still possible to see themes common in other eastern garrisoned communities: a rider on a quadruped (likely a horse given the position of the rider's legs; Fig. 3), a camel's head, a soldier with a round shield and weapon, a human head, a human hand, trees, shrubs, and vegetal motifs, an ostrich or snake's head, and a sailing vessel. Another possible ship appears on a wall plaster fragment from a dump in the brewery and latrine. A pecked graffito in a displaced floor slab in the *praetorium* is more enigmatic (Fig. 4). The image has an enclosed curved "top" with two lines radiating beneath its center. It could be interpreted as one of the standards surrounding Emesa's sacred stone on Roman coins (e.g., *RIC* IV Elagabalus 195–6) or as a jellyfish or an unfinished game board. Support for the Emesene cult interpretation comes from a fragmentary graffito on the fort wall that resembles the coin imagery of Emesa's sacred stone travelling by chariot across the Roman Empire (Reeves 2019a). Unfortunately, that graffito is on a block reused in a 20th century shed. Another block on the fort wall also has an uncertain context as it was not found until after the fort wall had been consolidated by the Department of Antiquities in the early 21st century. The graffito does, however, have an old patina and its subject matter, a bare right foot (Fig. 5), is consistent with graffiti found on the



5. Graffito of a bare right foot pecked into a stone on the fort's perimeter wall (E. de Bruijn).

threshold of the garrisoned gate at Hegra (Villeneuve 2015: 74, fig. 43). Foot imagery is also common in al-Ḥumayma's hills (Reeves *et al.* 2018). As will be discussed below, some of it is contemporary with the Roman garrison, including a pair of feet possibly carved by a Roman officer.

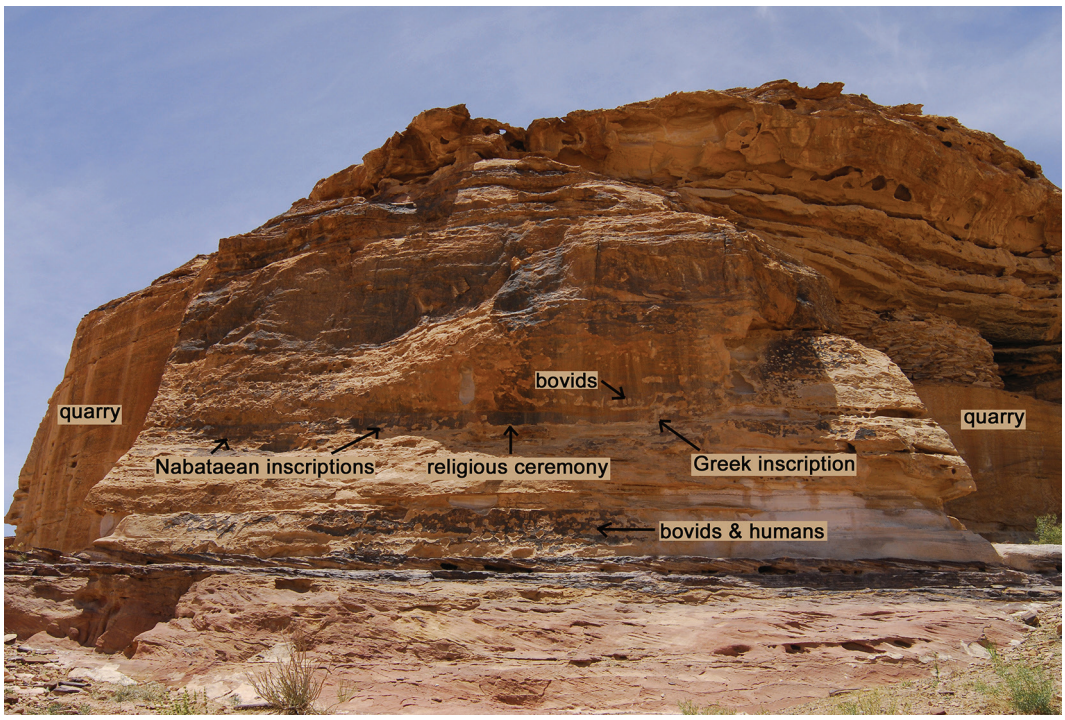
Commemoration Cliff

The Commemoration Cliff is a ca. 10 m long natural vertical cliff face covered in graffiti in the midst of a Nabataean quarry (Figs. 1:D, 6; Reeves *et al.* 2018: 146–7). The cliff and quarry are situated in an elevated sandstone outcrop near the southern end of Ridge 2, a dendritic ridge that parallels the eastern face of Jebel Qalkha and is separated from it by the Wādī al-Ḥumayma; another wādī separates Ridge 2 from the easternmost Ridge 1, whose other face borders the town. Immediately in front of the Commemoration Cliff is the Flat Top Activity Area (Reeves *et al.* 2018: 145–6), a large flat horizontal sandstone surface (ca. 115 m long by 35 m wide) with excellent views of the surrounding terrain, including three wādīs, Jebel Qalkha, and the southern route of the *Via Nova Traiana* into town. This large elevated surface could have been used for ceremonies, including the religious ceremony depicted at the center of the Commemoration Cliff.

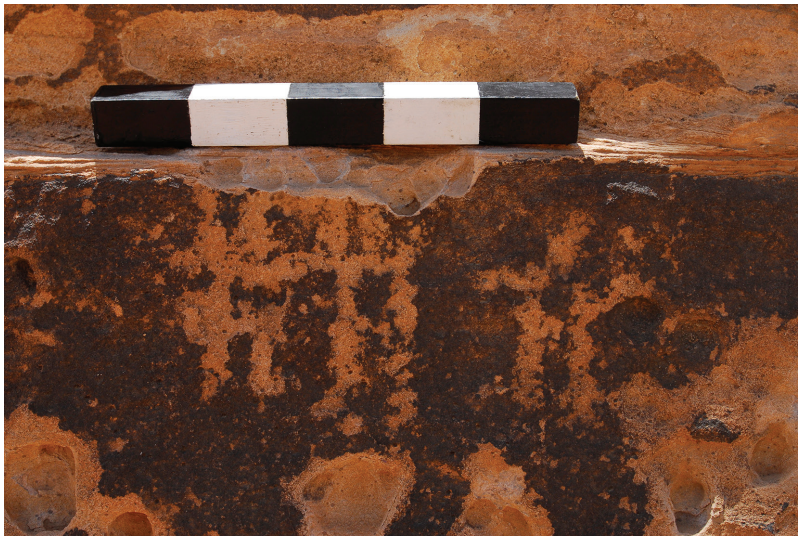
Although the Commemoration Cliff has been heavily eroded, incised graffiti are still visible on patches of dark desert varnish near its middle. In the center of the extant graffiti, near the actual center of the cliff is an elaborate depiction of a Roman officer's religious ceremony. On either side of it are personal invocations for peace (in Nabataean) and remembrance (in Greek). Above the Greek inscription is an image of two wild bovids (ibexes?) butting horns. Further down the cliff is a horizontal band containing many images including a cluster of three humans with arms raised as if praying (in the orant pose) or dancing (Fig. 7), and three discrete images of wild horned bovids.

Of all the graffiti on this cliff, the most important for understanding the nature of relations between Roman soldiers and Nabataean civilians in this garrisoned town is the religious ceremony graffito (Fig. 8). This small but detailed graffito depicts a religious ceremony in three registers. As the graffito has been previously published with an extensive analysis (Reeves 2015; 2016: 167–8; 2019b: 145–6), only a summary of the imagery will be provided here.

The top register shows a person offering a branch at an altar or betyl set up on a platform. A huge anthropomorphic god rises from the stone to receive the offering



6. Commemoration Cliff with graffiti locations marked (M.B. Reeves).



7. Graffiti of people with arms raised in prayer or dance on the Commemoration Cliff (C.A. Harvey).



8. Religious ceremony graffito from the Commemoration Cliff (M. Fergusson).

while a large wild bovid watches from behind. The middle register shows a camel wearing the North Arabian saddle seated with its legs tucked beneath. The bottom register shows the location of the ceremony in relation to the local topography. More specifically its shows, from left to right, Jebel Qalkha's high notched peak (a focus of Nabataean and Roman cult: Reeves 2016), Wādī al-Ḥumayma, and Ridge 2, where the Commemoration Cliff is located (for a photograph of the terrain, see Reeves 2015: fig 3).

The person making the offering can be identified as a representative of the Roman troops based on the military standard he is holding. The god is identifiable as Jupiter-Ammon-Serapis (also known as Sarapammon or Jupiter Hammon), the legionary deity of the Legio III Cyrenaica (Stoll 2003), a unit of which was stationed at Hauarra in the 2nd and/or 3rd century (Oleson 2019: 395; Reeves 2019b: 142). The animal is not the ram, the sacred animal of that regimental god as represented by a ram's head amulet in Hauarra's community shrine (Reeves 2019b: 143–4) and as seen on a Roman coin from Neapolis showing the god, his ram, and military standards in front of that town's sacred peak (*RPC* IX 2174; Roman Provincial Coinage Online, https://rpc.ashmus.ox.ac.uk/coins/9/2174). Instead, the Hauarra graffito shows a local wild bovid, probably a gazelle, although shown here much larger than the actual gazelles that roamed this landscape. Quite likely this supernaturally sized local animal, whose placement in the composition balances that of the garrison's god, is meant to represent a local god, or at least, to provide a link to local religion. Like many other sites in the region, wild horned bovids are the most prevalent subject of rock carvings at al-Ḥumayma (Reeves *et al.* 2018), including at the two sites discussed below. Based on their prevalence in regional rock carvings, terracotta images, and faunal evidence from shrines, many scholars have posited that both gazelles and ibexes had significance in Nabataean religion (e.g., el-

Khouri 2002: 30, 218; Studer 2007: 267; Avner *et al.* 2016).

As for meaning, the graffito is interpreted as showing a Roman standard bearer making an offering that is being received by the garrison's god. This is a moment of religious epiphany, and, if the bovid is also a god, this is the moment of a double epiphany, when the gods of the garrison and town appear together to receive the standard bearer's offering. This mirrors the theme of concord between the town and garrison that is also proclaimed at the center of Hauarra's community shrine, where a Nabataean betyl (representing a local god) and a Roman legionary altar (dedicated to Jupiter-Ammon) stand side-by-side (Reeves 2019b). The same theme appears also on coins from the Arabian provincial capital (Bostra), where Jupiter Ammon and the town's goddess shake hands beneath the legend *CONCORDIA BOSTRENORVM* ("The Harmony of the Bostreans;" Kindler 1983: nos. 48, 56). At Dura-Europos the same theme is repeated in a wall painting from the Temple of the Palmyrene Gods showing the tribune, standard bearer, and men of a Roman unit making an offering in front of the city goddesses of Dura-Europos and Palmyra (where the unit was recruited; James 2004: 39–42).

Parallels to other elements of Hauarra's graffito can be seen in graffiti from Dura-Europos. For example, several soldiers, including a standard bearer, are depicted making offerings to a god associated with their regiment (Iarhibol) on the walls of offices used by military scribes (Goldman 1999: 67–9 no. F.2; Reeves 2004: 148). In this scene two soldiers stand before incense altars, another rides in on a horse, and another offers a palm frond. Two images hammered into a tower wall show camel-riders stopping before altars (Goldman 1999: 68, 71–2 no. F.7). Finally, there are graffiti at Dura-Europos showing topographical features including a temple and exterior views of walled cities, possibly Dura-Europos (Goldman 1999: 68–74 nos. F.3, F.5, G.1, G.2)

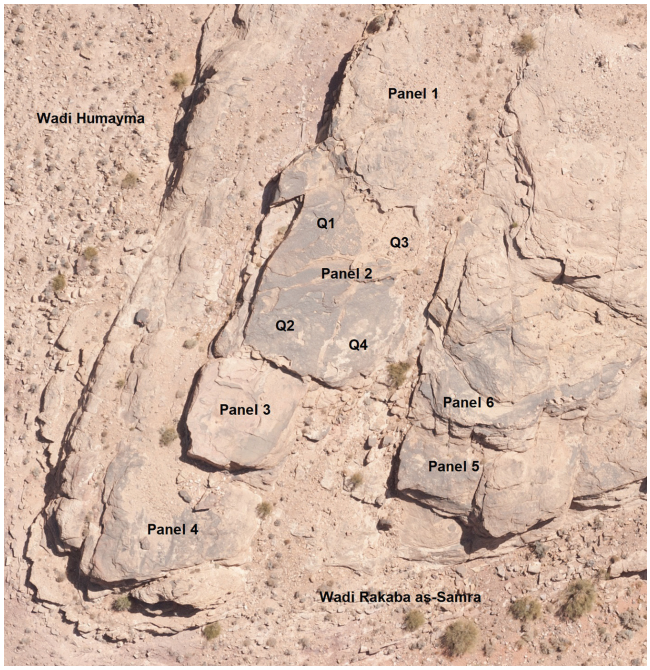
Returning to the Hauarra graffito, it is significant what elements of the local landscape its creator chose to reinforce: not the manmade landscape as in the examples from Dura-Europos, but the natural landscape, specifically Ridge 2 and Jebel Qalkha. Their inclusion in a religious narrative graffito emphasizes their significance in Hauarra's religious landscape. A good parallel for this is the wide range of civic coins from Neapolis in Samaria that showed that town's sacred peak paired with Roman religious and imperial imagery (Evans 2011: 177–81). Ridge 2's religious significance is confirmed by the presence of the Commemoration Cliff (with commemorative imagery and Greek and Nabataean invocations) and the adjacent Flat Top Activity Area that could have been used for ceremonies (as depicted in this graffito and by the graffito of dancing or worshipping humans below it). As for Jebel Qalkha, evidence from across al-Ḥumayma shows that its highest peak was a focus for local cult and civic identity in the Nabataean and Roman periods (Reeves 2016). Beneath this peak was the Cascading Plateau Site, the next site to be discussed.

Cascading Plateau Site

The Cascading Plateau Site (Reeves *et al.* 2018: 153–7) retains the highest concentration of graffiti discovered anywhere at al-Ḥumayma. The site is situated on the eastern flank of Jebel Qalkha with a commanding view of the jebel's highest peak and its distinctive bifurcated top (Fig. 9). As noted above, this notched peak seems to have been a focus of cult and identity in Humayma's Nabataean and Roman periods (Reeves 2016). The plateau, itself, is composed of a series of bedrock panels that cascade down from south to north (Figs. 1:B–C, 10). It has a



9. View down the Cascading Plateau Site towards people standing on Panel 2; Jebel Qalkha's notched peak above (M.B. Reeves).



10. Northern tip of the Cascading Plateau Site with six panels and the four quadrants of Panel 2 marked (labelled image created by M.B. Reeves from APAAME_20171001_ REB-0814. Photographer: Rebecca Banks. Courtesy of APAAME).

triangular shape bordered on the east by the Wādī al-Ḥumayma and on the west by the Wādī Rakaba as-Samra. The runoff from these two wādīs converges below the lowest tip of the plateau. The Wādī Rakaba as-Samra and its runoff also stood between the triangular plateau and the notched peak which towered over the site's cascading panels. From the plateau there are excellent views of the surrounding terrain, and from its highest elevations it is possible to look over the intervening ridges to the ancient settlement and Roman fort.

Given the exposed nature of the Cascading Plateau Site it is likely that any graffiti on its bedrock panels and other indications of ancient human activity have been greatly impacted by runoff pouring down the hill and across the panels. The effects of this are visible today by the buildup of sediment and rocks obscuring some surfaces (e.g., Fig. 10, Panels 1 and 4) and erosion channels cutting through others (e.g., Fig. 10, Panels 2 and 3). It is unclear whether this erosion is a recent development caused by a change in the runoff's route or if it existed also in ancient times. In spite of this erosion, over a hundred graffiti have been documented on the site's bedrock panels. They are all located on the front ends of Panels 2, 3, 5, and 6, closest to the convergence of the wādīs.

As noted above, the dating of rock-cut graffiti can be challenging. At this site the presence of some Greek, Nabataean, and Thamudic inscriptions show that people were adding graffiti here during the Nabataean and Roman periods. In addition, the specific nature of Quadrant 2 on Panel 2, which is composed of a homogeneous honeycomb stratum of the Umm Ishrin sandstone coated in a thin desert varnish, has allowed us to identify three main phases in the carvings made there (Reeves and Harvey 2021). Phase 1 images (the darkest on the panel) are hypothesized to predate the foundation of the Nabataean town by a considerable time. Phase 2 images and texts (with medium dark patinas) are likely contemporaneous with the Nabataean through early Islamic occupation of the ancient settlement in the 1st c. BC through 8th c. AD. Phase 3 images and texts (the lightest on the panel) are the most recent.

In addition to the aforementioned Greek, Nabataean, and Thamudic inscriptions, the carvings from Phase 2 include images of footprints, wild bovids (ibexes and gazelles), humans on camels and horses, canines hunting bovids, an anthropomorphic figure in the orant position, and abstract symbols. Many of these were likely either created or visible for interpretation during the time of the Roman garrisoned town. Phase 1 graffiti, including footprints and wild bovids, would also have remained visible during that later period.

Of the pictorial graffiti found here several types have connections to Nabataean and Roman religious activities, supporting the theory that this dramatic location above the wādīs and under the town's distinctive peak had a cultic significance. The first is an orant figure with arms half-raised in prayer (Fig. 11). The second type consists of numerous footprints, both bare and shod, carved as single feet, as pairs, and in groups. One of these is accompanied by a Thamudic E text that Graf (2018) has suggested may have been made by an officer in Hauarra's 4th century unit of *equites sagittarii indigenae* (Fig. 12). Another pair of footprints has a line tying it to a Nabataean inscription (not yet published) and a wild horned bovid standing on its right foot (Fig. 13). A line extends out from the left foot and shows a camel on it, as if on a road. The inclusion here of a camel and wild bovid has a parallel to the Roman officer's religious ceremony graffito on the Commemoration Cliff and supports the idea that both wild bovids and camels played a role in Hauarra's Nabataean and Roman cult. There are numerous contemporary graffiti across this same panel showing wild horned



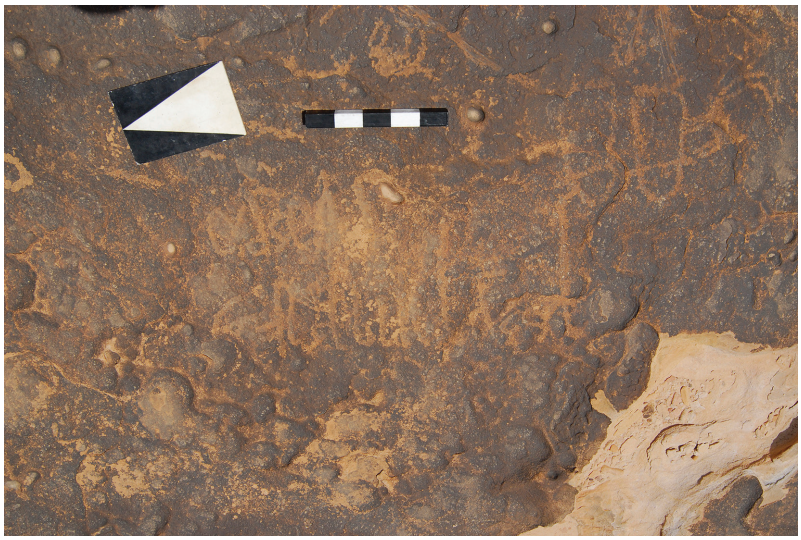
11. Phase 2 orant figure with other Phase 2 and 3 graffiti (C.A. Harvey).



12. Footprints and Thamudic E text possibly made by a 4th century officer in the midst of other Phase 2 and 3 graffiti (C.A. Harvey).

bovids. Additionally, the solitary camel on a road may be related to Ḥawara's foundation myth in which a Nabataean prince followed a divine camel-riding figure to a hill firmly rooted in the earth, perhaps this very peak (Reeves 2016: 167–9).

Panel 2 also contains almost 20 footprint carvings dating to Phase 2. A full catalogue and analysis of these footprints and the others found in various locations across al-Ḥumayma will be the subject of a forthcoming paper (Reeves in preparation).



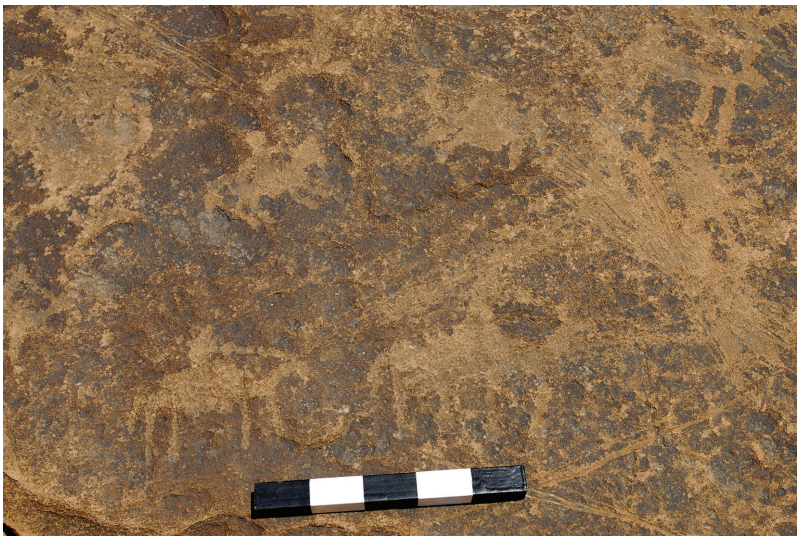
13. A Nabataean textual graffito linked to a pair of footprints, a wild horned bovid, and a camel walking on a possible road (C.A. Harvey).

For the present paper, however, a consideration of how members of Hauarra's Roman garrison might interpret footprint graffiti is important. Footprint images have been created from prehistoric times until the present day in all parts of the world including Jordan (Inglis 1988; Khan 2008). There are many different theories regarding their creators' intentions (e.g., Dunbabin 1990). In the case of the pair of feet accompanied by a Thumudic E inscription mentioned above, the creator tells us his name and his rank but not why he created the graffito. Similarly, none of the footprint graffiti at al-Ḥumayma explicitly says why they were created. This left it up to subsequent viewers (archaeologists and Roman soldiers alike) to interpret their meaning. In the context of Hauarra's troops from the Legio III Cyrenaica, whose regimental deity was Jupiter-Ammon-Serapis, it is important to note that Serapis, Isis, and other Egyptian gods were the most common recipients of inscribed footprint votives in the Roman Empire (Dunbabin 1990: 86; Takács 2005; Puccio 2010). In Egypt and Nubia this practice of carving footprint votives at temples and religious sites dates back to the New Kingdom (Puccio 2010) and would have been seen by Roman soldiers who garrisoned and patrolled the region (e.g., at Qasr Ibrim where an oracle of Amun—i.e., Ammon—and incised feet existed at the time of the Roman garrison, Rose 1996). In addition, the Foot of Serapis and the Foot of Isis were cult objects in their own right as shown in votive objects and on Roman coins, including those from towns with Roman garrisons (e.g., Alexandria and ʿAkko-Ptolemais; Bricault 2006: 129 Pl. 19.15; Caesarea Maritima: Gersht 2008: 513–5). At al-Ḥumayma, it is therefore likely that any pre-existing footprints would have been interpreted in terms of the Roman soldiers' expectations for cultic practices. For a garrison that had as its patron deity Jupiter-Ammon-Serapis, this suggests the soldiers would have interpreted footprint graffiti in terms of the cult of their regimental god and his consort, Isis. The

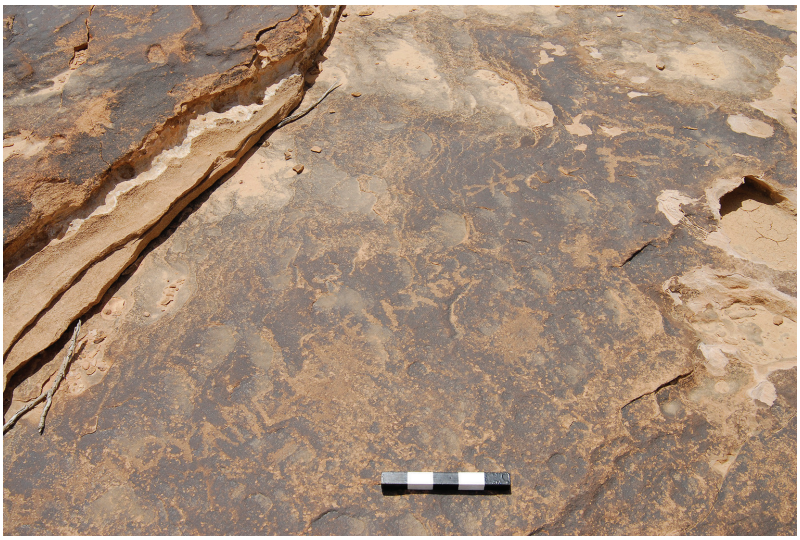
same interpretation may have encouraged them to add new footprint images at this site and elsewhere at Hauarra, including in the fort.

Another type of pictorial graffiti on Panel 2 that likely relates to soldiers and civilians in the Nabataean and Roman community shows riders on horses and camels. These are mostly clustered together at the front of Panel 2 where several camels with riders appear to be walking in a line with riders on horses and perhaps camels scattered above (Fig. 14). Beyond showing that camels and horses were ridden during Phase 2, the meaning of these carvings is now difficult to interpret. For example, it is unclear both whether the riders are armed and if they are soldiers or civilians. The difficulty in interpretation is largely due to deliberate damage resulting from sections of the scene being scratched out later in Phase 2 (i.e., anytime up to the early Islamic period). Some of these scratched erasures are over the top of written names or labels; other erasures have obfuscated the figures. Such erasures remind us that graffiti, once created, have a meaning to later viewers. In this case, their meaning was subsequently censured by scratching out older texts and images. Today the patinas of the initial graffiti and overlying scratches are very similar. At the time of their creation, in contrast, the erasures would have been a noticeably lighter symbol of someone's censorship.

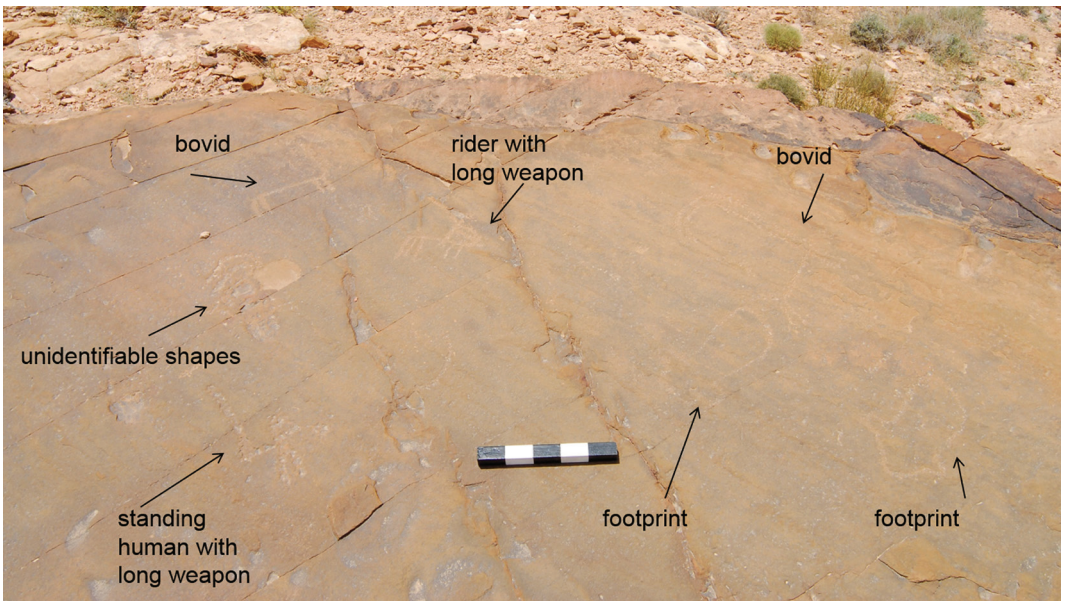
The graffiti on the other panels at the Cascading Plateau are not as numerous, but a few showing people with weapons are worthy of attention for their possible connection to Hauarra's Roman garrison. For example, two soldiers with horizontally held swords and round shields appear on the front of Panel 6 next to a name carved in Greek (Fig. 15). As Greek was the common language of Hauarra's garrison, the adjacent images were quite likely made by members of that garrison. Two weapon-carrying figures at the front of Panel 3 might be members of the garrison as well, although there are no inscriptions to aid interpretation (Fig. 16). One standing figure holds a long weapon vertically and another appears ready to



14. Horse and camel riders and erasures at the front of Panel 2 (M.B. Reeves).



15. Humans with swords and round shields to the right of a Greek inscription on Panel 6 (C.A. Harvey).



16. Graffiti at the front of Panel 3 (M.B. Reeves with labels by E. Welsh).

throw a spear from horseback. Another horseman appears on Panel 5 spearing a large feline (Fig. 17). Although not necessarily Roman, this last image is similar to graffiti inside the military offices at Dura-Europos showing Roman soldiers hunting lions and boars from horseback (Goldman 1999: 35–7). A graffito from the al-Jawf region of Arabia, showing a horseman pursuing an ostrich with a spear, may also

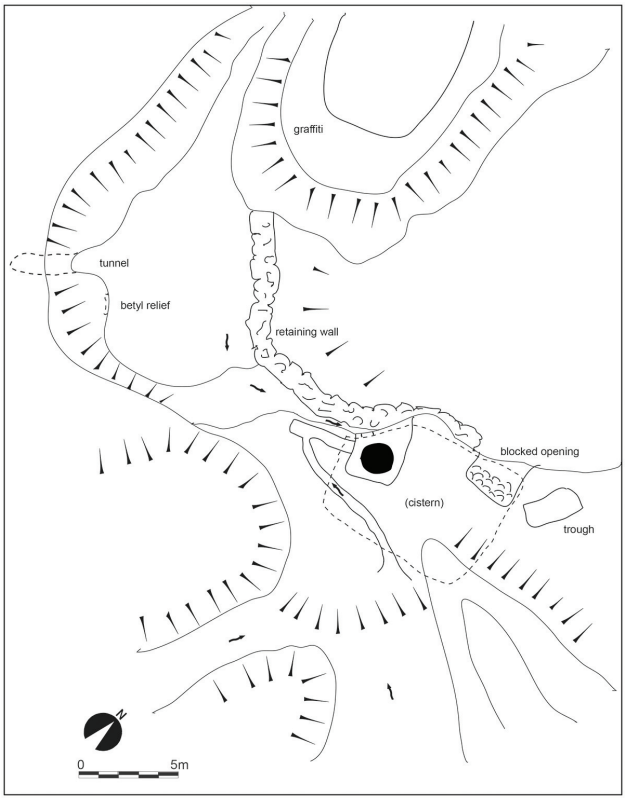


17. Horseman spearing a large feline on Panel 5 (M.B. Reeves).

depict a Roman soldier as it is next to a Nabataean text carved by a cavalryman serving in the Roman army (Nehmé 2017: 133–4, 143–4, 148 fig. 13). Another Roman cavalryman, who is about to throw a lance, appears in a graffito from Mons Claudianus (Tomber 2006: 301–2 no. 55). Graffiti depicting standing soldiers holding spears (and standards) appear also at Dura-Europos (Goldman 1999: 57–8 no. D.16). Finally, what is thought to be a Sasanian graffito from Dura-Europos shows a lancer spearing a Roman soldier armed with a sword and round shield (James 2004: 42).

Servant of Ḥawara Site

The last site to be discussed here is the Servant of Ḥawara site, named after a Nabataean graffito requesting peace for a "servant of *'l-ḥwr*" (Graf 1992: 70; Oleson 2010: 53; Reeves 2016: 172). This site is located in an elevated



18. Plan of the Servant of Ḥawara Site (courtesy of J.P. Oleson).

hollow in the eastern flank of Jebel Qalkha, about 500 m north of its southern tip (Fig. 1:A; Oleson 2010: 144–7). Figure 18 shows a plan of the site with the primary features marked: a Nabataean cistern with a horned altar or betyl carved above its circular opening (Reeves 2009: 330 fig. 6); a relief carving of an aedicula niche containing either three betyls or a betyl flanked by two altars (Reeves 2009: 330 fig. 6); an adjacent tunnel that could have been used for storage, dedications, or shade; a retaining wall (mostly modern); and a graffiti panel facing the aedicula and tunnel. It should also be pointed out that there may have been other graffiti panels here in the past but, if so, they have eroded as result of runoff streaming down the cliffs.

The combination of a cultic niche, betyls, water, cave, and graffiti, especially the "servant of *'l-ḥwr*" graffito, has led previous scholars to posit that this area might have functioned as an open-air shrine (Graf 1992: 69; Oleson 2010: 409). This is certainly true, but the site's location overlooking the southern edge of the settlement also seems very significant. This elevated nook with its own cistern would have provided an extremely useful vantage point to monitor the *Via Nova Traiana*'s route in and out of town, which is hypothesized to have run between Jebel Qalkha and the Wādī Qalkha (Reeves 2019c: 129). The site also provided clear views of the fort, the town, and the activity areas at the southern end of the two ridges (Reeves 2019c: 125). Altogether the combination of an elevated viewpoint with water and divine protection would have made this site an excellent base for soldiers or civic officials to monitor travellers leaving or entering the settlement in both the Roman and Nabataean periods. Some of these monitors may be responsible for the site's graffiti.

The extant graffiti panel (Fig. 19) shows signs of erosion, especially around its edges. The textual graffiti are in Nabataean and Thamudic and include the aforementioned text asking for peace for "BR-TLM, servant of *'l-ḥwr*." This late 1st c. AD graffito is the only Nabataean text from the site containing the name of the Nabataean town (Ḥawara)



19. Detail of graffiti on the Servant of Ḥawara Site showing archers, ibexes, and a horseman executing the 'Parthian shot' (C.A. Harvey).

and possibly, by extension, the name of the town's god. Why exactly BR-TLM chose this location for his graffito is not specified, but it could be related to the nearby aedicula or with the site's location overlooking the southern entrance to the town. The pictorial graffiti surrounding this text are lighter suggesting that they may have been made at a later date. The imagery shows four archers hunting bovids with long curved horns (likely ibexes). One of the archers, mounted on what appears to be a horse (based on proportions), is shooting backwards in the saddle, a manoeuver known as the 'Parthian shot,' but used also by Roman soldiers (Rostovtzeff 1943; James 2004: 197–8). A Thamudic text appears in the midst of the hunting scene.

Bovid hunting scenes, often accompanied by Thamudic texts, are common in desert graffiti found throughout the region (Corbett 2012). What is special about these images, however, is that they are the only images found at any of the graffiti sites at al-Ḥumayma that depict bowmen. This is strange as the *Notitia Dignitatum* records that there was a unit of mounted indigenous bowmen (*equites sagittarii indigenae*) stationed at Hauarra in the 4th century. As discussed above, an officer from this unit may have carved footprints and his name in Thamudic at the Cascading Plateau Site. As regards the Servant of Ḥawara Site, it is likely that this elevated well-watered vantage point was used by the military bowmen to monitor the southern route into town. If so, these protectors of the town could have added imagery reflecting their skills alongside the earlier Nabataean graffito. These soldiers would be using hunting imagery to display their skills just as graffiti from Dura-Europos show Roman soldiers hunting lions and wild boars (Goldman 1999: 35–7). Moreover, the addition of bowmen imagery beside a Nabataean text would parallel the imagery seen at other local graffiti sites and in the town's community shrine where the interests of civilians and soldiers appear side-by-side. Alternatively, these hunters could be civilians who chose to add their imagery alongside the servant of Ḥawara's inscription.

Commonalities, Differences, and Significance

In the body of this paper four different sites were examined where graffiti existed during the 2nd to 4th c. AD when a Roman garrison had been installed next to the Nabataean founded town. The themes of the graffiti across these four sites will now briefly be examined to explore commonalities and differences across the site and what these suggest about the interests and beliefs of Hauarra's Roman period inhabitants.

One commonality in the graffiti across all the sites discussed are depictions of soldiers with weapons or military standards. Although relatively small in overall numbers, such images would have been impactful in a Roman garrisoned town. For the creators these images would have had a personal significance that we can sometimes determine by other imagery or texts. In other cases, when no clues were given, the presence of a garrison provided a context for interpreting such images as reminders that Hauarra was under military protection.

Depictions of horses and camels with riders (or a saddle indicating a rider) are also present in all four locations. Many of these riders are armed with bows or spears/lances or carry a military standard. Again, such imagery would likely be interpreted in the Roman period as connected with the military garrison. Strangely, there is only one depiction of a mounted bowman, shown on a horse at the Servant of Ḥawara Site. As noted above, the *Notitia Dignatum* reports that an indigenous mounted unit garrisoned Hauarra in the 4th century. As imagery of mounted archers is common at Dura-Europos, similar imagery would be expected here. It may, however, be that such graffiti at al-Ḥumayma have been lost to

erosion or remain undiscovered in the hills or in unexcavated parts of the fort.

Another theme that appears only once at these four sites is a religious ceremony in progress (on the Commemoration Cliff). Fortunately, the one example we do have is very informative about a particular god (or gods), the role of a local animal in Hauarra's cult, the shared interests of soldiers and civilians, and specific locations in the natural environment with a religious significance. This is, of course, a very detailed image of a religious ceremony and other graffiti showing orant figures (from the Commemoration Cliff and Cascading Plateau Site) and footprints (from the Cascading Plateau Site and Roman fort) may relate to religious ceremonies as well. Some of the images of wild bovids that appear on natural surfaces throughout the hills and ridges may also have a cultic significance. Some of these are accompanied by inscriptions that are still being analyzed by David Graf (e.g., the Nabataean inscription accompanying a bovid, feet, and a camel). Once his work is complete, more will be understood about such images' local significance. Finally, it should be noted that although textual graffiti from the fort were not included in this paper, a Latin graffito from the *praetorium* with a date corresponding to the Isia Festival suggests that this festival honouring Isis and Serapis may have been one of the religious events celebrated in this Roman garrisoned town (Reeves 2019b: 146–7).

As was discussed above, Isis and Serapis were two of the most common recipients of inscribed footprint votives in the Roman Empire. Their cult would have provided a filter for soldiers interpreting footprints carved or seen at Hauarra in the Roman period. Of the four sites discussed, such footprints have only been found on the Cascading Plateau Site and in the Roman fort. They have, however, been documented on other horizontal bedrock surfaces exposed on Hauarra's sandstone ridges (Reeves *et al.* 2018). It is quite possible that footprint carvings also exist on horizontal surfaces beneath the fill at the Servant of Ḥawara Site and the Commemoration Cliff, but excavation would be needed to test this possibility.

To conclude, the pictorial graffiti from Hauarra's Roman fort and three sites in the adjacent hills and ridges demonstrate themes comparable to other Roman garrisoned communities. These themes of armed men standing or riding horses and camels, religious imagery relating to particular gods, wild animals, and the town's typography provide us with clues as to the interests and beliefs of Hauarra's military and civilian populations. The imagery present also allows us to speculate how different sites were used. When differences in the imagery appear between sites it is not clear, however, if such differences are meaningful in terms of ancient uses or are a consequence of which graffiti have survived and been discovered.

Acknowledgments

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The Cylindrical Heating Pipes from the Late Roman Bath at ʿAyn Gharandal, Jordan

Introduction

In the summer of 2015, the ʿAyn Gharandal Archaeological Project excavated a large section of the site's Late Roman bath. This excavation resulted in the collection of a considerable quantity of ceramic building materials, including bricks, *tubuli* (specialized rectangular heating pipes), and cylindrical pipes used in the heating system. This large corpus represents a significant opportunity to study this material that typically receives little scholarly attention, and a preliminary study and typology of the ceramic bricks and *tubuli* has already been published in *SHAJ* 13 (Harvey 2019). The intent of this article is to present the cylindrical pipes from the bath at ʿAyn Gharandal and to provide a brief discussion of their unconventional use within the heating system. It is hoped that this publication will provide an overview of the types of cylindrical pipes used within the ʿAyn Gharandal bath and serve as a reference for future work on this class of material both at this site and within the wider region.

ʿAyn Gharandal

Situated on the eastern edge of the Wādī ʿAraba, the site of ʿAyn Gharandal is *ca*. 70 km north of the Gulf of Aqaba and *ca*. 40 km southwest of Petra (Fig. 1). Archaeological exploration of the site has revealed that it was once home to a Late Roman outpost, comprising a *castellum* and its associated bathhouse. The foundation of the fort has been securely dated to the reign of Diocletian, thanks to the discovery of the fort's dedicatory inscription found outside its main gate (Darby 2015).

Numerous explorers and archaeologists have visited ʿAyn Gharandal, with Alois Musil being one of the first

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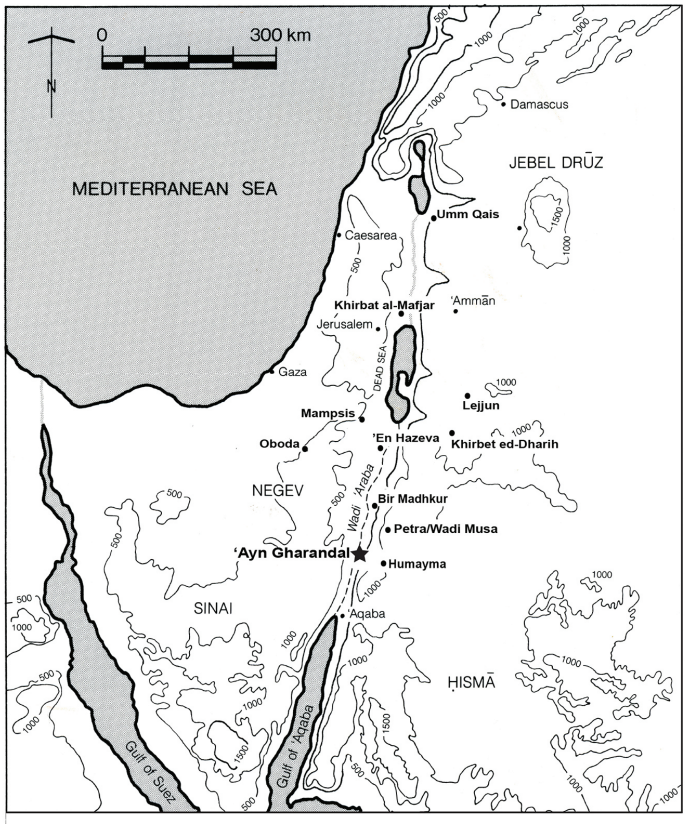


1. Map showing location of 'Ayn Gharandal and mentioned sites (C.A. Harvey after Reeves and Harvey 2016: fig. 1).

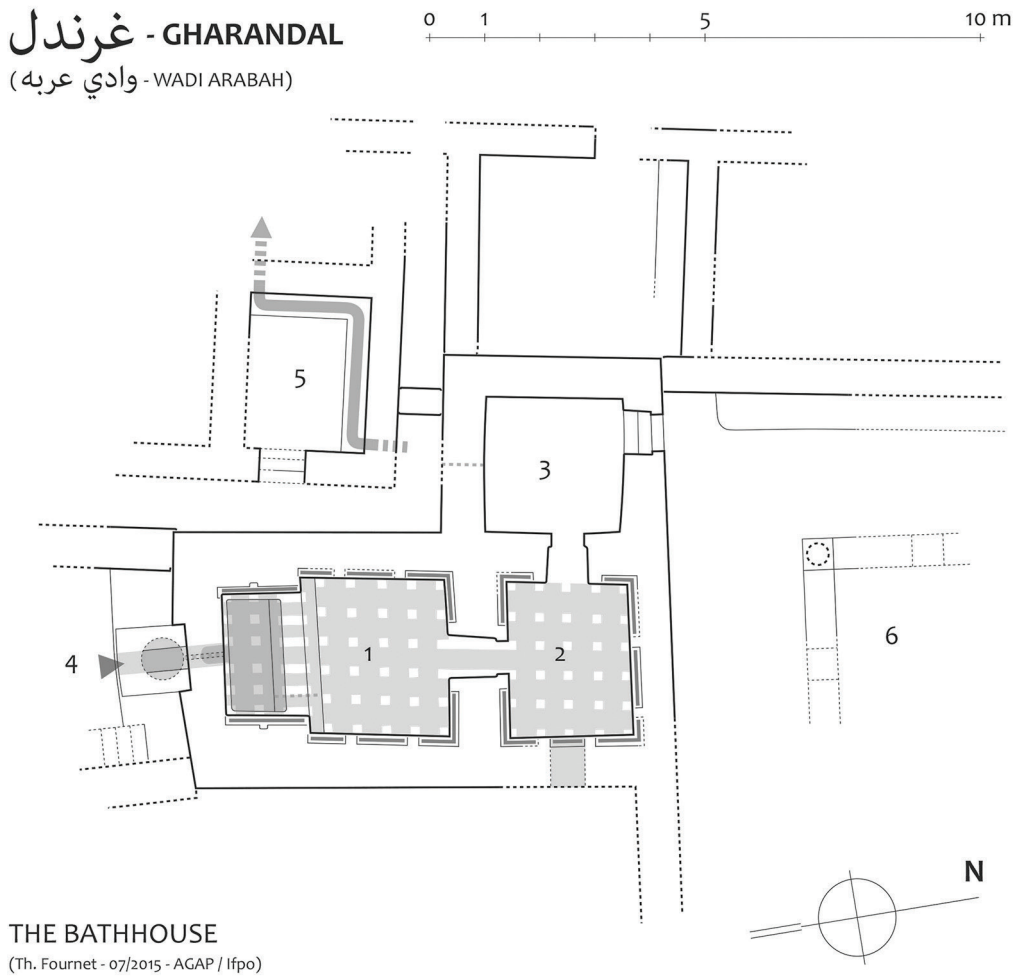
in 1902 (Musil 1907: 193–7; R. Darby and E. Darby 2015: 461). In 2009, the 'Ayn Gharandal Archaeological Project conducted a survey of the site and subsequently undertook excavations in 2010, 2011, 2013, 2014, 2015, 2017, and 2019, with further excavation seasons planned (Darby *et al.* 2010; R. Darby and E. Darby 2012; 2015; 2016; E. Darby and R. Darby 2017; 2018). Thus far, the excavation of the site has primarily focused on the Late Roman *castellum*, the later church that was found within its walls, and the nearby garrison bath. These excavations have also uncovered a large number of ceramic building materials, with the majority coming from the bath's heating system.

The Bath

The garrison bath at 'Ayn Gharandal is located about 60 m east of the fort and remains only partially uncovered. Excavation of the structure has thus far revealed two heated rooms (the *caldarium*: Fig. 2:1 and *tepidarium*: Fig. 2:2), an unheated room (*frigidarium*: Fig. 2:3), the furnace (*praefurnium*: Fig. 2:4), a latrine (Fig. 2:5), and a section of a large courtyard (Fig. 2:6). It is possible that the bath belongs to a larger caravanserai, similar to those at Bir Madhkūr (Smith 2010: 147) and En Hazeva (Cohen and Israel 1996: 111–2).

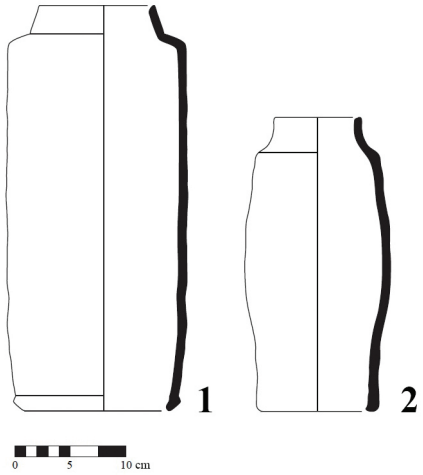
Although not confirmed through excavation, the bath is likely contemporaneous with the Diocletianic *castellum*. The heating system, however, seems to have undergone at least one major renovation at some point during its use, as reflected in the ceramic building material (Harvey 2019: 169, 178–9). In the last phase of its use, the wall-heating system employed a wide variety of rectangular *tubuli* as well as cylindrical pipes of the type normally used to convey water. It is these cylindrical heating pipes from the wall-heating system that are the focus of this article, and their form and function will be discussed in greater detail below.

Prior to excavation by the 'Ayn Gharandal Archaeological Project, illicit digging had partially cleared the bath's *tepidarium*, breaking through the hypo-



2. Plan of bath: 1. *Caldarium*, 2. *Tepidarium*, 3. *Frigidarium*, 4. *Praefurnium*, 5. Latrine, 6. Courtyard (Th. Fournet).

caust and damaging the wall-heating system in the process (Darby *et al.* 2010: 190–1). The 2009 survey of the site recorded this disturbance to the bath and collected samples of the bricks and pipes (including cylindrical heating pipes, which were labeled water pipes) that had been removed from the heating system and discarded on the surface (Darby *et al.* 2010: 193–4, 198 figs. 19–20). In 2010, the ʿAyn Gharandal Archaeological Project began excavating the bath to document further the extent of the damage and to study the surviving architecture. This initial field season resulted in the clearing of the *tepidarium*, the latrine, and parts of the *caldarium* and *frigidarium* (R. Darby and E. Darby 2012: 407–11; 2015: 463–7). The 2010 excavation also uncovered a large quantity of ceramic building material that had been removed from the heating



3. Drawings of cylindrical heating pipes removed from bath in 2010 (A. Hendrick).

system during the clandestine digging (Fig. 3). Although much of this material was left on site for future study, a few samples (including cylindrical heating pipes) were collected and appear in publications (R. Darby and E. Darby 2012: 411 figs. 11–12; 2015: 465 fig. 7). The renewed excavation of the bath in 2015 exposed the entirety of the bath's heating system in the *caldarium* and *tepidarium* as well as the *praefurnium*. During this last season, excavators collected every fragment of ceramic building material, and it is this material that forms the corpus of the present study.

The Wall-Heating System

Both the *tepidarium* and *caldarium* of the ʿAyn Gharandal bath had wall-heating systems built with ceramic pipes installed against the interior walls. These pipes created voids through which hot air rising from the hypocaust could circulate and help heat the room. Two types of heating pipes were used in the heating system at ʿAyn Gharandal. The first was the specially designed wheel-made tube with a rectangular profile, which is called a *tubulus* or box-flue. Stacked on top of each other, these *tubuli* had lateral vents cut into their sides that aided the horizontal flow of air between adjacent *tubuli*. Within the ʿAyn Gharandal bath, these rectangular *tubuli* were primarily found in the *caldarium*, although at least one example was found in the *tepidarium*. Similar *tubuli* are found in heating systems across the region, and a typology of those from ʿAyn Gharandal has already been published (Harvey 2019: 170–9). The second type of heating pipe was the cylindrical pipe.

The Cylindrical Heating Pipes

The cylindrical pipes used in the wall-heating system of the ʿAyn Gharandal bath are of the same type as those used in hydraulic installations throughout the wider region. These ceramic tubes are characterized by their two distinct ends: the spigot (narrow or "male" end) that comprises an often inverted neck (or collar) that slopes towards a turned shoulder, and the socket (wide or "female" end, or "bell"), featuring a wide opening. The socket end of the pipe was designed to fit around and receive the spigot end of an adjacent pipe, thereby ensuring a tight join, which was further sealed by the application of mortar around the join and by embedding the pipes in mortar. Examples of this type of pipe being used to convey water are found at many sites in the region, such as Petra (Bellwald *et al.* 2003: 56–7; Bellwald 2008: 90; Bedal, this volume), Wādī Musā (ʿAmr and al-Momani 2001: 270–1), and al-Ḥumayma (Oleson 2010: 330–1; Reeves and Harvey forthcoming).

Within the ʿAyn Gharandal bath,



these cylindrical pipes were primarily found in the *tepidarium*, where they comprise the near entirety of the wall-heating system (Figs. 4–5). Several of these tubes were also found in the *caldarium*. While the installation of these pipes against the wall in columns allowed for the vertical flow of hot air from the hypocaust, the lack of lateral vents like those on rectangular *tubuli* prevented

4. Photograph of cylindrical heating pipes *in situ* in southeast corner of the *tepidarium* (R. Darby).

5. Close-up photograph of cylindrical heating pipes *in situ* in southeast corner of the *tepidarium* (R. Darby).

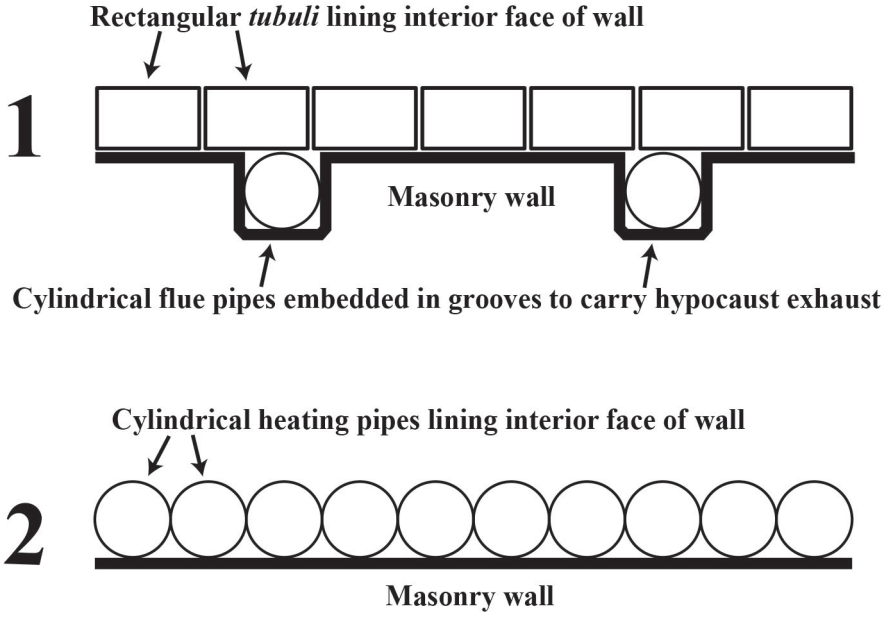


the hot air from flowing between columns. This restricted air flow theoretically resulted in a less efficient wall-heating system than one built entirely out of traditional *tubuli*. For this reason, and as will be discussed below, the use of these cylindrical pipes in the heating system is curious, although it is not without parallel.

Comparanda

In other baths of this region, cylindrical pipes were commonly used in wall-heating systems; however, they primarily served a different function than those at ʿAyn Gharandal. Typically, cylindrical pipes were embedded in vertical grooves cut into the masonry of the wall and acted as flues to carry the draft and exhaust of the heating system to the exterior (Fig. 6.1). In front of these cylindrical pipes, and on the interior surface of the wall, rectangular *tubuli* could be installed. While these rectangular *tubuli* served to distribute heat from the hypocaust across the wall surface, the cylindrical tubes that were embedded into walls served to carry the hypocaust exhaust and maintain the draft that was necessary for the overall function of the heating system. The use of cylindrical pipes strictly as flue pipes is apparent at the site of Humayma, where such tubes were found associated with vertical grooves in which they were once inserted (Reeves *et al.* 2017: 122, 128). A similar use is also documented in a bath at Umm Qays (Nielsen *et al.* 1993: 122, 192 pl. 34). Such recessed tubulation also seems to have been used in the *caldarium* of the garrison bath at Lejjun (de Vries and Lain 2006: 217).

Compared to the use of rectangular *tubuli*, it was much less common to use



6. Drawing of top-down view of wall-heating systems: 1. Use of rectangular *tubuli* along face of wall, with cylindrical flue pipes placed in vertical grooves in masonry wall; 2. Use of cylindrical heating pipes along interior face of masonry wall (C. A. Harvey).

cylindrical pipes as the primary wall heating system by installing them in closely packed columns on the face of the wall, as was done at ʿAyn Gharandal (Fig. 6.2). Nevertheless, comparanda do exist at several sites in the Negev Desert. At Oboda, modern Avdat, excavation of the site's well-preserved bath uncovered closely packed cylindrical pipes along the surface of the walls in the *caldarium* (Negev 1997: 175). Although the shape of these pipes is not specifically mentioned, their depiction in the plan of the bath (Negev 1997: fig. 26) indicates that they are cylindrical in profile, a fact confirmed by personal observation. These pipes likely date, not to the bath's initial construction in the 4th c. AD, but rather to the renovations that took place sometime after an early 5th c. AD earthquake (Erickson-Gini 2014: 97). Another example of cylindrical pipes being used for heating comes from the bath at the site of Mampsis. On the walls of this bath's *caldarium*, excavators recorded mortar impressions of pipes measuring 10 cm in diameter (Negev 1988: 176). There is no published image of these impressions or the heating pipes, which are not specifically referred to as cylindrical. The stated diameter of these pipes, however, strongly suggests that they were cylindrical, as there are no known rectangular *tubuli* with such narrow diameters. Personal observation of the excavated bath at En Hazeva also noted the presence of mortar impressions of cylindrical pipes along the walls of the heated rooms.

Outside of the Negev Desert, cylindrical pipes are attested in at least two later baths in the Levant. Within the sanctuary precinct at Khirbat adh-Dharīḥ, excavation uncovered a small bath dating to the Byzantine period. Within the heated room of this bath is a wall-heating system built with both rectangular *tubuli* and cylindrical pipes (Sartori 2015: 128 figs. 7–8). Further north, the early Islamic *hammam* in Hisham's Palace at Khirbat al-Mafjar also seems to have used cylindrical heating pipes. The excavation report of this complex states that pipes "rebated to fit into each other" were installed against the walls of the heated rooms to carry hot air from the hypocaust (Hamilton 1959: 56). The description of these heating pipes as "rebated" is likely a reference to the spigot ends of the cylindrical pipes. Unfortunately, publications of heating systems do not always provide enough detail or images to ascertain the types of materials used in their construction, and it is entirely possible that further examples of cylindrical heating pipes exist.

The Use of Cylindrical Pipes at ʿAyn Gharandal

While paralleled elsewhere, it is not entirely clear why the ʿAyn Gharandal bath used cylindrical pipes within the heating system. As discussed earlier, the absence of lateral vents constricted airflow within the walls and limited its efficiency. The most obvious explanation for their use is that the builders of these baths did not have enough *tubuli* and as a result had to use whatever materials were available. Supporting this theory is the heterogeneity of both the cylindrical pipes and the *tubuli* used, which suggests the builders were using the materials they could acquire. Close examination of one *tubulus* type indicated that the builders were even reusing old *tubuli* from a previous phase of the bath (Harvey 2019: 179). It is likely that the builders of the ʿAyn Gharandal bath recognized the limited efficiency of the cylindrical pipes and, faced with an inadequate number of *tubuli*, prioritized the use of the more efficient *tubuli* in the *caldarium*. They

then used cylindrical pipes as substitutes for *tubuli* in the *tepidarium*, where the relative inefficiency of these pipes would have been less noticed.

Methodology

The study of the cylindrical pipes from the ʿAyn Gharandal bath was carried out in 2016 alongside the study of the site's *tubuli* and brick (Harvey 2019). The disturbance caused by the clandestine digging combined with the inconsistent collection methods between excavation seasons prevented a fully quantitative study of this material. Furthermore, the absence of any purposeful removal of material from *in situ* contexts limited a detailed understanding of exactly where and how these pipes were used within the wall-heating system.

Of the 2,106 fragments of ceramic building material available for study in 2016, 339 fragments, weighing 23.4 kg, were cylindrical heating pipes. The vast majority of these sherds were too fragmented to be studied; however, a total of 19 pipes were partially reconstructed, 14 of which are presented here. Although the cylindrical pipes used for heating are identical in form to those used in hydraulic installations, the presence of black soot on their interior surfaces, resulting from their exposure to hypocaust fumes, clearly distinguishes them from pipes used to convey water (Fig. 7). The form and fabric of these reconstructed pipes are described in detail below using the same conventions used by a similar study of ceramic building materials from Humayma (Reeves and Harvey 2016: table 1; forthcoming).

Unfortunately, it is not possible to propose a typology for the cylindrical heating pipes as was done with the bricks and *tubuli* from the ʿAyn Gharandal bath. Instead, the full descriptions of selected examples are presented along with profile drawings in the following catalogue. These examples should not be taken as a comprehensive representation of all cylindrical pipe forms that were used in the heating system, but rather only as an exemplification of the range of pipes used based on what evidence was available during their study.



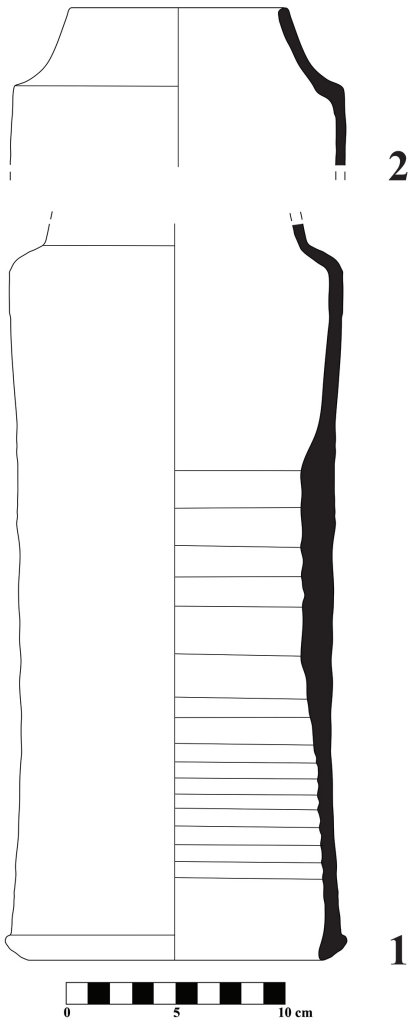
7. Photograph of cylindrical heating pipe (cat. no. 8) showing soot on interior surface and exterior of neck (C.A. Harvey).

Catalogue of Cylindrical Heating Pipes

In the following catalogue, the cylindrical heating pipes are organized by room, with those from the *tepidarium* presented first. Within this division, the examples are roughly organized by similarity of form. For each example, the sherd number (*e.g.*, 60,013) is given, followed by its archaeological context [*e.g.*, D: 7-6/14-13.1211.2 (Square. Locus. Bucket)] along with a verbal description of that context.

1. (60,013) D: 7-6/14-13.1211.2, found in 2010 backfill removed from *tepidarium* (Fig. 8:1). Cylindrical pipe section, nearly complete, missing only its spigot rim. Large wheel-made ceramic pipe with cylindrical body, narrow shoulder, triangular socket rim, and a wall that greatly thickens in middle. Measurements: MPL 33.5 cm; D 14.7 cm; Th of walls 0.6–1.3 cm. Weight: 1,975 g. Fabric: rough, sandy light red (5YR 6/6) fabric and a reddish yellow (5YR 6/8) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: rim is not extant; there is a sharp turn where the neck meets the sloped shoulder; the shoulder turns less sharply where it meets the body; D at shoulder 15.2 cm. Socket: slightly inverted triangular rim (Th 1.2 cm); rounded overhang on exterior; rounded interior edge; no interior ledge; D of opening 13.0 cm. Interior: rilling. Exterior: slight rilling. Mortar: grey mortar with ash inclusions on exterior and rim. Soot: interior and exterior. Comments/Comparanda: this pipe seems to be of the same type as cat. no. 2 (60,014), described below. Based on personal observation, both appear similar to the large cylindrical pipes that remain *in situ* in the *tepidarium*. Several of these large pipes, which had been torn away by the clandestine digging, were removed during excavation of the bath in 2010 and were not available for study in 2016. A drawing of one of these complete pipes, generously provided for this publication by the directors of the project, confirms this similarity (Fig. 3:1).

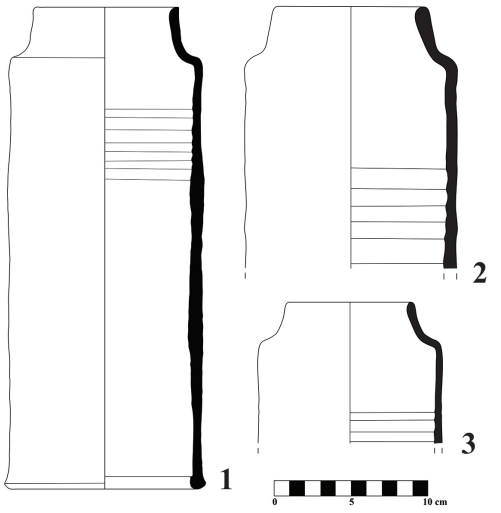
2. (60,014) D: 7-6/14-13.1211.2, found in 2010 backfill removed from *tepidarium* (Fig. 8:2). Cylindrical pipe section, preserving only its spigot end. Large wheel-made ceramic pipe with inverted and curving neck and a sharp turn at the shoulder. Measurements: MPL 7.3 cm; D 16.0 cm; Th of walls 0.4 cm. Weight: 41 g. Fabric: rough, sandy reddish yellow (5YR 6/8) fabric with a reddish grey (2.5YR 5/1) core and a reddish yellow (5YR 7/6) surface. Inclusions: medium sub-rounded sand, with a few white inclusions.



8. Drawings of cylindrical heating pipes from the *tepidarium*: 1. cat. no. 1 (60,013); 2. cat. no. 2 (60,014) (C.A. Harvey).

Ware: Petra. Spigot: simple rounded rim (Th 0.5 cm); neck is inverted and gently slopes to the shoulder; shoulder turns sharply where it meets the body; D at shoulder 15.5 cm; D of opening 9.0 cm. Socket: not extant. Interior: slight rilling. Exterior: slight rilling. Mortar: trace amounts on exterior. Soot: none. Comments/Comparanda: this pipe seems to be of the same type as cat. no. 1 (60,013), described above. Based on personal observation, both appear similar to the large cylindrical pipes that remain *in situ* in the *tepidarium*. Several of these large pipes that had been torn away by the clandestine digging were removed during excavation of the bath in 2010 and were not available for study in 2016. A drawing of one of these complete pipes, generously provided for this publication by the directors of the project, confirms this similarity (Fig. 3:1).

3. (60,047) D: 7-6/14-13.1233.68, found in disturbed soil filling hypocaust hole in *tepidarium* (Fig. 9:1). Cylindrical pipe section, preserving full profile. Wheel-made ceramic pipe with cylindrical body, narrow shoulder with a sharp turn, and bulbous socket rim. Measurements: L 31.4 cm; D 13.3 cm; Th of walls 0.5–0.8 cm. Weight: 1,045 g. Fabric: rough, sandy light red (2.5YR 6/6) fabric with a light brown (7.5YR 6/4) core and a pink (5YR 7/3) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.6 cm) on slightly inverted neck that curves to the shoulder; the shoulder turns sharply where it meets the body; D at shoulder 12.5 cm; D of opening 8.4 cm. Socket: thickened rim (Th 1.0 cm) with flattened and rough top, rounded overhang on exterior, sharp and rough edge on interior; no interior ledge; D of opening 11.2 cm. Interior: rilling.



9. Drawings of cylindrical heating pipes from the *tepidarium*: 1. cat. no. 3 (60,047); 2. cat. no. 4 (60,049); 3. cat. no. 5 (60,017) (C.A. Harvey).

Exterior: slight rilling. Mortar: grey mortar with ash inclusions on exterior. Soot: interior and exterior of neck.

4. (60,049) D: 7-6/14-13.1233.68, found in disturbed soil filling hypocaust hole in *tepidarium* (Fig. 9:2). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with cylindrical body, narrow shoulder, and inverted neck. Measurements: MPL 17.3 cm; D 14.0 cm; Th of walls 0.8 cm. Weight: 256 g. Fabric: rough, sandy brown (7.5YR 5/4) fabric and a brown (7.5YR 5/4) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: rounded thickened rim (Th 1.0 cm) on inverted neck that curves to the shoulder; the shoulder turns sharply where it meets the body; D at shoulder 14.0 cm; D of opening 8.2 cm. Socket: not extant. Interior: rilling. Exterior:

slight rilling. Mortar: none. Soot: interior and exterior of neck.

5. (60,017) D: 7-6/14-13.1215.36, knocked down from the east wall of the *tepidarium* (Fig. 9:3). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with cylindrical body, narrow shoulder, and inverted neck. Measurements: MPL 9.3 cm; D 11.9 cm; Th of walls 0.4 cm. Weight: 112 g. Fabric: rough, sandy light red (2.5YR 6/6) fabric and a very pale brown (10YR 7/4) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.5 cm) on inverted neck that curves to the shoulder which turns sharply where it meets the body; D at shoulder 12.5 cm; D of opening 7.4 cm. Socket: not extant. Interior: rilling. Exterior: slight rilling. Mortar: trace amounts on exterior. Soot: interior and exterior.

6. (60,050) D: 7-6/14-13.1233.77, found in disturbed soil filling hypocaust hole in *tepidarium* (Fig. 10:1). Cylindrical pipe section, preserving full profile. Wheel-made ceramic pipe with rounded shoulder and a body that tapers toward the socket end. Measurements: L 28.6 cm; D 14.4 cm; Th of walls 0.5–0.9 cm. Weight: 683 g. Fabric: rough, sandy light red (10R 6/8) fabric and a pinkish white (7.5YR 8/2) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.5 cm) on a slightly inverted neck that turns at the rounded shoulder; D at shoulder 14.0 cm; D of opening 9.8 cm. Socket: thickened rounded rim (Th 0.9 cm) with rough surface; sharp and rough edge on interior; no interior ledge; D of opening 11.9 cm. Interior: rilling. Exterior: slight rilling. Mortar: trace amounts on exterior. Soot: interior, exterior, and on neck. Comments/Comparanda: this pipe is of a similar form as cat. no. 7 (60,046), described below, but it is larger in size. The form also appears similar to the pipes in Pipeline D at the Petra Garden and Pool Complex, which likewise have rounded shoulders as well as a tapering profiles and date to the late 2nd to mid-4th c. AD (Bedal, this volume).

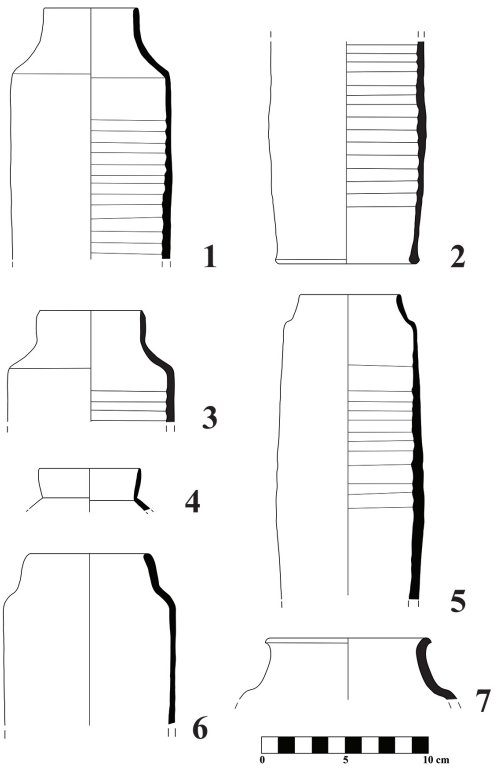


10. Drawings of cylindrical heating pipes from the *tepidarium*: 1. cat. no. 6 (60,050); 2. cat. no. 7 (60,046) (C.A. Harvey).

7. (60,046) D: 7-6/14-13.1233.68, found in disturbed soil filling hypocaust hole in *tepidarium* (Fig. 10:2). Cylindrical pipe section, preserving full profile. Wheel-made ceramic pipe with rounded shoulder and a body that tapers toward the socket end. Measurements: L 24.4 cm; D 12.9 cm; Th of walls 0.3–0.5 cm. Weight: 321 g. Fabric: rough, sandy red (2.5YR 5/6) fabric and a light grey (10YR 7/2) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Spigot: simple rounded rim (Th 0.5 cm) on a slightly

inverted neck that turns at the rounded shoulder; D at shoulder 12.7 cm; D of opening 8.0 cm. Socket: thickened rounded rim (Th 0.8 cm); round but rough edge on interior; no interior ledge; D of opening 9.6 cm. Interior: rilling. Exterior: slight rilling. Mortar: off-white mortar with ash inclusions on exterior. Soot: interior and on exterior of neck. Comments/Comparanda: this pipe is of a similar form as cat. no. 6 (60,050), described above, but it is smaller in size. The form also appears similar to the pipes in Pipeline D at the Petra Garden and Pool Complex, which likewise have rounded shoulders as well as a tapering profiles and date to the late 2nd to mid-4th c. AD (Bedal, this volume).

8. (60,033) D: 7-6/14-13.1225.50, found in loose sand above the *alveus* (tub) in the southern half of the *caldarium* (Figs. 7 and 11:1). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with cylindrical body and sloping shoulder with a sharp turn where it meets the body. Measurements: MPL 15.2 cm; D 9.7 cm; Th of walls 0.3–0.4 cm. Weight: 146 g. Fabric: rough, sandy yellowish red (5YR 5/6) fabric and a very pale brown (10YR 7/4) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.4 cm) on a neck that curves into a sloping shoulder; shoulder turns where it meets the body; D at shoulder 9.2 cm; D of opening 5.1 cm. Socket: not extant. Interior: heavy rilling. Exterior: slight rilling. Mortar: grey mortar with ash inclusions on exterior. Soot: interior, exterior, and on neck. Comments/Comparanda: the diameter, fabric, and rilling of this pipe suggest it may be of the same form as cat. no. 9 (60,040), described below; however, the absence of a full profile prevents confirming this theory. The spigot end and diameter of this pipe also bear a slight resemblance to a pipe found within the Roman fort at Humayma (Reeves and Harvey forthcoming: cat. no. 12.11 fig. 12.11). Interestingly, this parallel was also found in a heating system where it was used as a flue pipe. It is unclear, however, whether this ʿAyn Gharandal pipe, which is missing its socket end, once had an interior ledge similar to the one on the socket end of the Humayma pipe.



11. Drawings of cylindrical heating pipes from the *caldarium* : 1. cat. no. 8 (60,033); 2. cat. no. 9 (60,040); 3. cat. no. 10 (60,022); 4. cat. no. 11 (60,029); 5. cat. no. 12 (60,032); 6. cat. no. 13 (60,028); 7. cat. no. 14 (60,015) (C.A. Harvey).

9. (60,040) D: 7-6/14-13.1229.61, found in fill of the *alveus* (tub) in the southern half of the *caldarium* (Fig. 11:2). Cylindrical pipe section, preserving only its socket end. Wheel-made ceramic pipe with cylindrical body that tapers slightly towards the socket end, and a thickened, rounded socket rim. Measurements: MPL 13.4 cm; D 9.3 cm; Th of walls 0.3–0.5 cm. Weight: 138 g. Fabric: rough, sandy light red (2.5YR 6/6) fabric and a very pale brown (10YR 8/2) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: not extant. Socket: thickened rounded rim (Th 0.6 cm); rim is slightly bulbous; no interior ledge; D of opening 7.4 cm. Interior: heavy rilling. Exterior: slight rilling. Mortar: large amount (Th 2.0 cm) of grey mortar with ash and lime inclusions on exterior. Soot: interior. Comments/Comparanda: the diameter, fabric, and rilling of this pipe suggest it may be of the same form as cat. no. 8 (60,033), described above; however, the absence of a full profile prevents confirming this theory.

10. (60,022) D: 7-6/14-13.1224.44, found in loose sand fill of the *caldarium* (Fig. 11:3). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with cylindrical body and sloping shoulder with a sharp turn where it meets the body. Measurements: MPL 6.8 cm; D 10.0 cm; Th of walls 0.5 cm. Weight: 31 g. Fabric: rough, sandy light red (2.5YR 6/8) fabric and a light brown (7.5YR 6/4) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: rounded rim that comes to a point (Th 0.4 cm) on a straight neck that turns at curved and sloping shoulder; shoulder turns where it meets the body; D at shoulder 10.0 cm; D of opening 6.9 cm. Socket: not extant. Interior: rilling. Exterior: slight rilling. Mortar: trace amounts on exterior. Soot: interior, exterior, and on neck. Comments/Comparanda: the spigot rim of this pipe and the diameter of its opening bear a close resemblance to cat. no. 11 (60,029), described below; however, the neck of this pipe is far less everted than cat. no. 11. The spigot end and diameter of this pipe also bear a slight resemblance to a pipe found within the Roman fort at Humayma (Reeves and Harvey forthcoming: cat. no. 12.11, fig. 12.11). Interestingly, this parallel was also found in a heating system where it was used as a flue pipe. It is unclear, however, whether this ʿAyn Gharandal pipe, which is missing its socket end, once had an interior ledge similar to the one on the socket end of the Humayma pipe.

11. (60,029) D: 7-6/14-13.1225.47, found in loose sand above the *alveus* (tub) in the southern half of the *caldarium* (Fig. 11:4). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with everted neck that turns very sharply where it meets the shoulder. Measurements: MPL 2.6 cm; D unclear; Th of walls 0.4 cm. Weight: 21 g. Fabric: rough, sandy light red (2.5YR 6/6) fabric and a very pale brown (10YR 7/4) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: rounded rim that comes to a point (Th 0.3 cm) on an everted neck that turns very sharply where it meets the curved shoulder; D of opening 5.8 cm. Socket: not extant. Interior: unclear. Exterior: unclear. Mortar: none. Soot: interior and exterior of neck. Comments/Comparanda: the spigot rim of this pipe and the diameter of its opening bear a close resemblance to cat. no. 10 (60,022), described above;

however, the neck of this pipe is much more everted than cat. no. 10.

12. (60,032) D: 7-6/14-13.1225.50, found in loose sand above the *alveus* (tub) in the southern half of the *caldarium* (Fig. 11:5). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with very narrow shoulder and cylindrical body. Measurements: MPL 18.5 cm; D 8.8 cm; Th of walls 0.3–0.6 cm. Weight: 228 g. Fabric: rough, sandy reddish yellow (5YR 6/6) fabric and a reddish yellow (7.5YR 6/6) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.3–0.4 cm) on an inverted neck that turns at the shoulder; the shoulder is very narrow and turns where it meets the body; D at shoulder 8.2 cm; D of opening 5.8 cm. Socket: not extant. Interior: rilling. Exterior: slight rilling. Mortar: grey mortar with ash inclusions on exterior and neck. Soot: interior, exterior, and on neck.

13. (60,028) D: 7-6/14-13.1225.47 found in loose sand above the *alveus* (tub) in the southern half of the *caldarium* (Fig. 11:6). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with cylindrical body and inverted neck. Measurements: MPL 10.4 cm; D 10.3 cm; Th of walls 0.3 cm. Weight: 47 g. Fabric: rough, sandy reddish yellow (5YR 6/6) fabric and a very pale brown (10YR 8/3) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: simple rounded rim (Th 0.5 cm) on a slightly inverted neck that turns at the rounded shoulder; D at shoulder 10.3 cm; D of opening 6.2 cm. Socket: not extant. Interior: rilling. Exterior: slight rilling. Mortar: none. Soot: interior, exterior, and on neck.

14. (60,015) D: 7-6/14-13.1212.5, found in 2010 backfill removed from *caldarium* (Fig. 11:7). Cylindrical pipe section, preserving only its spigot end. Wheel-made ceramic pipe with curved neck that flares out. Measurements: MPL 3.4 cm; D unclear; Th of walls 0.4 cm. Weight: 17 g. Fabric: rough, sandy light red (2.5YR 6/6) fabric and a very pale brown (10YR 8/2) surface. Inclusions: medium sub-rounded sand, with a few white inclusions. Ware: Petra. Spigot: flaring, everted neck with a slightly pointed rim (Th 0.5 cm); neck curves down to shoulder which is partially extant; D of opening 9.0 cm. Socket: not extant. Interior: unclear. Exterior: unclear. Mortar: none. Soot: interior and on exterior of neck.

Conclusions

The cylindrical heating pipes of the ʿAyn Gharandal bath are characterized by a high degree of heterogeneity, with many different forms of pipes being used. All of the studied examples, however, appear to be of Petra ware, suggesting a common place of manufacture. It is also noteworthy that none of these pipes have ledges on the interior of their socket ends, a feature present on some pipes from other sites, like Humayma (Reeves and Harvey forthcoming: cat. nos. 12.8–12.11). This absence is not surprising, however, as pipes from other sites also lack these ledges (ʿAmr and al-Momani 2001: fig. 24; Bedal, this volume).

It is worth re-emphasizing that the pipes presented here are not a comprehensive representation of all the cylindrical pipe forms that were used in the ʿAyn Gharandal heating system. This fact is exemplified by a cylindrical pipe that was collected in 2010 and was not available for this study (Fig. 3.2; R. Darby and E. Darby 2012: fig. 12; 2015 fig. 7). This pipe does not closely

resemble any of the cylindrical pipes presented here, and it is very likely that other forms were also used within the heating system.

Although no attempt was made at establishing a firm typology for the cylindrical pipes from the ʿAyn Gharandal bath, it is clear from the examples presented above that there is potential for one. For example, there seems to be two general forms of cylindrical pipes attested in the *tepidarium*: those with sharply turned shoulders and cylindrical bodies (cat. nos. 1–5; Figs. 8–9), and those with rounded shoulders and bodies that taper toward their socket ends (cat. nos. 6–7; Fig. 10). Based on the sample presented here, the cylindrical pipes from the *tepidarium* also appear to be generally larger than those from the *caldarium* (cat. nos. 8–14; Fig. 11).

The use of cylindrical pipes in the wall-heating system of the ʿAyn Gharandal bath presents a clear example of builders making do with the materials available to them at the time. Such deviations from best practices are not surprising and are a topic worth exploring further. The study of ceramic building materials in Roman Jordan and the wider Roman East also requires more attention than this class of material has traditionally been given. This presentation and discussion of the cylindrical heating pipes of ʿAyn Gharandal is a step towards that goal. As was the case with the publication of the brick and *tubuli* from this bath, this article will assist in the development of a much-needed regional typology of ceramic building material. It is also hoped that it will serve as encouragement, a source of comparanda, and a model for future work on cylindrical heating and water pipes in the region.

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Prosopographical Notes on *Praesides Arabiae* (*ca.* AD 356–363): A Reconsideration of Libanius' Letters to the Governors of Arabia

Introduction

We know only a dozen or so of the several hundred governors of Arabia during the entire Byzantine period (11 from the 4th century, 6 from the 5th century, and 4 from the 6th century; Sartre 1982: 100–15).[1] Even for the best-documented century—the 4th century—the bulk of the information concerns a very narrow slice of time, *ca.* AD 356–363. For this period, we derive our information almost exclusively from the letters of the famous Antiochene Rhetorician Libanius.[2] In an unusually extensive correspondence (1,544 letters have survived), written in an intricate, ambiguous language full of rhetorical devices, we find 25 epistles addressed to the governors of Arabia.[3] Thanks mainly to these texts, Maurice Sartre (1982: 103–4) prepared the list of the governors of Arabia that looks like this for the period of interest (AD 356–364):

Andronicus [AD 356–357]
Maximus [AD 357]
Belaeus [AD 363]
Ulpianus [AD 364]

The goal of this article is to reinterpret Libanius' letters by asking

[1] The average period of provincial governorship lasted customarily (it was never regulated by imperial law) from several months to about two years (Slootjes 2006: 26).

[2] For the latest biography of Libanius, along with a very comprehensive list of source editions and modern literature on the subject, see Janiszewski 2014: 290–4; Van Hoof 2014. For the most significant monographs on Libanius, see Petit 1866; Sievers 1868; Seeck 1906; Petit 1959; Petit 1994; Wiemer 1995; Wintjes 2005; Cribiore 2009.

[3] For the most extensive study of the letters, see Foerster 1927: 49–241; for a commentary on translations into modern languages, see Norman 1992: 17–43; Cabouret 2000: 16–25; Bradbury 2004: 19–27; Cabouret 2014: 143–59.

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new questions and providing new answers to questions already asked. The re-examination of Libanius's work I present offers ways of interpretation that move beyond those generated by the previous research. I will present the first three governors, and introduce a new one, Orion [AD 363], who is absent from M. Sartre's list. I am omitting Ulpianus, whose biography I intend to elaborate on a separate article due to the particular abundance of source material.[4]

Below I present revised biographical notes consisting essentially of two parts: paraphrases of the respective letters and a commentary (due to the ambiguity of the sources, I consider this to be the best solution). I have arranged the biographical notes in chronological order, and because the chronology of terms of office is based on the dating of the letters, I have adopted P. Petit's (1994) findings as the most up-to-date in this regard. Throughout the text, I have numbered the letters according to the publication by Richard Foerster (1921; 1922).

Andronicus

At the turn of 356 to 357, Libanius sent a letter to one Andronicus (*Ἀνδρονίκῳ*).[5] The letter concerned the sophist Gaudentios (Janiszewski 2014a: 203–5), a teacher at the school of rhetoric led by Libanius in Antioch. Since Gaudentios was an Arab, his entire clan also came from Arabia (*Ἀράβιος δὲ οὑτοσὶ καὶ ἔστιν αὐτῷ γένος ἐκεῖ;* Libanius *Epistles* 543.1.1–2 [ed. Foerster 1921]). He knew that Andronicus was a friend of Libanius (*γνοὺς οὖν ὡς εἴης μοι φίλος*: *Epistles* 543.1. 3) and therefore, through the latter, he intended to resolve his problem. The relatives of Gaudentios suffered from a total lack of dignity (*πενόμενοι παρὰ τὴν ἀξίαν: Epistles* 543.1. 2–3), and two of them had even gone bankrupt (*Epistles* 543.1.5–7). To redress their ill fate, it is enough for Andronicus to issue appropriate laws (*λύσας δὲ αὐτοῖς τὸ κακὸν τοὺς νόμους τε βεβαιώσεις*: *Epistles* 543.2.1–2).

Nowhere does Libanius refer to Andronicus as a governor (this situation will be repeated many times in subsequent letters). Instead, we conclude that he was a governor from indirect information: those 'dignities' that, if I understand correctly, were the offices and resulting benefits most at the disposal of the provincial governor (and this may have concerned the position in his *officium*); the passing and observance of laws in a province are also a sphere of gubernatorial responsibility; finally, the 'action' of this letter is unquestionably set in Arabia, since that is where Gaudentios' family came from—this is the only basis for identifying the province governed by Andronicus. O. Seeck (1906: 75) does not hesitate to name Andronicus *praeses Arabiae*.

He was 'respectueux de lois', in the opinion of P. Petit, but it seems to me that the last Greek phrase quoted above proves the instrumental use of Andronicus' entitlements. Libanius counted on settling the case with the governor, which means that it was possible to put pressure on this official to achieve some concrete, private benefit. In Arabia, as in all other provinces of the Roman Empire, service in state administration was a guarantee of a reasonably steady life. And that is why Libanius expected

[4] See also Filipczak 2018 with a large part based on Libanius' letters to Ulpianus.

[5] Biographical notes: Seeck 1906: 75 [*s.v.* Andronicus III]; *PLRE* I: 64 (*s.v.* Andronicus 2); Sartre 1982: 103 (*s.v.* Andronicus); Petit 1994: 41 (*s.v.* Andronicus III).

the governor to bestow a dignity on Gaudentios' relatives and was looking for some form of financial bail-out for two of his relatives.

Based on the accounts of the historian Zosimos (4.15), O. Seeck (1906: 75) claims that Andronicus may have been a philosopher from Caria condemned to death in 372 because of (false) suspicion of attempted sedition. This hypothesis is based on the obvious accordance of names and chronology. Andronicus knew Greek, he bore a Greek name, he was friends with Libanius (I assume that the sentence speaking of friendship does not result from a polite letter-writing style, but reflects the actual state), and it is thus plainly clear that he must have originated from the Greek-speaking part of the empire. In Caria, however, in addition to local languages, Greek was certainly spoken, due to the presence of a long-established and populous Greek community. All this evidence is circumstantial, but makes O. Seeck's thesis very probable (P. Petit doubts the identity of both figures, but without presenting any arguments; 1994: 41).

Maximus

In 357 and 358, Libanius wrote four letters to Maximus (*Μαξίμῳ*).[6] In the first (*Epistles* 320), he calls Maximus his friend (*φίλον*: *Epistles* 320.1.2). He asks whether Maximus will restore prosperity to Arabia, which is poor thanks to those who have taken local goods to their homes (*ἐγίγνωσκες δὲ ἄρα τὴν Ἀραβίαν εὐδαίμονα ποιεῖν πάνυ φαύλως ἔχουσαν ὑπὸ τῶν οἴκαδε τἀκείνης ἑλκόντων ἀγαθά: Epistles* 320.2.1–4). He is becoming impoverished in office (*τῆς ἀρχῆς*), applying himself more to achieving glory than money (*Epistles* 320.2.4–5). Finally, there is a request: the nephew of the rhetorician Magnos, who works in Antioch, is counting on recovering his estate, which was stolen by his uncles—Maximus could provide a chance for him to do so (*Epistles* 320.3 i 4).

We are not sure who Libanius meant when he wrote in the initial parts of the letter about the people who were plundering Arabia. In the Spanish translation by González Gálvez we read about the 'gobernadores'—the governors (González Gálvez 2005). It cannot be ruled out this was indeed referring to them since, after all, it was the governors who were responsible for the abuses by the Roman administration in the provinces, which in this case was in Arabia, as is expressly stated. After all, only by 'beating about the bush' could Libanius criticise those in power without taking risks. It seems all the more that Maximus' *arché* is simply the governorship of Arabia. O. Seeck (1906: 207) and P. Petit (1994: 159) use the title *praeses Arabiae*.

The image of Maximus stands in clear opposition to the image of these governor–plunderers. Maximus is a just and honest governor (P. Petit writes: 'justice' and 'intégrité'), and for precisely this reason, the rhetorician Magnos and his nephew seek help through Libanius. The question remains open for now as to whether this is a stylised, exaggerated portrait simply aiming to ensure Maximus' favour or whether it is a faithful image. And this time Libanius calls him his friend, thus giving himself license to ask Maximus for another favour.

In another letter (*Epistles* 332), we return to the case of Gaudentios of

[6] Biographical notes: Seeck 1906: 207 [*s.v.* Maximus IV]; Ensslin 1931: 671 [*s.v.* Maximus 61]; *PLRE* I: 582 [*s.v.* Maximus 14]; Sartre 1982: 104 [*s.v.* Maximus]; Petit 1994: 159 [*s.v.* Maximus IV]; Janiszewski 2014b: 313 [*s.v.* Maksimos 7].

Arabia, a rhetorician and a co-worker with Libanius. This time, Libanius asks Maximus to look favourably (*ἰδεῖν ἡδέως*) on two relatives of Gaudentios (*Epistles* 329.1.3–4): to help because he is, after all, a rhetorician (*ῥήτορος*; *Epistles* 329.2.2–3). If he had taken office for a reason other than his ability to use words, he would have reason not to value rhetoric (*καὶ γὰρ εἰ μὲν ἀπ ‘ἄλλου του πρὸς τὸ ἄρχειν ἐληλύθεις, ἴσως ἂν ἦν λόγος ἀμελοῦντι τῶν λόγων*). Now he must take care of those who have mastered that through which he had also achieved greatness (*νῦν δέ, οὗτοι γάρ σε τοσοῦτον ἔθηκαν, φαίνου σπουδάζων περὶ τοὺς κεκτημένους ὑφ ‘οὗ γεγένησαι μέγας*: *Epistles* 329.3). Keeping to a literal interpretation of the Greek text, and there is no reason to do otherwise in this particular case, we can conclude that rhetorical skills were decisive in taking on the office of governor. This proves the still-great role that classical values played in the selection of administrative staff in this period. According to O. Seeck (1906: 207) and P. Petit (1994: 159), Maximus must have previously been an advocate.

Once again, we see the governor being pressed with a request from Libanius. In order to achieve his goal, the famous rhetorician referred to what we today call professional solidarity or socio-cultural particularity—in this case, of rhetoricians.

In the next letter (*Epistles* 337), Libanius lobbies for the rhetorician Tiberinus (Janiszewski 2014c: 586 [*s.v.* Tiberinos 2]), his colleague. The case concerns that rhetorician's son, Archelaos. He works (*ποιεῖ*) 'among us' (*παρ ‘ἡμῖν*), as Libanius writes, therefore in Antioch, but he is also valued in his homelands: in serving (*ὠφελῶν*) our inhabitants, he exalts his homeland (*Epistles* 337.1). Maximus should help him, and in this manner he will be helping the cities, both ours, as Libanius writes, and the one that man comes from (*ταῖς πόλεσι τῇ τε ἡμετέρᾳ καὶ ἐξ ἧς ἐστιν*: *Epistles* 337.2).

We are not sure what this action was or what the service to the Antiochians was, but it was related to the neglect of some other city. In the opinion of González Gálvez (2005), Archelaos, who lived in Antioch, was subject to an attempt by his hometown to force him into curial duties, or perhaps he was even being put on trial. There had probably been an intercession with the provincial governor, Maximus, which is why Libanius was trying to settle the whole matter through him. We do not know what the outcome was.

In another letter (*Epistles* 357), Libanius asks for help for the family of his friend, a co-worker, the rhetorician Uranios (Janiszewski 2014d: 588–9 [*s.v.* Uranios]). Even a small gesture would help these poor people in their relations with the rich (*τοῖς ἀσθενέσι πρὸς τοὺς εὐπόρους*: *Epistles* 357.3–4). If he does not help those whom we consider worthy, he will not be behaving like a Hellen (*Εἴτε μὴ βοηθεῖς οἷς ἀξιοῦμεν, οὐχ Ἑλληνικὸν τοῦτο ποιεῖς*: *Epistles* 357.1).

This may be about the legal protection of people of humble origin (known as *humiliores* in the legislation of the period) against abuse by influential people (*honestiores*). However, we do not know the details, and Libanius' words are not precise enough in this case to go beyond hypotheticals. Less affluent citizens could have less potential to operate (perhaps more modest *sportulae* to give to officials), and perhaps little chance of taking a job in public administration. This is another way to explain Libanius' words. If, however, this was about protecting the poor from

the rich, then that was the duty of a special official (*defensor civitatis*; Frakes 2001: *passim*, mainly 130–47). Does this mean that Maximus held that position at that time, and not the provincial governorship? Did Libanius, without knowing that defender, send a letter to the only person among the provincial authorities with whom he maintained friendly relations, *i.e.*, Maximus? Does 'Hellen' mean a pagan, or a person who has been classically raised and educated?

In M. Sartre's (1982: 104) opinion, it is not known whether letters 337 and 357 were addressed to Maximus while he was governor of Arabia. Indeed, neither of these letters expressly mentions Arabia. However, the matter that Libanius addressed in his letter 337—the observance of civic duties to one's hometown—was the responsibility of provincial governors. According to P. Petit (1994: 159), letter 337 was written in 357, when, in the light of two earlier letters (320 and 329), Maximus governed Arabia. The chronological agreement suggests that letter 337 was also addressed to the governor of the province. Letter 357 comes from the year 358, which means that either at that time Maximus was already in another office, maybe precisely *defensor civitatis*, or that Maximus was governor of Arabia in 357 and 358, when he dealt with the difficult-to-define case of Uranios' family.[7] The second option seems to me the more likely. All four letters coincide not only in the time they were written, but also in a shared motif, that of helping the immediate family of three rhetoricians friendly with Libanius: Gaudentios, Tiberinus, and Uranios. This was therefore a 'series' of letters sent at almost the same time, and addressed to the same official, in very similar cases.

Recent studies on Libanius' vocabulary presented by I. Sandwell (2007), prove that, unlike the Christian authors of this period, Libanius did not use a simple language qualifier (Hellen=Pagan), but used a number of other words and expressions to denote the followers of old cults.[8] Maximus would have been a man from a classical Greek cultural circle ('le possesseur d'une culture littéraire', as P. Petit 1994: 159 writes), but not a pagan. It is true that M. Sartre (1982: 104), based on hagiographic literature, suggests that Maximus may have been the same Maximus as an official persecuting Christians in Petra, but the source (*Passio sanctorum* 77: 84–7 [comment] and 88–101 [source] [ed. Blake and Peters 1926]) that evidences this is describing the persecution of Maximinus Daia's time, *i.e.*, events from before 313. It seems to me unlikely, on account of the excessive time difference, that the high-ranking imperial official from the beginning of the 4th century could have been the governor of Arabia of almost half a century later.

Orion

A figure known from two letters to the governor of Arabia is that of

[7] Prosopographic studies mention another Maximus who was in office in 358; he was the governor of Cilicia, see Seeck 1906: 207 [*s.v.* Maximus V]; *PLRE* I: 582 [*s.v.* Maximus 15]. Both publications clearly distinguish Maximus the governor of Arabia from Maximus governor of Cilicia (*contra* Sartre 1982: 104—'O. Seeck, *Briefe*, p. 207 pense qu'il peut s'agir du même Maximus qui fut praeses Ciliciae fin 358. . .').

[8] Sandwell 2007: 63 *ff.* (analysis of John Chrisostom's terminology), 92–3 (words and phrases used by Libanius to describe pagans), 99–100 (correction to Petit 1994 on the religious affiliation of some officials, with the ultimate conclusion that it was not, in most cases, the goal of Libanius to clearly distinguish between Christians and pagans); 177–9 (for various theories in the meaning of the word 'Hellen').

Belaeus (*vide infra*).[9] The first of the letters (*Epistles* 763), dated to mid-362, certifies that Orion (*Ὡρίων*) is an old friend of Libanius (*φίλος ἐπὶ τῶν προτέρων χρόνων*), that he is an honest man (*χρηστὸς*: *Epistles* 763.1), and that his rule was benign (*πραότατα ... τὴν ἀρχήν*). Orion neither demolished temples nor fought with priests, as Libanius heard from the residents of Bostra (*τὴν Βόστραν οἰκούντων*: *Epistles* 763.2). Orion barely escaped from those who had never been in any way wronged by him (*μόλις τὰς τῶν εὖ παθόντων ὑπ ἐμοῦ διαπέφευγα χεῖρας λυπήσας μὲν οὐδένα οὐδέν*: *Epistles* 763.3). The whole family, including his brother, had to leave their lands, and lost their property (*καὶ προσετίθει φυγὴν ἀδελφοῦ καὶ γένους ὅλου πλάνην καὶ γῆν ἄσπορον καὶ σκευῶν ἁρπαγήν*: *Epistles* 763.3.5–7). Now Libanius sees (*τοῦτον νῦν εἶδον*) and listens to Orion walking with his head bent, despairing (*Epistles* 763.3.1–2). Such behaviour, Libanius points out, is not pleasing to the emperor (the rhetorician quotes Julian's words calling for peace in the cities, such as are preserved in a letter to the inhabitants of Bostra, *vide infra*). Those who coveted the others' property pretended they were doing so in service to the gods (*ἐν τῷ τοῖς θεοῖς προσποιεῖσθαι βοηθεῖν*: *Epistles* 763.6).

About six months later, in the summer of 363, Libanius wrote another letter (*Epistles* 819) to Baleus, regarding Orion. Libanius had already interceded personally (*πρὸς παρόντα*) with Maximus, but to no effect (*Epistles* 819.2.2). He differs from Orion regarding gods (*περὶ τὸ θεῖον δόξῃ*)—Orion has been led astray in this matter, but remains so by his own free will (*Epistles* 819.2.4–5). Those who are currently tormenting him (*τοὺς νῦν ἐγκειμένους αὐτῷ*) need to be reminded of how much good they derived from him (*Epistles* 819.3.1–2). However, they had obtained Mysian plunder (*Μυσῶν λείαν*: *Epistles* 819.3.4–5) from Orion's relatives, and had attacked him (*ἐπὶ τὸ τοῦδε σῶμα*: *Epistles* 819.3.5–6), believing that they were thus serving the gods (*τοῖς θεοῖς*: *Epistles* 819.3.6). Following their example, simple people (*τοὺς μὲν πολλοὺς*) had begun acting unwisely (*ἄνευ λογισμοῦ φέρεσθαι*: *Epistles* 819.4). If Orion has taken temple property, he must be tortured; if he is a beggar, torture will only bring him sympathisers (*Epistles* 819.5). If he dies in shackles (*ἀποθανεῖν αὐτῷ δεδεμένῳ*), they will revere him (*Epistles* 819.6). Libanius calls for Orion to be released untouched, even if he has to be submitted to the tribunal (*εἰ δεῖ δίκην αὐτὸν ὑποσχεῖν*: *Epistles* 819.7).

Both letters prove that he held some important office, which is customarily not named explicitly. That it was a provincial governorship is indicated by the content of letter 763 about the benignly administered office and, above all, the scope of the matters that both letters deal with. The implementation of the emperor's religious policy (judging by letter 763, Orion did not attend to this with fervour), but also the upholding of social order and peace, justice, including conducting arrests, interrogations and torture—all these activities fell to provincial governors.

[9] Biographical notes: Ensslin 1939: 1087 [*s.v.* Orion 5]; Petit 1994: 185 [*s.v.* Orion]. See also Sievers 1868: 117; Petit 1866: 38–41. According to Petit (1994: 185), Orion is also mentioned in certain letter to the governor of Galatia, Maximus. The name 'Arion' is given in Wolf's 1838 edition of Libanius' letters (*Epistles* 1105.4) and 'Orion' in Foerster's 1922 (*Epistles* 1381.4). The letter speaks of Arion/Orion being freed from some misfortune that had beset him. In the opinion of Bradbury (2004: 151 n. 78) this is about Arion, a philosopher from Ancyra; the recipient of letter 1381 had no jurisdiction over Arabia, nor any other connection with this province that we know of.

That both letters were addressed to the governor (Belaeus) currently governing the province of Arabia is a sign that the situations described in both letters were going on in precisely this city. Therefore, in spite of some doubts in the literature on the subject,[10] I believe that Orion served as the governor of Arabia (*praeses Arabiae*, according to P. Petit 1994: 185).

In the context of Orion's governorship, and that of his successor, Belaeus, the letter from Emperor Julian to the inhabitants of Bostra dated 1 August 362 is important. The emperor accuses Christians, in particular the clergy, of fomenting riots and plundering estates. It was the Emperor's opinion that, in this illegal manner, the Church was reacting to the abolition of a number of privileges. Julian also received a letter from the Bishop of Bostra, Titus, in which the hierarch stated that local Christians, who were comparable in number to pagans, were being restrained from violent acts by him and his clerics. The Emperor recognised that the letter proved the participation of Christians in the riots, and therefore encouraged the Bostrans to change their bishop.

The letter says nothing about Orion. Is it because the attacks on him came later, after 1 August? Did Julian know the situation with Orion, but not mention him, knowing that the pagans were committing the lawlessness? We do not know the answer to these questions, so we cannot date Orion's term of office by the date of the letter. We must remain with the cautious dating of P. Petit (1994: 185), according to whom Orion held the governorship at the end of Constantius' reign.

Nowhere does Libanius call Orion a Christian, but from the quoted passages of letter 763, it appears that Orion was one, though—judging from the description of his government, and as P. Petit (1994: 185) rightly notes—moderately so. The anti-pagan legislation of Emperor Constantius II (a series of edicts issued after 341, that, among other actions, prohibited public sacrifices, closed pagan temples, and banned magical practices)[11] was not during Orion's rule, or it was completely disregarded, or the authorities were not zealous in upholding and enforcing it. Since the governor was not a zealous follower of Christianity, and since he did not pursue a repressive policy against local pagans, it was not for religious reasons that he was persecuted. The persecutors were pagans, which Libanius did not explicitly write anywhere, but this follows from a few cautious (quoted) mentions, and principally those that talk about acting under the guise of serving the gods. So the religious motives were just a pretext, and the real reason for the riots was the opportunity for material enrichment.

The numerous quotes above relating to Orion's escape beg several further questions. Did Orion leave office as a result of attacks by local pagans? Did he flee to Antioch to seek help there from his influential friend, Libanius? Or was it that he was 'only' relieved of his property, but remained in Bostra under the protection of the new governor, Belaeus? We can only give a decisive answer to the last question, because only on this subject does the text (*Epistles* 819) leave us in no doubt (Norman 1992: 158–9 n. a). One hypothesised answer to the first question is as follows: Orion did not lose office because of the pagan attacks. We know this for the following

[10] According to Bradbury (2004: 168 n. 123), 'Orion's post is still unclear', if he was a provincial governor 'he governed his own province', which was against the law, but sometimes happened.

[11] *CTh* 9.16.4–6; 16.10.2, 4, 6 (eds. Mommsen and Meyers 1954).

reasons: firstly, nowhere did Libanius write about this (in complaining about Orion's misfortune, he would have above all mentioned him having lost his office); secondly, apart from exceptions, we do not know what the pagans' actions were that would have threatened the local authorities during the rule of either Julian or other 4th-century emperors (later, officials fled office, but as a result of great rebellions by circus factions: Filipczak 2004: 35–48). As for the second question, Orion's escaping to Antioch is only possibly intimated by a letter (763.3.1–2) that says that Libanius saw Orion with his own eyes (but only assuming that the quoted phrase is read literally and not figuratively). The strongest argument for an escape to Antioch stems instead from the logic of events: Orion, being under threat in Bostra, escapes to the Syrian capital to seek help from his influential friend, Libanius. However, this scenario cannot be reconciled with an indisputable fact, namely that Orion was being held in custody in Bostra.[12]

Belaeus

Between mid-362 and the beginning of 363, Libanius sent five letters to Belaeus (*Βηλαίῳ*).[13] In the first (*Epistles* 747), we read that Belaeus dignified his office by delivering speeches (*τῆς σῆς ἀρχῆς ἄξιος τῶν λόγων*) on the high regard he had for the great family of rhetoricians (*ἅπαν τὸ τῶν σοφιστῶν γένος*: *Epistles* 747.1), that he led the city to prosperity (*ποίει τὰς μὲν πόλεις εὐδαίμονας*), and that the law was then widely observed (*πᾶσι μὲν βεβαίου τοὺς νόμους*: *Epistles* 747.2). However, Gaudentios, who is known to both of them, is still waiting for justice (*νῦν γε δικαίως ἂν βελτίονος ἐγεύοντο τῆς τύχης*: *Epistles* 747.3). The fate of two of his relatives would now have to be improved (*τυχεῖν*: *Epistles* 747.4).

In two other letters (*Epistles* 762, 776), Libanius also intercedes for rhetorician friends Sopater (Janiszewski 2014e: 412 [*s.v.* Sopatros 4]) and Magnos (Janiszewski 2014g: 407 [*s.v.* Magnos 1]). Libanius had a debt of gratitude to the former (thanks to contacts among the authorities in Constantinople, Sopater had made it easier for Libanius to acquire local students: *Epistles* 762.1 i 2) and he therefore now asks him to look favourably (*ἡδέως ὁρᾶν*) on the matter concerning Sopater's parents (*Epistles* 762.4). In turn, Magnos, a school friend of Libanius, cannot assume inherited property (*πατρῴαν*), because of the actions of some adversaries (*τοὺς ἀντιπάλους*: *Epistles* 776.1), and because the case will definitely go before the tribunal, the right decision will need to be taken (*καὶ δικαστηρίου χρήζοντας εὐμενῶς δέχοιο*: *Epistles* 776.2).

In the next two letters to Belaeus (*Epistles* 763, 819), Libanius raises the matter of his old friend Orion: because both letters have already been analysed, here I look only at three fragments relevant to Belaeus' biography. Referring to the people attacking Orion and his family, Libanius makes the appeal that it was he, Belaeus, the man who had turned the teaching department into a jewel of power (*σὲ δὲ τὸν ἀπὸ τοῦ παιδεύοντος θρόνου πρὸς τὸν ψήφου κύριον*), who had stopped those evildoers (*Epistles* 819.4).

[12] It cannot ultimately be excluded that Libanius saw Orion in Bostra. Since, as he himself wrote (*Epistles* 819.2.2), he interceded in person with the governor of Arabia in the case of Orion, so in Bostra. But such a statement provokes further questions: would Libanius have gone to a province or city experiencing popular unrest? If so, why did he not write anything about it anywhere else? After all, nothing is known of Libanius' journey to Arabia from any other sources.

[13] Biographical notes: Seeck 1899: 197 [*s.v.* Belaios 3]; 1906: 97 [*s.v.* Belaeus]; *PLRE* I: 160 [*s.v.* Belaeus]; Sartre 1982: 104 [*s.v.* Belaeus]; Petit 1994: 54–5 [*s.v.* Belaeus]; Janiszewski 2014e: 111 [*s.v.* Balaios].

As for the treatment of Orion himself, a good administrator (*τὸν δ ‘αὖ ἄρχοντα καλόν, ἄλλως τε καὶ σέ*), Belaeus should arrange the law (*παρὰ τομς νόμους*) such that those who have fled could return from exile, and their estates, acquired as easily as Mysian plunder, could be returned to their owners (*Epistles* 763.6).

The quoted fragments prove that Belaeus served as governor of Arabia (the text refers to events in Bostra, the provincial capital, since it was the inhabitants of Bostra who had informed Libanius about Orion; the term *arché* thus refers to the office of the governor of the province and *dikasterion* to his tribunal). O. Seeck (1906: 97) and P. Petit (1994: 54–5) write that he held the office of *praeses Arabiae*. According to M. Sartre (2007: 57), the fervent pagan Belaeus was appointed governor of Arabia by Julian (as evidenced by inscriptions on milestones) in response to the actions of local Christians. Later, in March 363, leaving Antioch, Julian appointed the new governor of Syria, Alexander, in revenge for the insults that he suffered from the Christians in this city. In both cases he can be seen to act the same way.

Libanius’ letters only make it clear that Belaeus was in office when the attacks against Orion and his family occurred. Because the letter of Julian dated 1 August 362 testifies that riots between Christians and pagans had been going on for some time, Belaeus must have taken office before 1 August. Until when he held office is not known (if he were to have taken the customary year, or two at most, his service would have to have ended in mid-363 or 364 at the latest).

Before becoming governor he was ‘professeur d’éloquence’ (Petit 1994: 54–5), since during his tenure he showed proficiency in oratory and he was close to the rhetorical community. Libanius interceded with him most often in regard to other rhetoricians (Gaudentios, Sopater, Magnos). These were private matters, and it is impossible to say whether they ended as Libanius wanted or not. The example of Orion, for whom Libanius interceded three times and whose fate depended on Belaeus, indicates Belaeus’ intractability (or at least indifference) to the requests of Libanius (although the case of Orion, a former governor and a Christian, was probably exceptional). Both this fact, and calling out to Zeus while at the same time Libanius turned to Belaeus, prove that Belaeus was a pagan.

It is difficult to say whether the mention of prosperous cities and the rule of law resulted from the actual situation (two other letters talk about riots in Bostra, so one might doubt it) or from the letter-writing convention according to which Libanius had to appeal to the ideal of a just governor, in the hope of decisions in favour of his friends. It is certain that Belaeus had a certain apparatus of coercion and a prison service capable of carrying out torture, judging by the words of letter 819 (Filipczak 2006: 53–70).

Conclusions

Titulature and duties

Andronicus, Maximus, Orion, and Belaeus. We have no doubt that each of them was a governor of Arabia, although the identification of this office is nowhere based on technical terms (from 262, the province was governed by the equaestrian *praesides*), but is ‘extracted’ from general vocabulary and, above all, from context.

According to the reforms of Diocletian and Constantine (3rd/4th century), governors were stripped of power over the army, which was handed over to

provincial *duces*. However, as stated by some scholars, in less secure provinces of the empire (including Arabia), governors still commanded the military units (Jones 1964: 101). All situations discussed in this article refer to civil, legal, or judicial cases. They most often relate to restoring property to its owners, appointments of positions, and favourable treatment in various matters. There is not a single trace that would indicate military command or any other military tasks having been carried out by governors of Arabia between 354 and 363. My research confirms and supplements the findings of M. Sartre, who on the basis of epigraphical sources (but referring to governors other than those I discuss), determined that before the year 367, Arabia was governed by two officials, a *dux* and a *praeses* (*IGLS* 13/1: 134–135). Later, military and civil authorities may have been brought together in the hands of *viri spectabilis ducis Arabiae et praesidis* (according to the mention of *Notitia Dignitatum*, a source from the 4th/5th century: *Notitia Dignitatum* Orient 33, 36: 264 [ed. Faleiro 2005]).

Origins, Education

Two of them (Andronicus and Orion) bore popular Greek names, one a Latin name (Maximus), and one a name of unknown origin (Belaeus). Judging only by names, the first two must have come from the Greek-speaking, eastern part of the empire. Maximus is a name that appears on several dozen inscriptions from the Bostra region, most often for the earlier period, and sometimes for soldiers (*IGLS* 13/1: inscriptions 9342, 9343, 9002, 9396, 9266, 9415, 9232, 9112, 9358; *IGLS* 13/2: inscriptions 9536a, 9536b, 9570k, 9595, 9666, 9747, 9750, 9751, 9756, 9757, 9758, 9767, 9865, 9882, 9884, 9888, 9919). I doubt that our Maximus had recently arrived from the West in order to make an administrative career in Arabia. He is more likely to have been a descendant of soldiers or veterans, or some other Latins who had previously come to Arabia and been Hellenised there.

They must all have used Greek well, since they received correspondence from Libanius, and he himself called three of them (Andronicus, Maximus, Orion) his friends. Apart from Orion, whose education we know nothing about, the three others were well educated. It seems that Maximus should be counted among those few governor-rhetoricians who ruled in various provinces, and about whom Libanius writes during the reign of Julian (Libanius *Orations* 18: 159 [ed. Norman 1969]). Belaeus was a sophist before becoming governor; there are grounds to identify Andronicus as a philosopher.

Religious Identity

We know little about this, but it seems that the situation was varied, since the governorship was held by a Christian (Orion) and, perhaps straight after him, by a pagan (Belaeus). Although since the time of Constantine the number of Christian provincial governors increased, until 416 there were no formal obstacles to pagans holding the office (*CTh.* 16.10.21). In the case of the neighbouring province of *Syria Coele*, in 324–395, more-or-less half of the governors we know of believed in the old gods (Filipczak 2014: 164–6). The situation may have been similar in Arabia, all the more so that the region was probably less Christianised than northern and western Syria.

The Situation in Arabia in Julian's Times

The analysed letters give an

insight into the situation of individual families, mainly attesting to their material problems. It is true that, in the correspondence, we find signs of some abuse, probably by provincial officials, but this cannot be seen as proof of the impoverishment of the entire province.

Comparing Libanius' descriptions of the situation in Bostra with what Emperor Julian wrote on the issue, we must ask who really was responsible for the explosion of provocations in the provincial capital—whether it was pagans, as Libanius writes, or Christians, as Julian claims. Pagans rioted with a sense of impunity and the desire to enrich themselves on the property of Christians (Libanius stresses it so many times that it is hard to doubt); as for Christians, we are not sure. Julian's argument is confused and unconvincing, and is based on a peculiar, twisted interpretation of the words of Bishop Titus. Libanius, who was after all a pagan, did not accuse Christians of rioting in Bostra. If the Christians really took part in some of the events, then it may have been only in self-defence. In any case, Libanius' letters do not attest to any revolt.

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A Cave to Live and to Pray In: The Topography of Monastic Hermitages in the Valleys of Nebo

Introduction

Interest in Christian hermitages has assumed considerable importance in recent decades due to a broader understanding of monasticism in Late Antiquity (Brooks Hadstrom 2018). The analysis of archeological evidence, together with the topographical survey of the landscape, allows for the reconstruction of the settlement dynamics of early Christian hermits. Moreover, the study of the material culture provides new information on the practical aspects of monasticism and its interaction with the territory. Recent research has also indicated that the distinction between the hermitic and coenobitic monasticism, by which these two forms could be antithetical, is nowadays less strict (Rapp 2016: 95–9). Indeed, archaeological evidence testifies that hermitages and *coenobia* could share the same environment and landscape, as in the case, for example, of the Nebo region (Bianchi 2018; 2021: 19–22).

The aim of this paper is to focus on the architectonic typology of the hermitages in the Nebo region. The peculiar features of these monastic structures, consisting of both rooms carved out of the natural rock and rooms built in masonry, will be analysed.

The Archaeological Evidence

Mt Nebo is located in Jordan, *ca*. 7 km northwest of Mādabā, and it reaches an altitude of 800 m on the Balqa' plateau. The archaeological ruins of the village of Nebo and the Memorial of Moses stand on the top of the two western peaks of the mountain, respectively Khirbat al-Mukhayyaṭ and Ṣiyagha (Saller 1941a: 1–5). At the foot of Mt Nebo there is the *wādī* of 'Uyun Musa with a spring, which flows for some kilometres into a lush valley (Fig. 1).

Literary sources, in particular the travelogues of Egeria, who visited the place at the end of the 4th c. AD, and the text by

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1. The *wādī* of ʿUyūn Mūsā with Mt Nebo in the background (photo by the author).



2. The rock caves in ʿUyūn Mūsā (photo by the author).



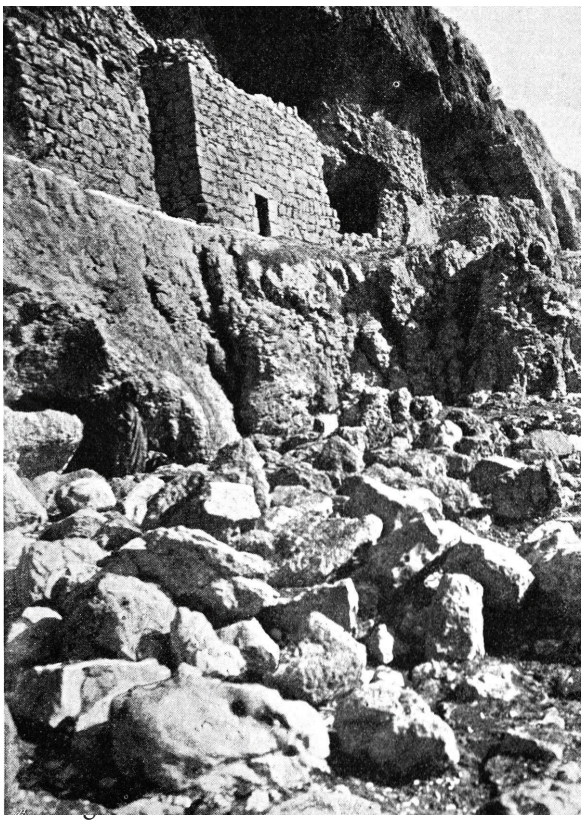
3. The rock caves in ʿUyūn Mūsā (photo by the author).

the anonymous pilgrim of Piacenza (6th c. AD) attest a hermitic presence in the Nebo Region (Piccirillo 1998: 193–4). The oldest nucleus seems to be that of ʿUyūn Mūsā. Egeria effectively mentions that these monks were called 'ascetics',[1] thus specifying their particular way of life (Judge 1977: 80). Further on in the text, the pilgrim recalls that the monks lived in monastic cells named *monasteria*.[2] It is worth mentioning that the semantic origin of the Latin word *monasterium*, deriving from the Greek verb μονάζω (to live alone), refers to structures for a single monk (Talbot 1987: 231; Liddell and Scott 1996: 1143).

The territorial surveys carried out by Saller in 1933–1935 in the ʿUyūn Mūsā valley have reported the presence of numerous caves, which were identified as possible hermitages inhabited by ascetics (Saller 1941a: 187–93). These cavities, located on the northern slopes of Mt Nebo, rise halfway up and are mostly square or rectangular in shape. They consist of a single room that is not very deep and from 1.5–2 m high. Some structures have two communicating rooms and the internal walls show signs of human activity (Figs. 2–3). In some caves, pottery sherds dated to the Byzantine period (mostly 5th c. AD) and small pieces

[1] 'Very many truly holy monks, whom they call here ascetics, live there' (*Itinerarium Egeriae* 10.9). For the translation, see McGowan and Bradshaw 2018: 124.

[2] 'So, there in the middle between the church and the monastic cells flows from a rock abundant water, very beautiful and clear, with excellent taste' (*Itinerarium Egeriae* 11.2). For the translation, see McGowan and Bradshaw 2018: 124.



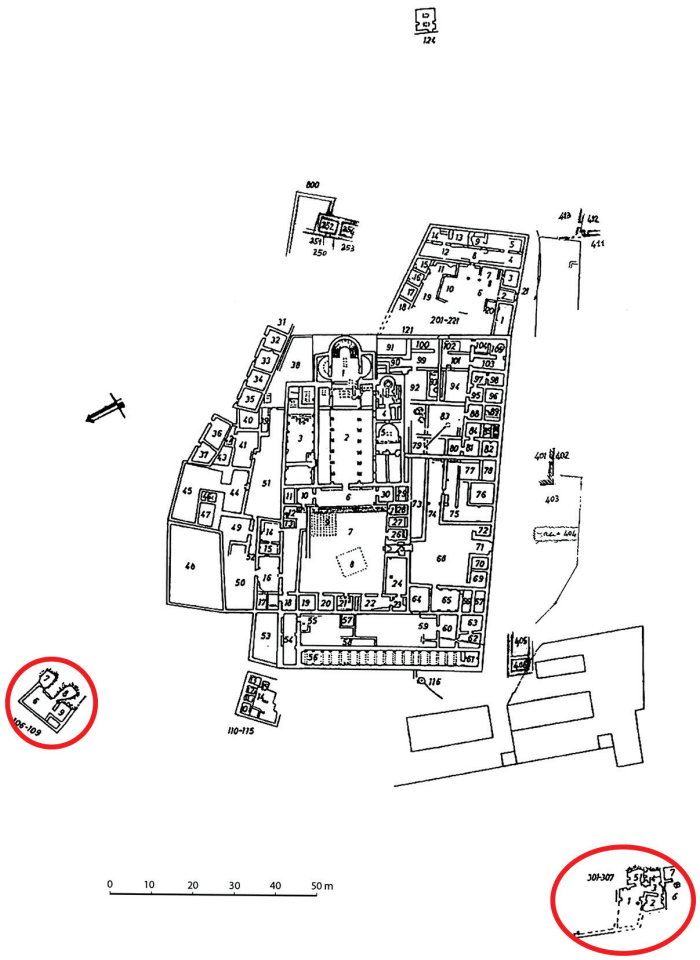
(Saller 1941a: 189–90). The ceiling in many cases today shows a thick blackened layer of smoke attributable to fireplaces. This practice, forbidden to hermits, suggests a later occupation of these rooms by Bedouins or local shepherds.

One photo in the book *Arabia Petraea* by the Czech theologian and orientalist Alois Musil, provides an interesting documentation of the status of these cave-hermitages in the second half of the 19th century (Fig.

4. The cave-hermitages in ʿUyūn Mūsā with facade masonry in the time of A. Musil (after Musil 1907: 345 fig. 163).

5. Ruins of the facade masonry of the cave-hermitages in ʿUyūn Mūsā in 2018 (photo by the author).





6. Map of the monastery of Ṣiyyagha showing rock hermitage nos. 106–109 and the hermitage of Procapis (edited by the author).

4; Musil 1907: 345 fig. 163). The scholar, describing the landscape of ʻUyūn Mūsā, refers to several natural and artificial caves that served as chapels for monks, which in his time were inhabited by some people of the Ṛanamât-Belḳâwijje Arabic tribe (Musil 1907: 345–6). The pictures show that one of the caves had an artificial external wall created to close frontally the rock cavity, perhaps in order to make the inhabited rooms safer. Musil suggests that in the Nebo valleys this peculiar architectonic type of hermitage was widespread (Musil 1907: 346). These walls were also documented during the archaeological campaign of Saller, although in an evident state of decay, and in recent times as well (Fig. 5; Saller 1941b: pl. 13).

Although this type finds interesting parallels in the Judaean Desert, in particular in some hermitages of the Great Laura of Mar Saba (Patrich 1993: 233–43), a similar configuration characterises the so-called ‘cave-hermitages group nos. 106–109’[3] on

[3] For convenience, reference is made to the numbering of the rooms in Saller 1941b: pl. 161.

the north-western slope of Mt Nebo, near the *coenobium* dedicated to Moses (Fig. 6). This cave complex may have preserved the original form of the first hermitages in the Nebo valleys.

The area in front of the caves no. 107–108 has been cut to create a large flat area on which two rooms were built. Cave no. 107 is about 3.95 m long and 2.90–3.75 m high. The entrance to the cave was walled up, except for an opening originally used as a door, which was later closed. Internally, the cavity was purportedly lined with masonry and its walls were plastered (Saller 1941a: 188–9). The latter architectural structure suggests that this cave, originally used as a shelter for a hermit, was subsequently transformed into a cistern.

Cave no. 108 was found closed with five stones and its interior is very irregular. The entrance is about 90 cm wide and 110 cm high. Its walls have preserved no traces of plaster or masonry. During the excavation, an important layer of black soil partially filled the interior; after removing that, some human bones, a shell, a ring, and a few clay sherds were discovered (Saller 1941a: 189–90). These elements characterise the cave as a burial place.

Room no. 106, located in front of the entrances to caves no. 107 and no. 108, was built using part of the natural rocky slope of the mountain and partly with stone masonry. The internal wall surface was plastered and the floor was paved with plain white *tesserae* (Fig. 7). The two stone benches found against the eastern wall suggest that the room was a portion of the



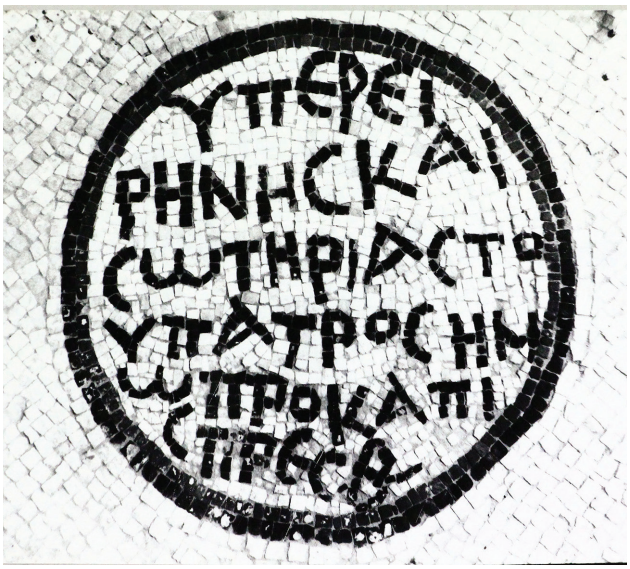
7. Mosaic floor of room no. 106 and entrances to caves nos. 107 and 108 (© SBF Jerusalem).



8. The hermitage of Procapis (photo by the author).

monk's dwelling. In the southern wall, an opening allowed entrance to room no. 109. The eastern and northern walls of the latter room were created by cutting into the rocky slope of the mountain, while the western and southern ones were built of masonry. The floor is also made from native rock. Pottery sherds and coins found in room no. 109 point to an occupation during the early Byzantine period (5th c. AD; Saller 1941a: 191). It, therefore, seems reasonable to assume that this group of caves and rooms could not have been for, and inhabited by, coenobitic monks, but by hermits.

The survey by Piccirillo and Alliata identified another hermitage located on the south-western slope of Mt Nebo dated, according to the types of pottery found during the excavation, to no later than the 6th c. AD (Piccirillo and Alliata 1990). This structure, consisting of four rooms, is partially rupestrian with additions in masonry, and it includes a paved courtyard obtained by cutting the tophaceous rock of the mountain for about 1 m to the north and east (Fig. 8). Remains of a collapsed mosaic floor suggest the presence of a second storey floor that fell completely into the room below. From the northern side of the courtyard, a small corridor with a mosaic floor connects the entrance of the hermitage. Two rooms to the east and one to the west of the corridor are all internally characterised by rocky benches, probably used as seats by



9. Hermitage of Procapis, mosaic floor with Greek epitaph (© SBF Jerusalem).



10. Ruins of masonry located in front of the rock cavity at 'Agri Specula' (photo by the author).

monks (Piccirillo 1998: 200). On the other side of the corridor, there is the northern room, which is the centre of the complex. This room has a two-stepped bench, a small cistern dug entirely out of the bedrock and a mosaic floor with a Greek epitaph recalling the monk and hegumen Procapis (Fig. 9):

> *Ὑπὲρ εἰ/ρήνης καὶ / σωτηρίας το/ῦ πατρὸς ἡμ//ῶ(ν) Προκαπι/ς πρεσβ(υτέρου)*[4]

A noteworthy element of this inscription is the designation 'our father', which according to L. Di Segni (1998: 438) was usually used in the epigraphic contexts to refer to hegumens. In this sense, the scholar supposes that this epitaph refers to a monk who held the *coenobium* of Ṣiyyagha. Although the inscription would suggest the presence of a tomb, no burial place has so far been identified. However, it should be noted that the entire hermitage has not been investigated archeologically.

A survey carried out by the author in summer 2018 allows for the identification of another possible group of hermitages on the summit opposite Ṣiyyagha, known from the biblical text and from Egeria with the toponym '*Agri Specula*' (Numbers 23.14; *Itinerarium Egeriae* 12.10). In this case too, the top of the rocky mountain has some natural caves that show signs of human activity. In front of the rocky cavity, courses of a regular masonry 2.5–3 m long and linked to the rock were found (Fig. 10). These walls seem to be pertinent to three rooms built in connection with the caves. Two of the rooms seem to be interconnected, as shown by the finding of a threshold. The proximity to Ṣiyyagha, as well as the same architectural configuration, suggests that these structures could be of the same type of the hermitage as the nos. 106–109 group. It is also important to remember the presence of a huge cistern not far from these structures that could have been the water reserve for the survival of the monks.

Discussion

The archaeological evidence of the Nebo Region shows that these hermitages had several rooms. Although one of them could have been for the dwelling of the monk and the other for prayer, the presence of two rooms could also suggest that these spaces were shared, perhaps by two or more monks, as seems to be reflected in the literary sources. Regarding the two hermitage-cave of the group nos. 106–109, Saller had already postulated that one room may have been inhabited by a master in the ascetic life, while the other by one of his disciples (Saller 1941a: 191–2). The custom of two monks living together occurs in some episodes of the *Spiritual Meadow* by John Moschus (*ca.* AD 550–619) as, for instance, in chapter 93. The text mentions Abba George's visit to a hermitage located near the village called Bethabara, about six miles from the Jordan River, at the time of the Emperor Tiberius II (AD 574–582). The anchorite Abba Sisinios, who declined a bishopric, and his disciple, lived in the same place and were later buried together (John Moschus 93, trans. Wortley 2008:75–6).

Hagiographic narratives also allude to the same practice, as in the *Life of Symeon the Holy Fool* by Leontius of Neapolis in the 7th c. AD. Symeon and John, who was to be his companion, met and became friends while on a pilgrimage to Jerusalem. The text emphasises that the two monks decided to devote themselves entirely to the monastic life, sharing the same living space in the desert (*Symeon the Holy Fool* 137; trans. Rydén 1963: 137, 16–9; Cesaretti and Hamarneh 2016: 120–1). Cyril of Scythopolis recalls another example in the *Life of Euthymius* (9–10; trans. Schwartz

[4] 'For the peace and preservation of our father Procapis the priest' (*SEG* 40 1990: no. 1537). See also Di Segni 1998: 438–9 no. 35.

1939: 21). Euthymius, together with Theoctistus, reached a natural cave in a gully of Wādī el-Muqallik (Dayr Muqallik), which after being blessed by their prayers, was transformed into the church of the *coenobium* at the beginning of the 5th c. AD (Kühnel 1984; Goldfus *et al.* 1995: 249–56). Later in the text, Euthymius and his pupil Domitian settled in a small cave at Mishor Adummim, which became the central point of the Euthymius monastery and the common burial place for the two monks (*Life of Euthymius* 14; trans. Schwartz 1939: 23–4; Hirschfeld 1993: 340–4).

In the last decades, several hermitage caves in the territories beyond the Jordan River have been identified, but the majority of the cells are carved into the mountain, often developing one or more natural cavities (Waheeb *et al.* 2011; Hamarneh 2014: 362). On the other hand, the groups built on the top of Ṣiyyagha consist of natural rock cavities to which one or two rooms were added externally. Although simple in shape, the interior often has benches carved from the rock, while some masonry rooms have a mosaic floor. The hermitages could also have several rooms, in some cases communicating, and in that of Procapis, an upper storey was built. The latter seems to suggest that the structure was used by a monk of a high status, maybe a hegumenos, and destined for long-term occupation. Monks may have preferred this type, including both the rock cave and the masonry, because of the proximity to the *coenobium*.

It is worth saying that the monks' secluded spaces contributed to modelling the sacred geography of the Nebo region. This pattern differs from the rock hermitages in the Lisan peninsula or in the valley of the Dead Sea, which refer more to the *Laurae* model or to temporary shelters for the ascetics (Politis 2001). The cave-hermitages of the ʿUyūn Mūsā, although in a worse state of conservation, could have shared the same typology as those on the top of Ṣiyyagha, in particular, the one that has two communicating rooms (Piccirillo 1998: 217).

Conclusion

In light of these considerations, the continuation of the research on the Nebo hermitages is desirable in order to lead to a more comprehensive understanding of the hermitic phenomenon of this region. Moreover, the importance of this task is necessary due to recent construction activities in the valleys of ʿUyūn Mūsā, which are undermining the integrity of the archaeological sites and, unfortunately, compromising the original landscape of this territory.

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Urbanism in the Late Antique Decapolis: Jarash and Scythopolis Compared

Introduction

In this paper, I compare the Late Antique (4th–8th c. AD) remains of Jarash (ancient Gerasa) with that of Scythopolis (modern Beisan).[1] Both cities were described as being a part of the Decapolis, which were cities united by a shared culture and special administrative status. Possibly established by Pompey in 63 BC, but definitely by the early empire, the Decapolis was connected to the Roman province of Syria (Parker 1975; Isaac 1981). Over time, Decapolis came be used as a geographic term. Located in the northern hills of the Transjordan, all but Scythopolis lay on the eastern side of the Jordan (Kennedy 2013). Though many of the Decapolis cities have been excavated over the years, none have been explored as extensively as Jarash and Scythopolis. This makes these cities invaluable for comparison.

Both cities underwent expansive building programs in the 1st and 2nd c. AD. In Jarash, temples, especially those of Zeus and Artemis, dominated the city. A *cardo* with two intersecting *decumani* defined the civic plan. In Scythopolis, the terrain did not enable a true Hippodamian plan, but the civic center was also delineated by monumental streets located between the city's acropolis (the Tall) and the Roman period theater. In both cities, population boomed in the first three centuries AD, and overall, the development of these two cities followed similar patterns in this period (Ward 2020: 100–13).

While the development of these cities were similar in Late Antiquity, the differences between them are also stark. For example, at least 20 churches have been discovered in Jarash, whereas only one has been discovered in the civic center of Scythopolis. This lone church stood not in the classical heart of the city, but on the Tall.

[1] This paper is a summary of Ward 2020: 113–34.

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Another major difference is that Scythopolis was the capital of a Roman province, which meant that the imperial authorities spent lavishly on its urban plan and constructions in the city. At Jarash, the most important non-residential building projects of this period were religious in nature—the aforementioned Christian churches and, under Muslim rule, a mosque in the center of town.

Jarash

Jarash continued to be a prosperous city in late antiquity, and unlike some other cities of the region, such as Scythopolis, its increasing Christian character can be easily charted through archaeological remains. At least 20 churches have been discovered in the city, most of them dated through building inscriptions (Crawfoot 1938; Clark 1986; Seigne 1992). Although they are found throughout the town, including on the eastern side of the river, the majority are clustered around the Temple of Artemis (March 2009: 119–30). Thus, the conversion of substantial numbers of people at Jarash to Christianity led to a change in the focal point of the city. The plan of the *cardo* and North and South *Decumanus* remained intact, but the uses of those roads changed significantly. After the city came under control of the Muslims, they too left their mark. The churches appear to have been largely undisturbed, but a substantial mosque was built right in the heart of the city at the corner of the South *Decumanus* and the *cardo*.

In addition to the growth of churches and the closing of temples, the changes to the city in late antiquity were substantial (March 2009). For example, the hippodrome, which was already being used for manufacturing by the late 3rd century, continued to be a site of industrial use, but the northern end was converted into an arena (Kehrberg 1989). Formerly public buildings, such as the *temenoi* of the Temples of Artemis and Zeus and the Northern Theater, were occupied by industrial production as well. The Temple C *temenos* was divided into living quarters (Kehrberg-Ostrasz 2018: 120–3). The building of churches also transformed previous public areas, with the Cathedral completely obscuring the remains of the Temple of Dionysus-Dusares, and the Propylaeum Church's construction blocked the northern bridge across the river (Kraemer 1938: 139–49, 176–234; Brizzi *et al.* 2010). Almost every quarter of the city saw increased population density, but this was true especially around the South Tetrapylon, which became the focus of the city during the Islamic period (Blank *et al.* 2010).

The increasing population density meant that much of the open space that characterized the earlier Roman city disappeared. For example, the open spaces of the temple precincts were occupied with either living spaces, churches, or manufacturing. The streets seem to have become narrower as more residential structures were built that encroached on public spaces, for example in the domestic complex north and west of the Church of St Theodore which reduced the street to an alley. Winding roads, rather than straight ones, cut through these residential complexes. The curved roads followed the topography instead of cutting through and across it, which diminished wind effects and permitted the higher population densities characteristic of this period (Stott 2018).

Another feature of the Late Antique city was the growth of industry (Kehrberg-Ostrasz 2018). Once the hippodrome was no longer used as an entertainment facility, industrial activities returned to the area. Pottery kilns and simple dwellings were found in the *cavea* chambers of the hippodrome where mass production of pottery, tiles, pipes, lamps, figurines, and Jarash bowls was located, and tanneries and lime kilns (for preparing animal skins) were also operating. These installations were

abandoned at beginning of the 7th century (Kehrberg 1989). The North Theater was used as a dump from the mid-6th until the 8th century when pottery production began on the site. Occupation ended in the late 9th or early 10th century (Ball *et al.* 1986; Clark *et al.* 1986; Schaefer and Falkner 1986). By the late 6th century, the *macellum* had been converted to industrial uses. The north and west side of the market was turned into a dye manufacturing center. Sections of the market were now used for storage and stables, possibly because animal products were used in the dye-making process. Portions of the floor were removed to create an in-ground lime kiln (Martin-Bueno 1989; Uscatescu and Martin-Bueno 1997). In the early Islamic period, two pottery kilns were found across the *cardo* from the Temple of Artemis along with a blacksmith shop, which continued into the 8th century. Recent research stresses the continuity of the industrial activities during the Late Antique period in the city (Lichtenbeger and Raja 2019).

There is no evidence of a stark break between the period of Roman and early Islamic rule, instead, the growth of population that is evident in the 6th century seems to have continued unabated until the 8th century, when it seems that population reached its height in the city. Evidence of 8th century Jarash is present in almost every excavated location around the city; however, little information of this later occupation was recorded by the earliest and most extensive excavations of the city (Gullini 1984: 27–8). New excavations in the northwest sector of the city are revealing rich occupation layers from the Umayyad period, including multi-story houses that were destroyed by the earthquake of 749, though occupation continued long after this (Lichtenbeger and Raja 2018a; 2018b).

Archaeology of the early Islamic period in Jarash demonstrates that settlement patterns were changing. For example, Umayyad houses share a courtyard, such as those just north of the South *Decumanus*. Their plan is irregular because they used previous Roman period walls as foundations. These residences cut into the hill to the north, where a retaining wall was constructed. The houses opened onto the South *Decumanus* between two shops, indicating that commercial life on this street continued unabated (Gawlikowski 1986).

The intersection of the South *Decumanus* and the *cardo* became the focal point of the Islamic community with the construction of a large mosque in the 8th century. This mosque was framed by the South *Decumanus* to the north and the *macellum* to the south, and the *cardo* to the east. The entire area around the mosque was occupied by domestic structures. An alley ran along the west wall of the mosque, with multiple dwellings surrounding an open courtyard. This area was continuously used even after the earthquake of 749 as there is evidence of repair of earthquake damage. Umayyad and Abbasid shops were found east of the *cardo* across from the mosque. There was also a large building just behind them—perhaps originally Umayyad, but maybe even earlier—which was remodeled after the earthquake (Blanke *et al.* 2010; Rattenborg and Blanke 2017).

Scythopolis

Scythopolis achieved its largest population size in late antiquity, likely during the early to mid-6th century. In fact, its population may have doubled to around 30,000–40,000 people, possibly making it the third largest city in the southern Levant. Domestic structures expanded over sections of the city that were previously uninhabited, especially on Tall Iztaba. A church and houses replaced the town acropolis and temple on the main Tall. Additionally, the city wall was constructed sometime in this period, increasing intensification inside the city and suburbs were built beyond the city

walls. Buildings from the late 5th and early 6th century emphasized the importance of the city, as it was the capital of Palestine Secunda, a province created in the late 4th century.

The city was heavily impacted by the earthquake of 363, as excavation reports describe extensive damage throughout the civic center from the mid-4th century. Most of the structures were reconstructed around AD 400, with the exception of the pagan structures. Examples include the *nymphaeum*, the *propylon* leading from the Northern Street to the Tell, the portico near the eastern bathhouse, and the theater (Tsafrir and Foerster 1997: 108–16).

Evidence of population growth is quite evident outside of the monumental civic center in almost every section of the city. Tall Iztaba was inhabited for the first time since the Hellenistic period, and several churches were built on it (FitzGerald 1939; Mazor and Bar-Nathan 1994). The Tall was completely rebuilt with large numbers of domestic structures and a circular church (FitzGerald 1931: 50–3; Mazar 2006: 40–2). Domestic structures and a bathhouse were built between the theater and the hippodrome. This marks the first time this area of the city was inhabited. Silvanus Street was lengthened in the early 6th century, connecting this new residential zone with the monumental civic center. One gets the impression that there was a rapid construction of domestic structures throughout the entire city, with the exception of the civic center, throughout the 4th through 6th centuries. It is possible that the construction of the western bathhouse, completed by the end of the 5th century, was necessitated by the rapid growth of the population (Tsafrir and Foerster 1997: 99–106).

Extensive roadwork must be connected to the expansion of the population of the city. The civic center was repaved, beginning with Palladius Street, named after the governor Palladius who built the facing portico, which stretched from the theater to the Northern Street. It was lined with the aforementioned portico, with a mosaic sidewalk, and commercial shops just beyond this. In 515/6, Silvanus Street and an associated basilica (Silvanus Hall) were constructed along the northeast side of the civic center over the previous Roman period road and blocking the entrances to the Roman shops located along the road (Tsafrir and Foerster 1997: 121–5).

The layout of roads is an important difference between the Late Antique and earlier Roman periods. Whereas the Roman roads were generally straight and angles were disguised with tetrapylons, arches, or other monuments, the Late Antique builders were willing to employ curved roads that followed terrain, rather than cut through the town's topography, as at Jarash. Silvanus Street is a good example of this, which curved from the civic center to the new southern residential area.

In the 5th century, a large trapezoidal agora was constructed over the ruins of the basilica and the previous Roman temple. Porticoes with decorated mosaics were built along the inside walls of the agora. It was remodeled at the beginning of the 6th century, perhaps in response to the constructions just across Palladius Street. In the reign of Anastasius, the governor Theosebius and the *protos* Silvinus embarked on a transformation of the northern part of the civic center. They replaced the mosaic and some of the shops in the center of Palladius Street with a new semi-circular plaza, which they named "the Sigma." This semi-circular plaza contained 12 new shops or offices, each richly decorated with colorful mosaics with a portico covering the entrances and sidewalk in front of the shops. In order to construct this plaza, the builders removed portions of the nearby wādī bed and the structures standing on it, which included the odeon, already abandoned at the time

of the Sigma's construction (Tsafrir and Foerster 1997: 121–2).

Literary sources, such as Epiphanius, describe Scythopolis as a Christian, though Arian, city in the 4th century, but there is little archaeological evidence to suggest that the city had converted to Christianity by then (Epiphanius *Panarion* 30.4–12). One suggestion that paganism was dying by the late 4th century is the lack of evidence that any of the temples were rebuilt or restored after the earthquake of 363 (though there is not much evidence that they were damaged by the earthquake either; Heyden 2010: 312–3). A parallel to this situation exists at Petra, where the structures associated with pagan worship were also not restored after the 363 earthquake (Ward 2016). Looking at the two entrances to the Tall suggests, however, that the city had turned away from paganism. While the *propylon* off the Northern Street was restored, the one which connected the civic center to the Temple of Zeus was rebuilt as an industrial complex with pools and water pipes (Tsafrir and Foerster 1997: 106–16).

Currently, no Christian structure has been discovered inside the Roman civic center of the city. It is possible that the large putative temple to the north of the theater contained an undiscovered church, but so far Christian structures from within the civic center have eluded archaeologists. The large round church located on the Tall, however, would have dominated the scenic views of the city (FitzGerald 1931: 18–33). As this structure replaced a pagan temple to Zeus Akraios (possibly destroyed in the 363 earthquake), perhaps this church alone was deemed sufficient to demonstrate the Christianization of the civic center? Or maybe the civic center was kept clear of Christian structures because of the mixed population of the city that included Jews and Samaritans? Or perhaps there were no open spaces around the civic center like those that existed around the Temple of Artemis at Jarash.

However, evidence of Christianity is abundant throughout Tall Iztaba, including three churches and the Monastery of the Lady Mary. One church was also located within the city wall, located 400 m east of the Monastery. Two churches are known to the north of the wall; one was built to the northeast of the city in 522 in the Monastery of Abba Justinus (FitzGerald 1939; Mazor and Bar-Nathan 1994).

An earthquake seems to have heavily damaged the city in the late 6th century or the early 7th century. It caused severe damage to the city that was never repaired. For example, Silvanus Hall was leveled and the portico of the Byzantine agora and Sigma were irreparably damaged. It is also possible that the columns of Palladius Street fell at this time. The last known repair of the street occurred sometime after AD 565, helping to date the earthquake to no later than the mid-6th century (Tsafrir and Foerster 1997: 125).

With the passing of control of Scythopolis from the later Roman to Islamic authorities, the town lost much of its importance. Whereas it had been the capital of a wealthy province under the later Roman Empire, the Islamic conquerors completely transformed the provincial government of the Near East, moving the capital of the region to Tiberias (Walmsley 1987). Scythopolis, now known as Baysan, was just another city in the *Jund al-Urdunn*, as this new province was called. This transformation meant that there was no longer imperial money to improve the city, though the major monumental features of the city remained in use and standing for over a century until destroyed in the earthquake of 749.

Though the changes that took place in the city in the early Islamic period are hard to date, there are numerous obvious trends. First, many of the monumental structures were occupied by industrial pur-

suits. This included the domed chamber of the *frigidarium* (cold room) of the eastern bathhouse, the theater which was used for ceramic production, the western bathhouse which contained a large number of open air ovens (*tabuns*), the Byzantine agora which had numerous pottery kilns, and the entrance to the amphitheater which also had large pottery kilns. Along almost all the streets, shops had encroached onto the sidewalks, dramatically narrowing the size of the thoroughfares. Makeshift buildings were constructed in what were previously public spaces, such as in the plaza in front of the Central Monument. Walls were built along Valley Street, narrowing it significantly (Tsafrir and Foerster 1997: 135–41).

In the early Islamic period, the Tall's plan was completely altered. The circular church, the Byzantine period road, and residential complexes were all replaced with a planned community, which had two roads that intersected in a right angle at the southwestern sector of the Tall. These roads ignored the topography of the Tall and ran in straight lines. Little dating evidence was recovered or published, but the most recent evidence suggests that this early Islamic period remodeling occurred prior to the earthquake of 749. An early Arabic inscription dated to AD 806 confirms that the church destruction occurred sometime prior to that date (FitzGerald 1931: 53–7).

There was also some remodeling of the civic center during the early Islamic period. In the middle of the 8th century, a long line of shops was constructed on top of the remains of Silvanus Hall. These builders removed and then rebuilt the Byzantine arcade by reusing the marble bases, shafts, and capitals. Just behind the shops, another portico was erected, with an arched passageway connecting the new *suq* with the rear portico. A large mosaic was discovered which contained the *shahada,* the Muslim declaration of faith, and another mosaic declared that the complex was built during the reign of caliph Hisham ibn Abd al-Malik [724–743] by the governor Ishaq bin Qasbisa (Khamis 2001).

So far, no mosque has been discovered in the civic center, unlike at Jarash, for the Umayyad period. It is possible that an earthquake damaged the Sigma, as it was deserted around AD 700 when building elements were removed and used nearby. The area of the Sigma became a cemetery in which approximately 400 Muslim burials were discovered. Nearby Palladius Street was covered by alluvial soil. The columns from the street were placed in the former roadbed at ninety degree angles to the road to support run off agriculture in the street (Tsafrir and Foerster 1997: 135–41).

Conclusion

In late antiquity, the populations of Jarash and Scythopolis expanded from the Roman period. Both cities suffered damage from the 363 earthquake, but this damage was most heavily felt in Scythopolis. The late 4th century, there was a time of increased building in that city to repair damage from the earthquake. Scythopolis also became capital of an imperial province around that time, which is clearly indicated by the number of buildings constructed by Roman governors there. Jarash increasingly became a city of churches, several of which occupied the space around the Temple of Artemis. There are no surviving churches from the civic center of Scythopolis, but on the Tall a Christian church replaced the Temple of Zeus. The importance of Scythopolis for the imperial administration is perhaps shown by the continued construction of non-religious structures there, such as the Sigma, but there is little similar evidence from Jarash. There is little evidence that the Muslim conquest substantially impacted either city, at least initially. At Jarash, a congregational mosque was built in the heart of the civic center and was surrounded by new shops. A new commercial district

was also constructed in Scythopolis during the early Islamic period, but other sections of the civic center were being abandoned. These cities provide further evidence for understanding the transition of the classical polis to the Islamic *Madina* and appear to support the conclusions of Avni that the transformation of cities in late antiquity was unique to each city (Kennedy 1985; Avni 2011; 2014).

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A Sundial Discovered in Amman Citadel in 2009

Introduction

Amman Citadel has the largest archaeological remains in the core of the city. A sundial was initially discovered by Husam Hejazeen and Yazid Olyan (2005–2007) west of a Roman paved road, running in the 'bat steps' style up to the Hercules temple. The Byzantines, who occupied this complex more than 1600 years ago, reused the architectural elements from previous eras but failed to reuse the artifacts containing the sundial, a technological tool used for measuring time. To create the sundial, the artisan used a well-dressed stone, carving an accurate design in both shape and measurements in the Roman-Byzantine style. The sundial has to be situated in an unobstructed place either in a high position or in the center of a complex to observe the time by the position of the shadows formed on the sundial by the vane. In a complete sundial, the bronze vane is fixed in the center of the hemispherical stone in the upper horizontal position, but unfortunately in this sundial, just the fixed part of the metal rod is still preserved in the dressed stone. It was the work of a professional engineer and/or astronomer to incise accurate lines on the base to be able to measure time. This study will focus on the discovery of the sundial and the scientific ways of using rays from the sun for measuring time.

The ability to tell time has long been necessary for agricultural production. From the Paleolithic and Neolithic periods, human beings discovered that to grow plants and cereals special seasons were needed. To take advantage of the seasons you needed to measure time. Jumping forward in time, monasteries were usually built in rural areas to support the monks in their lifestyle and in meditation. Their activities and ceremonies usually took place outside, allowing them to observe the movement of the sun, moon, and stars, encouraging them to become more scientific in their observations.

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Although it has often been assumed that the vineyards were owned by the Church, it was later discovered on mosaics from the Byzantine period that the inscriptions inscribed on them were names of farmers who owned the vineyards, not the Church. It was the farmers, therefore, that built the churches on their land for God to give them blessings for successful harvests.

The sundial from Amman was presented at our first Archaeological Workshop, which took place in the Al-Hussain Park in cooperation with the local communities and under the umbrella of The Friends of Archae-

ology and Heritage. Its discovery sheds light on reuse strategies in the Late Roman/ Byzantine period in Amman Citadel.

Shape

In general, a sundial consisted of a round plate with a rod known as a gnomon fixed vertically in the middle. Lines were drawn equally on the plate radiating from the gnomon to the edge of the plate showing the 12 hours of each day. Time is indicated by a shadow cast by the sun rays on the gnomon. As the Earth turns on its polar axis, the sun appears to cross the sky from east to west, causing the shadow made by the gnomon to move, indicating the passage of time. The two commonest sundials used were the horizontal, commonly found on pedestals, and vertical, found attached to walls of buildings and churches. There was also the polar sundial aligned with the axis of the earth. Furthermore, sundials had different types of surfaces to receive the sun rays which could have passed through a small hole to increase accuracy or reflected from a small circular mirror. An example of this can be found in a church in the city of Rome today.

Historical Background of Ancient Technology

The earliest sundials known from the archaeological record are shadow clocks (1500 BC)[1] from ancient Egyptian and Babylonian astronomy. The world's oldest sundial comes from Egypt's Valley of the Kings (Fig. 1). A new study reports on the discovery in 2011 of a carved sundial on top of a Bronze Age grave in the Ukraine that is both horizontal and analemmatic (horizontal sundial with a vertical gnomon that is not fixed, but must change positions throughout the day), and now known to be the oldest analemmatic sundial (Vodolazhskaya 2013).



1. World's oldest sundial, from Egypt's Valley of the Kings.

A stele or a standing stone monolith sometimes served as an astronomical marker for the rising and setting of the sun. In Nabta in the Egyptian Nubian Desert, a stone circle made of small upright stones is probably the oldest monument discovered that was used to observe the moon, stars, and sun (Late Neolithic period, *ca.* 7000–5000 BC). Egyptian obelisks could have been used at temples that honored the Pharaoh to determine the time of feasts and offerings. The simple movement of the sun along the horizon is the religious aspect of the god Re who assists the goddess Nut in performing the task of self-creation (Wells 1992: 305–26; Clegett 1995; 1999; Malville

[1] More than 200 Byzantine churches have been identified by excavators (Ababsa 2013: 164). Upon reading the inscriptions, one realizes that the Christian community had a lot of zealots, landowners, farmers, and benefactors to the Church.

et al. 1998: 482–91).

The position of the shadow on the sundial made by the gnomon marks the hour in local time. The idea to separate the day into smaller parts is credited to the Egyptians because of their sundials, which operated on a duodecimal system. The importance of the number 12 is due to the number of lunar cycles in a year and the number of stars used to count the passage of night (Harris 1971: 13–26; Redford 2001: 53; Shaw 2003: 180–1).

At the same time, both the Sumerians and the Akkadians noticed a connection between the movement of the stars and natural occurrences. From here, they discovered how to count, and so mathematics came into use using the mathematical system of 60. There is more than one opinion on this system of calculation which was developed by human beings from ancient periods. If we look to the Sumerians and their sexagesimal numeral system, invented around the third millennium BC, we will see that the Sumerians first invented the time units of today. Water clocks divided the minute into sixty seconds, and the hour into sixty minutes. After this, the Egyptians invented the sundial around 1500 BC. The ancient Egyptians looked to the astronomers to know when to hold specific ceremonies in their temples. The astronomers used the monolithic stone circles as a calendar to calculate the exact time the ceremonies were to be held (Kramer 1981: 153–5).

The Calendar Stele (Figs. 2–2a) was found in 1847 in Libya and is inscribed in three languages: Egyptian hieroglyphics, Punic, and Libyan written from right to left, and all the inscriptions have the same meaning: the secret of how to regulate the calendar. The hieroglyphs indicate that rays of light fall upon the stone, called the watcher, at the moment of the sun rise on the New Year day which occurred in March (Fell 1978: 6–65). It is one of the most important trilingual stelae ever discovered,



2. Photograph of the Calendar Stele from Libya (from Fell 1978).

2a. Drawing of the Calendar Stele from Libya (from Fell 1978).



3. Sundial engraved with a symbol of sun worship, found in northern Portugal (Douro Valley; from Fell 1978).

and it is now in the Putnam Museum and Science Center in Davenport, Iowa.

Another ancient sundial (Fig. 3) is engraved with a symbol of Sun worship, the cultic power found in northern Portugal (Douro valley). It depicts the life-giving rays of the sun descending upon the earth beneath (Iberian Punic 700 BC; Fell 1978: 6–65). Presumably, humans were telling time from the lengths of shadows at an even earlier date, but this is hard to verify. In roughly 700 BC, the Old Testament describes a sundial mentioned in Isaiah 38:8 and 2 Kings 20:11.

A sundial in the Greek style was found among the ruins of Amman citadel (al-Qalaʾa; Fig. 4). It is dressed stone with a



4. The al-Qalaʾā sundial.

b



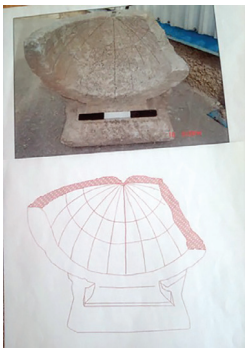
c



d



a



4a–d. Drawings and photos of the sundial used in al-Qalaʾā (Amman citadel courtyard or plaza).

e



4e. Greek hemispherical sundial dating to the Roman period (Archaeological Museum of Piraeus).

frontal face and base, but the backside of the stone is rough so as to engage with a pillar/wall or any part of construction (Figs. 4a–d). Its height is 49.2 cm, diameter 52.6 cm, and the base is 54.1 cm. There are parallels of this type at Ṭabaqet Fahil, Umm al-Jimāl, and Madaba. The Greeks developed many principles and forms from the 3rd c. BC, and this sundial is a hemispherical Greek type (Fig. 4e). These sundials differ in their portability: a sundial at latitude in one hemisphere reverses to the opposite latitude in the other hemisphere (Oleson 2008). This sundial will be discussed in detail later.

Later, the Roman writer Vitruvius (died *ca.* 15 BC) listed the dials and shadow clocks available at that time. In the follow periods, a canonical sundial was one that indicates the canonical hours of liturgical acts (celebrations). The members of religious communities used such sundials from the 7th to the 14th centuries in Byzantine and Islamic periods. Al Khwarizmi (AD 780–850) mentioned the sundial in the medieval period. Muslims used this device to calculate the time for prayers, especially at the major mosques (al-Hassani 2012: 42). Then, Italian astronomer Giovanni Padovani published a treatise on the sundial in 1570, in which he included instructions for the manufacture and laying out of mural (vertical) and horizontal sundials (Oleson: 2008).

Structures during the Late Roman and Byzantine Periods

During the Byzantine period, a number of Jordan cities became bishoprics. The capital of the Provence of Arabia was established in Bostra, in southern Syria today, which depended on Patriarchate of Antioch. The main source of the economy was farming, cultivating vines, and olive trees, and also production of some copper. Numerous olive and wine presses have been discovered in the rural districts of Rihab,

Al-Samra, Umm al-Jimāl, Umm Er-Rāṣaṣ, and al-Ḥumayma. At churches centered in Pella, Gerasa, Gudara, Madaba, and Petra, an assortment of presses were also found. Many of the Byzantine churches have been identified up to the end of the 8th c. AD (Piccirillo 1993: 566).

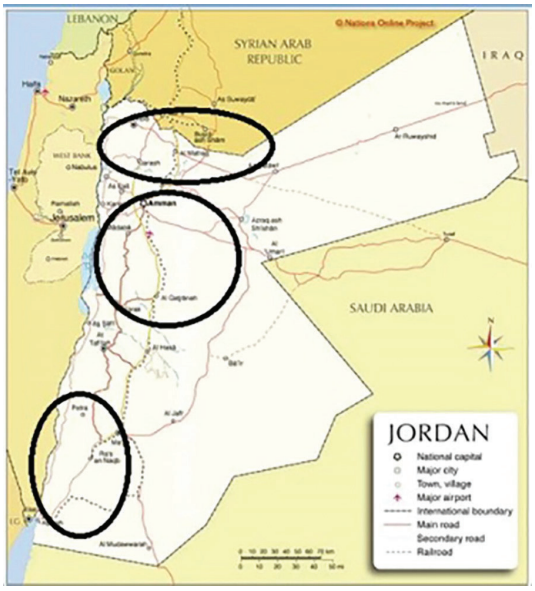
During the 5th century until the end of 8th c. AD, Christian communities were in charge of their own religious affairs, especially in the above mentioned cities. A great number of structures, monasteries, and churches were established under the instructions of their Bishops, indicating that they were in an excellent economical and educational situation.

There are numerous archaeological sites in Jordan dating to the Byzantine era, mainly found in the rural areas of farms and villages (Fig. 5):

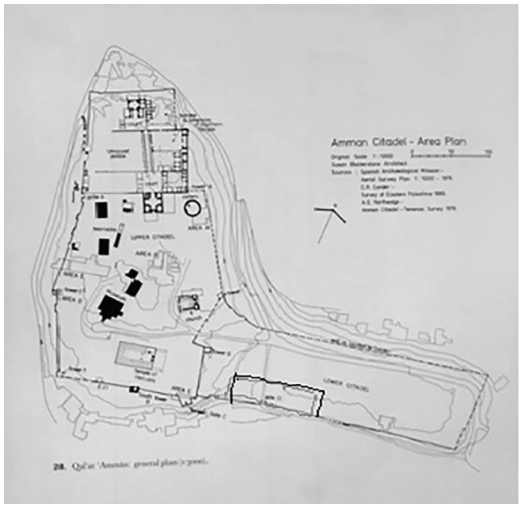
1) North Jordan: Gadara, Rehab in Mafraq, Umm al-Jimāl, Khirbat as-Samrā, Pella, Gerasa, and ʿAjlūn.
2) Central part of Jordan: Salt area, including the Jordan Valley, Dead Sea, and Baptism site, Madaba, Umm ar-Rasasand, and Philadelphia district.
3) Southern part of Jordan: Petra and al-Ḥumayma, Feinan, Wādī Araba, including the end of southern part of Jordan Valley (Aqaba).

According to the documents recorded in the Department of Antiquities Information Centre, there is no evidence referring to the position of a sundial in any excavated area, square, or locus. Consulted in particular were the reports of the Jabal al-Qal'ā development project, under the title: Recovering section No. 14 (2000–2004) the second stage, directed by Yazeed Olyan and Husam Hejazeen, and the reports of the previous excavation that occurred in this sector (Fig. 6; Northedge 1992).

The section situated in the southern part of the Amman Citadel (Acropolis), where they rediscovered the Roman Gate (opening from the southern citadel wall and



5. A great number of structures established in Belad Ash-Sham.



6. Section plan No. 14 (2000–2004), the second stage (after Northedge 1992: fig. 28).



6a. Fill which is a result of occupational periods in the citadel.

looking down to the Roman Theatre), was excavated to clean the area between this Gate and where the headquarters and old offices were located. This rubble is a dump fill about 70 m long and about 4 m wide. They recovered parts of the paved Roman road with structural remains on both sides. The fill is a mixture of rough stones and building materials reused through the ages, especially at the later part of Ottoman Period (Sq.29 L4 is a layer about 1.70 m thick). It was in this section (No. 14) that they discovered the Roman steps, which leads up to the Hercules temple. Nevertheless, this fill is a result of occupational periods in the citadel when reconstructed in a traditional pattern as a fortified wall against the Roman gate, especially in the late Byzantine and early Islamic periods (Fig. 6a).

Dr. Fawwaz Khrasheh, who was the General Director of the Department of Antiquities at that time, asked me to be a consultant and expert on this project. On the first visit to the headquarters in 2009, I found this sundial in the passageway between the hangers and the offices (Fig. 4b). I was unsuccessful in obtaining from the excavators and restorers the exact location of where the sundial was discovered. They said the workers were asked to use the best stone to design the passage around the temporary offices.

Description of the Archaeological Excavation Section of Amman Citadel (Philadelphia) Al-Qala'a

An unexpected discovery was made at the interior line of the southern fortification wall, which could be an early large Byzantine complex with a large platform and irregular openings into rooms which looked as if it had had some architectural redesigning. The aforementioned sundial likely stood in the center of this complex (Fig. 5), either in a courtyard or market facing south (city center), similar to the Greek one (Fig. 4e), to serve the citizens of Philadelphia especially in the Late Roman period.

Sundials Found in Jordan

1) Amman Citadel. Parallel with: Madain Saleh, Saudi Arabia; Piraeus, Athens, Greece (Fig. 4e)

2) Dar As-Saraya, Sultan Eshraideh excavations at Ṭabaqet Fahil 1981 (Fig. 7)

3) Umm al-Jimāl church, 2001. Al Mafraq archaeological store. (Figs. 8 and 8a)

4) Madaba. A sundial found in the archaeological store of Madaba Antiquities office, on a balcony above the ceiling of the Tuwal traditional house, among other archaeological artifacts exposed to the sky. This sundial is the earliest one found in Madaba and is believed to be from the Byzantine era site of 'Uyun Musa, Mount Nebo (Fig. 9). Around 1864, monks and clergymen began visiting the area in search of religious ruins especially around Mt. Nebo and Wādī Musa and 'Uyun Muse (Musa Spring). Saller and Bagatti did some rescue excavations at these sites and collected some archaeological artefacts. To the north of the caves they found isolated ruins of a



7. Dar As-Saraya Sundial, found from local excavation in Ṭabaqet Fahil 1981 by Mr. Sultan Eshraideh.



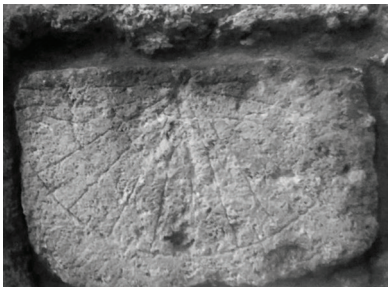
8. Umm al-Jimāl Sundial exposed outside of the Mafrag Antiquities Office in 2001. It was registered there from one of the churches.



9. Sundial found in the archaeological store of the Madaba Antiquities Office, at the balcony above the ceiling of the Tuwal traditional building mixed with other architectural elements exposed to open air (‘Uyun Musa archive; Mount Nebo).



8a. Umm al-Jimāl sundial exhibited in the Visitor Center.



10. Reused sundial in the Māmlūk reconstruction of Al Qastal Umayyad Mosque. Ahmad Lash discovered it in 2018 as a stone inserted in the interior wall beside the Mihrab and incised by lines. It was a dressed stone from the Umayyad structure (the Umayyad Mosque).

monastery with a cemetery nearby. This sundial was found between these ruins.

5) Al-Qasṭal Umayyad Mosque. A reused sundial in the Māmlūk reconstruction of al-Qasṭal Umayyad Mosque, discovered by Ahmad Lash in 2018 inserted in the interior side of the wall beside the Mihrab (Fig. 10; Lash 2018: 20).

Conclusion

Human beings discovered that to function in cooperation with nature they needed to record time. By observing the movements of the moon, stars, and apparent movement of the sun, they were able to plan their lifestyle and the planting crops, among other things. The invention of the sundial allowed for the accurate timing for religious festivals, the times of prayers, and an organized way of life. This needed the expertise of astronomers, engineers, and religious people who divided time into minutes, hours, and days.

The excavations that took place at al-Qala'ā with the discovery of the Byzantine complex confirms that the sundial would have been erected in the main square or market place facing south, serving the residents of the city.

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Unusual Burials from the Khirbat as-Samrāʾ Cemetery

Introduction

The Byzantine part of the Khirbat as-Samrāʾ cemetery was dated to between the 5th and 8th c. AD. Until the 1920's, the cemetery area was a field of tombstones (Savignac 1925). In thirteen seasons of excavations, the cemetery revealed a wide range of variability among the 725 excavated shaft-tombs (Nabulsi *et al.* 2009), as well as a number of extreme or deviant observations related to the structure or contents of these tombs.

Structural Observations

Tomb-651 and Tomb-652 were found to be "connected" at their eastern ends by a line of natural stones (20–40 cm in diameter) placed in a trench that was dug to about 60 cm in the virgin soil layer (Fig. 1a). No relevant structure was found anywhere near. Hence, the construct was intentional but its function remains unknown. Tombs in this cemetery varied in length from 1 m for subadults to around 2.4 m for adult burials. A few of the excavated tombs measured more than 3.5 m in length. They were reduced from the inside on the eastern or western end by a built stone wall to standard tomb size (Fig. 1b). The extra length in two of these tombs was obviously dictated by the appearance of a huge and unmovable stone or the basalt bedrock layer, which necessitated the building of the wall and extending the tomb in the opposite direction. Yet, this was surely not the case in the other large tombs. Tomb-546 (size 200 x 56 x 165 cm) was thought to belong to an adult burial. In the middle of the tomb's floor, there was a single row stone-structure that marked a small tomb closed by covering stones (Fig. 1c). The small tomb was probably of a totally deteriorated child burial that could have replaced the earlier (adult) one, or alternatively the tomb was just available at that time. Tomb-392 marked a change of direction. While all excavated

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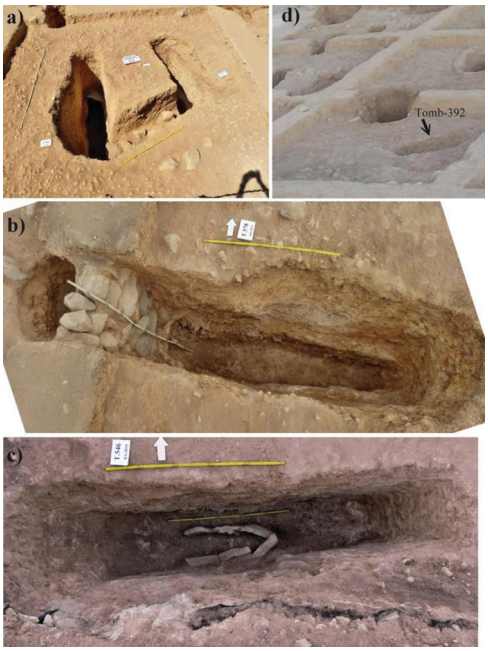
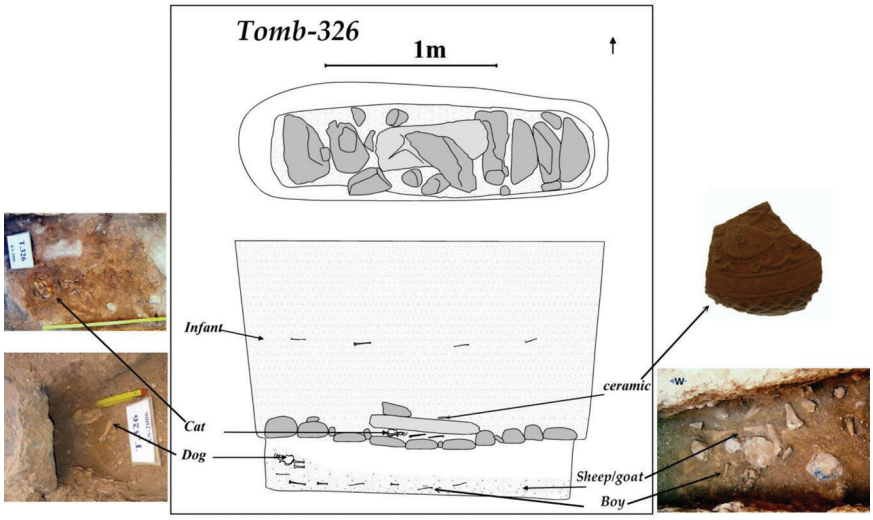


1. Unusual tombs from Khirbat as-Samrā' cemetery: a) stone-lined connected tombs; b) an example of long tombs with a built wall; c) built tomb in Tomb-546; d) Tomb-392 with N-S axis.

tombs were in general W-E direction, the small and shallow Tomb-392 (142 x 48 x 125 cm) revealed an exact N-S axis (Fig. 1c). Besides a few child bone fragments, there was an oval cornelian stone (Reg. no.: KS-1275, 13.4 x 8.5 x 3.4 mm) with an engraving on its flat side depicting Hygeia, the Greek goddess of health, all insufficient to explain this singular observation.

Tomb-326

Though it has already been published (see Wilson *et al.* 2012), Tomb-326 (Fig. 2) was a very different case that has to be included in this presentation of unusual burials. The tomb was excavated in 2006. In the shaft fill, a few bone fragments of an infant were found. Finding human bones in the fill was not unusual, even in intact tombs due to the common practice of tomb reuse. Upon reaching the cover slabs of the burial below, a brown-green painted pottery fragment (KS-1183) decorated with engraved geometric lines (eye-shape!) and dated as Islamic Fatimid-Mameluke (11th–14th AD) was found on a protruding cover slab. Below this stone, the skeleton of a small cat was found buried in a semi-rectangular grave. The burial chamber below was still closed. Upon removing the cover slabs, the remains of a small dog were found buried at the western (head) end covered with fine, loose earth. In the grave below was a 10 cm thick layer of hard mud, where fragmented skeletal remains of a 10–12 year-old juvenile male were found. At the eastern end, the human bones were mixed with sheep or goat tarsal bones that appeared to be positioned where the boy's legs were. The sheep/goat bones were already sun-dried prior to their deposition in the tomb and therefore cannot be associated with feasting. The problem was not only to explain these extraordinary finds, but also the presence of the Islamic pottery fragment implied extending the use of this cemetery for at least four more centuries. This would contradict the chronology and history of the site (*comp.* Humbert 1998). To solve this problem, radiocarbon ^{14}C dating was carried out on bone samples from the infant, dog, boy child, and sheep/goat fragments. The burials of the cat and dog were obviously simultaneous. The sequence of events in Tomb-326 became accordingly clear. The original burial was that of the juvenile male that took place between the 5th and 6th c. AD (430–571 cal AD at 95.4% probability). The burial was disturbed sometime between AD 1253 and AD 1385 when the tomb was opened and the boy's bones were broken and mixed with earth. Then the sheep/goat bones (1253–1383 cal AD at 95.4%) were placed there instead of the boy's legs. Later, the dog (1266–1384 cal AD at 95.4%) was buried at the west end. The burial cist was closed by the stone slabs and the grave for

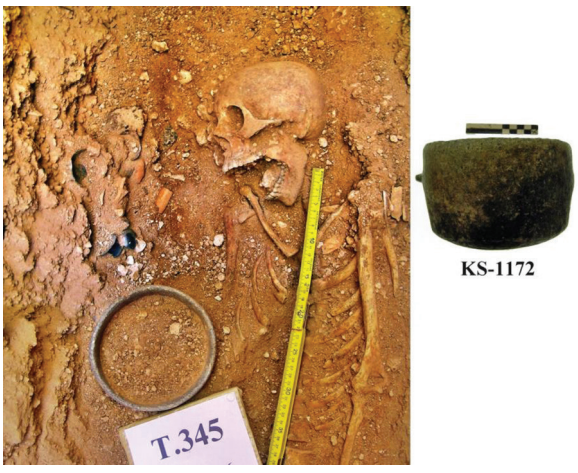


2. The case of Tomb-362: the locations of the various deposits (see text).

the cat was made. The cat was then buried and covered by a flat stone upon which the Islamic pottery fragment was placed. The shaft was then half refilled before burying the infant (1261–1385 cal AD at 95.4%), and finally the tomb fill was completed. The observations made in this tomb open the door to a wide range of speculative interpretations. After the abandonment of the settlement during the 9th c. AD, the area was seasonally frequented by roaming groups (Humbert 1998). One might suggest that one of these groups or individuals carried out the 13th/14th c. AD manipulations in Tomb-326, which was located centrally within a field of tombstones engraved with crosses and unintelligible letters. All observed manipulations were part of a single procedure or act, from the location of the tomb to the disturbance of the original juvenile burial below. It is possible that the group had undertaken these manipulations as a protective or preventive measurement against an unknown or uncontrollable danger, possibly represented by the anonymous juvenile male tomb, which was believed to cause harm or endanger the group's viability (survival). This remains speculation and the truth might never be known.

Tomb-345

This tomb was about 10 m to the NW of Tomb-326. Tomb-345 (Fig. 3) contained the remains of two consecutive female burials. A 3 cm thick mud layer separated



3. The juvenile female second (upper) burial in Tomb-345. Notice the burial position, diverse utensils, and the basalt cooking pot KS-1172 to the right of the deceased.

the first and older adult female burial below from the second juvenile female above it. She was laid stretched on her right side and accompanied by various cosmetic utensils (*e.g.*, ivory and plaster mirrors and small glass vessels, as well as jewellery that included a silver earring with an elongated cross). Below the juvenile's left shoulder was a basalt cooking pot (KS-1172: 16 cm diameter, 9.9 cm height and *ca.* 1 cm thick) with a small knob handle. The lower half of this vessel was covered with soot. It is thus probable that the deposited pot contained some kind of cooked food. The side position of the deceased is rare but not unusual in this cemetery, whereby the deposition of a cooking pot is exceptional in any Christian Byzantine burial from this region.

"Lamenting" Woman Figurine

During the last excavation in 2013, a plaster figurine (KS-2275) was found in the burial of a female, Tomb-703 (Fig. 4a). The plaque figurine depicted a standing woman wearing a short-sleeved and transparent gown that revealed her breasts and pubic hair. The arms were stretched to reach the braided hair on each side and the wide open eyes and mouth (painted in black) suggest a shouting or "lamenting" female figurine. Small quantities of plaster were applied using a flat instrument to cover the mouth, nose, hands, elbows, and around the feet. The figurine was broken through the waist and "mended" with thick plaster applied around it. The light yellowish spots on the painted surface suggest that an unidentifiable liquid was sprinkled on it. These alterations were obviously undertaken shortly before depositing the figurine with the buried. Earlier in 1996, another similar figurine (KS-1051) was found in Tomb-126 (Fig. 4b), and then referred to as "dancer" figurine (Nabulsi 2000). What was thought to be lime deposits on the figurine was in fact added plaster. With KS-1051, two further broken female figurines were found,



4. Alterations on the female plaster figurines retrieved from different tombs in Khirbat as-Samrā' cemetery: a–b) manipulations on two different "lamenting" female figurines (see text); c) female figurine with an intact and (d) deformed face.

both with deformed facial parts and similar to the state of another similar figurine (KS-0030) from Tomb-143 (Figs. 4c–d). These alterations to the plaster figurines were probably practiced by some relatives of the deceased for an unknown reason.

Conclusion

The above described examples were part of unusual observations that were made during 13 seasons of excavations in the ancient Byzantine cemetery of Khirbat as-Samrā'. In the case of Tomb-326, the use of new technology prevented a major dating error that would have affected the whole site and provided the chronology of incidents. It could not, however, provide any explanation

to the situation in that tomb. The variability observed in this cemetery, including the outliers, has to be seen as different parts of one picture, and that variability in a cemetery must not always be associated with change. It is obvious that many of the presented observations might be associated with the grieving relatives of the deceased, who could act according to personal and/or irrational motives that are thus difficult to explain. One has therefore to concede that some questions will remain unanswered.

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Crises and the Development of the Abila/Quwaylibah Pilgrimage Site in Byzantine *Palaestina Secunda* and Umayyad *Jund al-Urdunn*

Introduction

Crises during the mid-2nd through mid-8th centuries stimulated the construction, utilization, enlargement, refurbishment, and maintenance of a sequence of monumental buildings at a site located in the ruins of ancient Abila at Quwaylibah, Jordan. The final phase of monumental construction at that site, identified by the excavators as Area E, was a large pilgrimage complex (Fig. 1) that began its service in Byzantine *Palaestina Secunda* and continued under the jurisdiction of Umayyad *Jund al-Urdunn* until it was destroyed by an earthquake in AD 749. Known ancient pilgrimage itineraries and recent guides (MacDonald 2010) preserve no mention of the Abila pilgrimage complex, but the continuing efforts of the Abila/Quwaylibah Expedition directed by Dr. David Vila of John Brown University under the permission of the Department of Antiquities of the Hashemite Kingdom of Jordan, have exposed much of the complex. Excavation quickly revealed an unusual five-aisled central church (Menninga 2004) and subsequent efforts show it surrounded by extensive processional passages (Smith 2018a) and auxiliary structures (Smith forthcoming). Architectural elements of this pilgrimage complex and its special hydrological features, together with associated artifacts such as eulogia, inscriptions, and an icon fragment (Fig. 2) installed to sacralize water flowing into the complex, bear evidence that the venue provided pilgrims with a memorable multi-sensory experience of being in a particularly special sacred place (Smith 2020). That sense of proximity to the sacred enhanced the pilgrims' hopes for divine intercession in the crises they faced.

The extant remains of the mid-8th-century pilgrimage complex surrounding the five-aisled transept church (Fig. 3) preserve evidence of several additions and repairs (Fig. 4) as well as echoes of two

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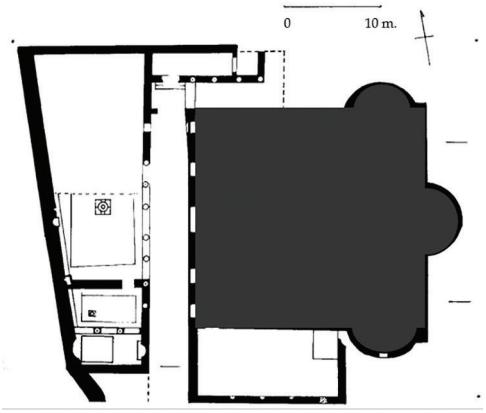
1. Abila pilgrimage complex from the south at the conclusion of the 2018 excavation.



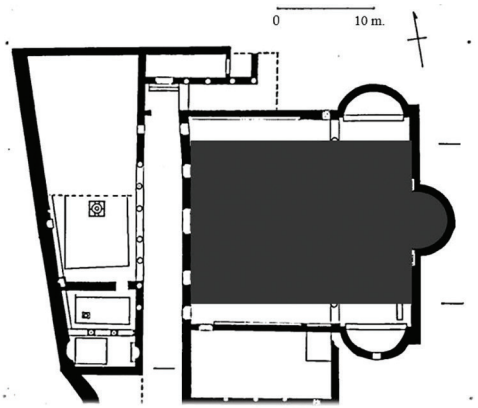
3. Plan highlighting the footprint of the 6th- to 8th-century five-aisled transept church in the complex.



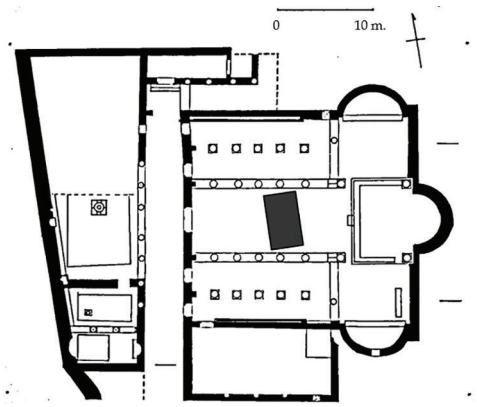
2. Abila icon fragment that sacralized water in the special ritual area adjacent to the atrium in AD 749.



4. View of the water ritual area from the south showing three additions and a repair in the atrium wall.



5. Plan highlighting the footprint of the 5th-century three-aisled church in the pilgrimage complex context.



6. Plan highlighting the footprint of the 2nd-century thermae in the pilgrimage complex context.

major earlier structures on the site. Portions of those earlier structures persisted in the continued use of urban infrastructure, wall foundations, and valuable architectural components from the earlier buildings at the site. Furthermore, probes excavated beneath the floor level of the mid-8th-century pilgrim complex reveal an earlier three-aisle church (Fig. 5) with mosaic floors and pastophoria at the east end and still further, below that, a public bath complex (Fig. 6) with an argillite-lined frigidarium (Fig. 7).



7. View of the argillite-lined frigidarium beneath the earlier structures from the east.

The presentation that follows will survey factors that put individuals of Abila and its broader community into the crises which contributed to the shaping of the structures in Area E that culminated in the extensive pilgrimage complex.

Crises and the Development of the Abila Pilgrimage Complex

The Abila pilgrimage complex in the Wādī Quwaylibah was hidden from travelers' gaze until they reached the edge of the surrounding hills and eastern plateau. That destination of pilgrims' journeys, and a point of pride for Abila residents, lay like a sparkling diamond in the emerald setting of the verdant valley below. Local citizens and the visitors from afar treasured it as a place of respite. In the Late Antique world, where people living around the Mediterranean experienced many troubles, they rarely found freedom from worry and anxiety in the manner prescribed in the Greco-Roman philosophies. Practicing *epoché* and suspending judgment regarding the existence of pains and frustrations had not made them go away or provided *ataraxia*. People continued to look for divine help at physical places, like the pagan temples, until they lost faith in finding help there. The ascendant Christian message proclaimed the possibility of "abundant life" in a fallen world and a future where there would be "no more tears" (Revelation 21:4), but believers in the Christian faith still had to deal with troubles in the present. They believed that in answer to their fervent prayers, and those of other pious people, God would intervene. Over time, Christian churches replaced temples as the preferred places to pray. Some churches, however, came to be seen as better places to pray than others because of their association with Biblical persons and events or their identification with Christian martyrs.

The larger pilgrimage impulse embraced by Byzantine Christian visitors to Quwaylibah, associated spiritual blessings and relief from problems with particular places where they experienced the sense of a physical closeness to God and saintly spiritual champions. When people made claims regarding encountering God and the saints at *loca sancta* and receiving blessings, such good news built a following and traditions. Traditions supported by church leaders and popular funding led to the construction of purpose-built shrines that created aesthetics conducive of a sense of sanctity which satisfied the local community and drew pilgrims from afar.

Pilgrimage structures embraced familiar elements used in ecclesiastical architecture and also copied impressive distinctive elements found at other venerated pilgrimage sites such as having five aisles (Al-Daire 2001). Popular pilgrimage sites had something special that went beyond impressive architecture. The abundant water supply at Abila was the special thing that allowed for the creative construction of a distinctive pilgrimage venue with features that generated a sense of awe. While finely decorated mosaic church floors might have two-dimensional silent portrayals of amphorae pouring out the rivers of Paradise, the Abila pilgrimage complex had splashing water running through it. Believing people, faced with crises, found what they sought at Abila, the sense they were close to God and their prayers were heard. There, their feelings of physical, emotional, and spiritual problems washed away. These powerful impressions helped allay the anxieties caused by crises and generated patronage that built and sustained the pilgrimage complex through the tumultuous Byzantine and Umayyad eras.

Belief in the efficacy of Abila pilgrimages is reflected in the mosaic inscription of Psalm 86:1 found in the north chapel of the pilgrimage church (Smith *et al.* forthcoming). That inscription, together with the subsequent uncited verses of the Psalm, suggests that it was a "lovely dwelling place of God Almighty," a stopping point where pilgrims who had navigated "deserts" and crossed through "valleys of tears," would yearn to visit since it flowed with fresh water and renewed hope that would strengthen them as they continued their journey to its conclusion before God.

Crises frequently confronted people of late antiquity living in the territory of modern Jordan. Sometimes the crises were particularly personal, localized to specific individuals and their families, but there were also general population-wide existential threats that prompted crowds of pilgrims to come to pray. As serious problems accumulated, the sense of impending disaster multiplied, resulting in patronage of sacred spaces. Pilgrimage facilities like those at Quwaylibah endured even when problems caused the decline in population and retractions in the economy.

Personal crises led many people to the Abila pilgrimage site. Their personal crises came in varied forms and ranged from overt physical issues to more subjective intellectual and spiritual issues. Examples of personal crisis are evidenced in artifacts found in the pilgrimage complex. First, is a case of acute thoracic scoliosis found in the articulated bones of the older man buried in a stone-lined and sealed grave beneath the marble-paved floor along the south side of the pilgrimage church chancel. Whether caused by a genetic predisposition, cerebral palsy, disease, or a crippling accident, his spine shows that he had long suffered from back pains. A second example illustrating personal crises are prayers inscribed in Kufic script at prominent locations on the paving and columns in the western atrium and processional passage around the pilgrimage church. The texts of these prayers preserve evidence of the supplicant's sense of guilt for known or suspected personal and familial

guilt in the face of approaching judgment by a holy God (Smith *et al*. forthcoming). Pilgrimage with its concomitant travel expenses and perils, together with financial patronage of holy places, functioned as a means of Late Antique personal crisis management. Pains, both physical and spiritual, diminished.

Culture-wide crises, like the aforementioned private problems that stimulated Abila pilgrimage, came in varied forms and degrees of acuity. They included "natural" and "man-made" events. Preserved Byzantine governmental and ecclesiastical reports in Greek alongside contemporary Semitic language texts attest to numerous public crises of late antiquity. While there has been some tendency by modern historians to diminish these sources as "exaggerated," there is increasing anecdotal evidence for the crises as archaeological projects expose physical evidences and can associate them chronologically with the recorded disastrous events. Telluric and anthropogenic crises mentioned in the historical record afflicted the people in the region around Quwaylibah and left evidence of their passage through Abila.

Obvious and imperceptible changes in the physical environment both caused general disasters for people in and around the urban center of Abila. These changes included distant volcanism, regional tectonic movements, severe local weather events, broader climate changes, and the introduction of new pathogens. The resultant effects of these changes could be enormous. Situated near the Great Rift Valley where the African and Arabian tectonic plates come together, Quwaylibah is subjected to frequent palpable tremors and occasional earthquakes of high magnitude. Regionally devastating earthquakes that relate to the story of Area E structures at Quwaylibah include the Galilee Earthquake of AD 363, the Beirut Earthquake of AD 551, the AD 633 Yarmuk Quake, and the cluster of early and the mid-8th-century seismic events which culminated in the Great Rift Valley Quake in AD 749 (Russell 1985). While no skeletons have been found under fallen earthquake-tumbled structures at Abila, and victims with a crushed cranium or fractured femurs have not been found in the tombs, Abila residents, like others in the region, suffered. Physical evidence clearly demonstrates that quakes damaged Abila's structures and infrastructure. The pilgrimage complex, like many city residents, depended on the *ca*. 1.4 m long water system that brought the regular flow from ʿAyn Quwaylibah into the city center (Fuller 1985: 37). The lower-elevation aqueduct which shows evidence of repairs may have been damaged in the Galilee Earthquake of AD 363 and compromised the water supply going to the Area E baths. That may have necessitated the repairs to the higher elevation aqueduct that supplied water to more of the city and the growing pilgrimage facilities around the three-aisled church in Area E. The great AD 551 Beirut earthquake is the possible cause of damages that happened to a portion of the later upper aqueduct. Water flowing to the city fountains and the pilgrimage complex diminished and could have stopped completely. The compromised water system threatened to take away an essential element for the growing pilgrimage traffic. Merchants of Abila, already facing the costs of rebuilding their homes and businesses, may have anticipated grim future economic prospects if pilgrims stopped coming. Human-caused issues, which will be described later, led to a vacancy in the episcopacy as Bishop Alexander was exiled shortly after the earthquake. The loss of his leadership and lack of funds exacerbated the situation and delayed the completion of aqueduct repairs and work in the pilgrimage complex until AD 568.

According to the water tunnel inscription at the south end of the upper water tunnel, the subsequent "illustrious" and

"most pious" local bishop, whose name might have been Ioannes, was responsible for effecting the clearing out of the blocked upper aqueduct that delivered water at sufficient height to provide water on the terrace above the pilgrimage church in AD 568 (Smith *et al.* forthcoming). Beyond simple maintenance and a clearing away of accumulated silt, what was needed was the reconstruction of a portion of the roof of the water tunnel at a point where it approached the city center. The bishop's engineers accomplished this using opposing ashlars set at an angle in a corbelling technique. The bishop used the crisis of the earthquake as an occasion to enhance the appeal of the pilgrimage complex and set it on an improved trajectory in the numbers of visiting pilgrims.

Unusual phenomena and severe weather events find mention in texts from late antiquity that caused local as well as regional crises. At Quwaylibah, study of the deep sediments filling the *wādī* near the bridge adjacent to the pilgrimage complex indicate that it did not fill slowly over time. Instead slips are the result of rapid events where mass-wasting caused soil on the flanks of the *wādī* slump into the valley. The first of these events occurred in the 6th century and is connected with the abnormal weather that began in AD 536 following a major seismic event far away, that caused a brief period of global cooling and abnormal rainfall (Lucke 2013: 213). When the soil was saturated by unusually heavy rains, gravity sent sheets of sediment sliding into the valley. As they did so, they carried away terraces of vines and destroyed some of the best watered crops growing in the valley floor. A year "without summer" followed by subsequent years of irregular weather would have had local economic repercussions as surviving grapevines that produced the wine, for which the city was famous, along with other cultivars that would not have produced good crop yields. In Area E, the movement of sediments down the slopes flanking the *wādī* and changing water flows suggest an explanation for why the relatively new three-aisled basilica, decorated with pleasingly patterned mosaic floors, was not worn by years of foot traffic, not damaged by falling masonry, and with still solid foundations was elevated one meter when work on the enlarged pilgrimage complex with the five-aisle transept church was undertaken. The creative response generated an attractional facility that would last two centuries.

Disease was a constant peril in late antiquity that caused both personal and public problems. At Abila, the public water system with its constantly flowing spring water had limited opportunities for contamination by pollutants along the route of the subterranean water tunnel. Most of the *putei* used in construction were sealed and there were otherwise only three well openings along upper tunnel's route to the urban center (Fuller 1985: 39). The water was therefore generally healthful and less susceptible to contamination by pathogens than cisterns where contamination from dirty hands and containers could accumulate and bacteria grew. While the water system of Abila would have helped to ameliorate a very common source of diseases, there were other vectors of contagion. Historical sources attest to the emergence of the Antonine Plague in the Levant in the 2nd century. That epidemic, together with the war against the Parthians, unstable weather, and the potential for instability like what developed at the time in Egypt (Elliott 2016) was on the minds of the local patrons of the Abila thermae in the first phase of monumental construction at Area E. Votive inscriptions on columns they erected proclaimed their belief that "Beneficent Tyche" had sustained the well-being of the co-emperors Marcus Aurelius and Lucius Verus in the year AD 165. The trade in wine, for which Abila was famous

in the Byzantine era, and olive oil for which it was renowned in the Umayyad era, along with pilgrims and immigrants brought people of Abila into contact with others and potential exposure to pathogens transmitted from persons. In AD 540, the first great wave of the deadly bubonic plague came to the Levant. That plague and the recurrences that followed in ensuing years left their mark at Abila where bodies evidenced in articulated skeletons were sometimes discarded unceremoniously onto the floors of tombs and in one Byzantine era tomb in the necropolis on the west side of the Wādī Quwaylibah, articulated skeletons were found stacked three deep in adjacent loculi. Diseases threatened all ranks of society and led the sick and scared to seek God's assistance.

Anthropogenic crises promoted anxieties in late antiquity that drove people to places of respite. The comparative political tranquility and related economic prosperity of the *Pax Romana* ended with the reign of Emperor Marcus Aurelius' son and successor, Commodus. His assassination in AD 193 led to civil war and the "Year of Five Emperors" that concluded with the ascendance of Septimius Severus. Abila, continuing their former practice, honored this new ruler and his Levantine wife, Julia Domna, on the obverse of city coins. Succeeding Severan emperors, Caracalla and Elagabalus, similarly graced the city's coins until AD 219 (Spijkerman 1978: 52–7). These emperors of the Severan dynasty succeeded in raising armies to restrain the Parthian Empire to the east, but it came at a price. In order to pay the legions, the imperial mints dramatically diminished the amount of silver in their coins. This made it necessary to discontinue making local coins in cities like Abila and created inflation, causing issues in making both small local transactions and doing long distance trade. The age of monumental constructions such as the hexastyle, tetrastyle, and distyle temples seen on the city coins, as well as baths at Abila, fell on hard times without funding.

Throughout late antiquity, resources had to be spent on conflicts that attempted to sustain Roman/Byzantine frontiers from territorial seizures and from threatening mass migrations. People of Abila were most aware of the great threat posed from the Neo-Persian dynasties of the Parthians and then after AD 230, their Sassanian successors. In the mid-3rd century, the tumultuous civil warring of the Barracks Emperors made the Roman Empire vulnerable on all frontiers. It is not surprising that a major public construction project in the late 3rd and early 4th centuries was the wall around Tall Abil above Area E. Those physical walls alone could not protect Abila from the Sassanids and this realization helped to promote the construction of spiritual walls that employed ashlars (Smith 2011: 504). The intensity of the Sassanid threat fluctuated between all out wars to short-lived peace treaties. When the Sassanians invaded, they took advantage of social divisions. In the population of Palestine, ethnic tensions, sometimes related to historical, cultural, and religious differences between individuals and people groups, held the potential to breed violence. The varied residents of Abila appear to have been generally convivial, but ethnic and religious differences created concerns and crises. In the region, Samaritans had revolted in AD 529 and were suppressed by the forces of the newly crowned emperor Justinian I. A century later, Benjamin of Tiberius and Jews of Galilee, feeling disenfranchised in the Byzantine Empire, supported the Sassanid invasion. No evidence of extensive damage in the pilgrimage complex or other church buildings at Abila can be definitively related to the seizure of control over Palestine between AD 614 and 628 by the Zoroastrian Sassanians and their Jewish allies. The threat of war and simmering

tensions caused distress for people of Abila and the region.

The immigration of Arabs into the territory of Abila and the plain of Ḥūrān, across the Yarmuk River valley from Tall Abil, would have been the source of some cultural conflict through the Late Roman and Early Byzantine eras. There the formerly nomadic immigrants settled and enculturated in a major grain-producing area balancing pastoralism and agriculture. Citizens of Abila and its pilgrimage complex came to benefit from the migration of the Ghassanids into the region. They generated wealth to spend on Abila products and to patronize the pilgrimage complex. The Ghassanids, who had embraced the Christian faith, however, remained a distinct group: speaking Arabic, having their own bishop and having their own mind regarding theological issues. Al-Harith V, from his capital at Jabiyah, seen on the east flank of the Jaulan north from Tall Abil, was a proponent of miaphysite Christology that was opposed by Emperor Justinian I and the influential clergy of Constantinople. The Byzantine emperor strategically endured the Ghassanid's theology since he depended upon them as *foederati* that had helped suppress the previously mentioned Samaritan revolt in AD 529 and served as a buffer against the Sassanians and their allies. Ethnic identifications, however, were not lost and Byzantine mistrust of the Arab Ghassanids contributed to the victory of the Muslim forces at the Battle of Yarmuk in AD 636.

Religious differences between people created tensions in the Levant and sometimes led to violence during late antiquity. Inter-religious differences and intra-religious differences were both problems that related to real and potential crises at Abila and the pilgrimage complex. An intra-faith issue reported in historical records is that concerning the beliefs of Bishop Alexander of Abila. He came to be identified as unorthodox when he refused to condemn the 3rd-century theologian Origen, as a "heretic" during an AD 543 regional meeting of church leaders at Jerusalem. The issues of Origenism were entangled in a broader debate regarding the nature of Jesus. Justinian I believed that it was his responsibility to keep the church unified and that holding fast to orthodoxy would sustain divine support in his effort to restore the Roman Empire. So when Bishop Alexander would not affirm the decree of the Council of Constantinople of AD 553, Justinian I had him exiled to Constantinople where he died in an earthquake (Wineland 2001: 66). This left Abila without a bishop to lead in the long-term recovery of Abila in the aftermath of the AD 551 earthquake and probably alienated Abila Christians and others who had positive regard for the former bishop. The religious division in the eastern empire over monophysitism created problems for the Emperor that became a crisis.

With all the wars directed by Justinian and fought by Byzantine armies, the Emperor found money to fund extensive church construction projects described by the court historian Procopius. His descriptions demonstrate that Justinian saw the ecclesiastical structures, like the walls that he funded, as part of the empire's spiritual defenses. He particularly funded church buildings dedicated to Mary and the creation or repair of aqueducts and cisterns restoring and creating water systems. At a location just outside Constantinople's walls is a site where Justinian funded a lavishly decorated complex of the Mother of God of the Life-giving Spring. The water effects and *hagiasma* there drew pilgrims looking for miraculous healing just like at the complex at Abila. That complex described by Procopius (*On Buildings* 3.6) is a strong parallel with the Abila complex. A possible artifact from the western water ritual area in the Abila complex that suggests connections with the *Theotokos* is the relief icon. The fleur-de-

lis in the guilloche framing and suggestive reconstructions based on the dimensions of the carving may point to a focus on Mary at Abila (Smith forthcoming).

While Procopius lists and occasionally describes projects funded by Justinian in surrounding provinces, he makes no mention of buildings in *Palestina Secunda*. This area was certainly strategically valuable and would have received aid. The scale of the funding needed for the repairs to the upper aqueduct and the enlargements in the Abila pilgrimage complex are suggestive of imperial patronage. In funding work at Abila, Justinian may have attempted to secure divine favor for himself and his subjects, and his subjects' loyalty to Byzantium since his religious agenda had alienated many like the Ghassind Arabs. The bishop who had replaced Alexander was most probably a person with close connections to the Emperor in Byzantium who helped to cement his place in Abila with needed imperial funding to enhance the pilgrim complex. Unfortunately, the damage to the top of the painted plaster water tunnel inscription has limited possible proof for imperial patronage.

Inter-religious differences posed potential problems for the survival of the Abila pilgrimage complex with the coming of the Islamic army of the *Rashidun* and the ascendance of the Umayyad Caliphate in Damascus. Abila citizens had reason to be anxious as they watched the battle of Yarmouk unfold in AD 636. In its aftermath, under both *Rashidun* Caliphs and the Umayyads, Christians found they could continue their religious practices and use churches as long as they allowed Muslims access if they wanted to pray in holy places. The Byzantine bureaucratic infrastructure in which bishops served as judges and tax supervisors and the size and symbols on coinage they employed, continued until the rule of Abd al-Malik. During the Umayyad rule over Abila, old problems persisted. Disease took lives and power politics produced three internecine wars that took more lives. Crises continued and people continued to look to places where they believed they would encounter God and get help.

Conclusion

Abila started out as a pagan city promoting its products, piety, and prestige through its coins and subsequently developed as a Christian and Muslim pilgrimage destination. It benefitted from being hospitable to diverse peoples. The perceived sanctity generated at the complex at Area E with its "miraculous" water appealed to crises-afflicted people of different religions and ethnicities building upon a long tradition. Polytheistic pagans burdened with the cares of the world built the monumental public baths that were numinous and patronized them in the Late Roman era. In the 5th century, Christians took over the baths and eventually built a three-aisled, mosaic-floored church, with an abundant water supply. The restorative waters of the baths had become associated with miracles at the church and attracted Christian pilgrims and most probably some people who still held to polytheism. In the early 6th century, further crises prompted the reconstruction of the pilgrimage destination with the construction of the five-aisled transept church with a yet again improved water supply. When that system was compromised, it was restored and additional increasingly spectacular water ritual facilities were added. After AD 636, the crowds who came included those who were embracing Islam. Some Muslims who had local roots returned to pray in the long-revered sacred place. In the early 8th-century patronage by Arabs helped rebuild and restore the facilities damaged in disasters. The creativity in developing the sanctity of the complex generated such powerful public pilgrimage support that it continued

its prominent use of a relief icon in spite of ideological opposition from Patriarchs and Caliphs. The Quwaylibah pilgrimage complex served as a venue where the desire for divine aid in alleviating shared problems and anxieties created a sense of community that crossed ethnic and religious divisions. Crises, like gravity that caused the water to flow through the water tunnels created a flow of people and their patronage to the Area E pilgrimage complex.

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Christian Communities in Jordan during the First Arab Domination through Epigraphic Sources

Introduction

> In the name of God, the Merciful, the Compassionate!
>
> This is a writing to *'Umar* from the Christians of such and such a city. When You [Muslims] marched against us [Christians]: we asked of you protection for ourselves, our posterity, our possessions, and our co-religionists; and we made this stipulation with you, that we will not erect in our city or the suburbs any new monastery, church, cell, or hermitage; that we will not repair any of such buildings that may fall into ruins, or renew those that may be situated in the Muslim quarters of the town; that we will not refuse the Muslims entry into our churches either by night or by day; that we will open the gates wide to passengers and travellers; that we will receive any Muslim traveller into our houses and give him food and lodging for three nights; that we will not harbor any spy in our churches or houses, or conceal any enemy of the Muslims. [At least six of these laws were taken over from earlier Christian laws against infidels.]
>
> That we will not teach our children the Qu'ran [some nationalist Arabs feared the infidels would ridicule the Qu'ran; others did not want infidels even to learn the language]; that we will not make a show of the Christian religion nor invite any one to embrace it; that we will not prevent any of our kinsmen from embracing Islam, if they so desire. That we will honor the Muslims and rise up in our assemblies when they wish to take their seats; that we will not imitate them in our dress,

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> either in the cap, turban, sandals, or parting of the hair; that we will not make use of their expressions of speech, nor adopt their surnames [infidels must not use greetings and special phrases employed only by Muslims]; that we will not ride on saddles, or gird on swords, or take to ourselves arms or wear them, or engrave Arabic inscriptions on our rings; that we will not sell wine [forbidden to Muslims]; that we will shave the front of our heads; that we will keep to our own style of dress, wherever we may be; that we will wear girdles round our waists [infidels wore leather or cord girdles; Muslims, cloth and silk].
>
> That we will not display the cross upon our churches or display our crosses or our sacred books in the streets of the Muslims, or in their market-places; that we will strike the clappers in our churches lightly [wooden rattles or bells summoned the people to church or synagogue]; that we will not recite our services in a loud voice when a Muslim is present; that we will not carry Palm branches [on Palm Sunday] or our images in procession in the streets; that at the burial of our dead we will not chant loudly or carry lighted candles in the streets of the Muslims or their market places; that we will not take any slaves that have already been in the possession of Muslims, nor spy into their houses; and that we will not strike any Muslim.
>
> All this we promise to observe, on behalf of ourselves and our co-religionists, and receive protection from you in exchange; and if we violate any of the conditions of this agreement, then we forfeit your protection and you are at liberty to treat us as enemies and rebels ('Umar Pact).[1]

According to the so-called 'Umar pact, compromises had to be maintained for a peaceful life by both Muslim and non-Muslim communities. But, in actuality, life was very different and varied from country to country and according to the caliph who took power. Especially during the first Arab age, that had its center in Damascus and was led by the Umayyad dynasty of Prince Mo'awia of Syria, the new Arab communities needed local Christian bureaucrats for the administration of the state, and could not oppose them with a too rigid attitude (Shahid 2002: 380). Father M. Piccirillo's numerous excavations, publications, and reflections on this period inspired me to focus my doctoral work on the topic in the form of a thesis entitled "Christian Communities during the Muslim Domination through Epigraphic Testimonies In: Israel, Palestinian territories, and Jordan," a portion of which is presented here. The aim of my research is to study Christian communities in Israel, Palestinian territories, and Jordan in the period between the 7th century and their disappearance, using data that come mainly from epigraphic sources.

Christianity did not disappear abruptly at the time of the Arab invasions. This is demonstrated by both the episcopal lists, which can be reconstructed through literary and epigraphic sources (from many archaeological excavations), and the descriptions of contemporary travelers. Concerning the epigraphic sources, Jordan represents a very special case: it is an area that has many attestations that allow us to reconstruct, at least partially, how

[1] The Pact probably originated *ca.* 637 by 'Umar I after the conquest of Christian Syria and Palestine. There are many variations of the text and scholars deny that the text as it stands today could come from the pen of 'Umar I. It is generally assumed that its present form dates to around the 9th century (Marcus 1938: 13–5).

Christians lived together with the first Arab communities. The inscriptions present significant evidence about the organization of the dioceses and about the tolerance shown by the Umayyad and the early-Abbasid dynasty, which does not cause any definitive crisis in the religious structure of the Christian communities.

Historical Events and Territorial Divisions

The territory of the current Hashemite Kingdom of Jordan extends mainly to the east of the homonymous river, where the Nabataean state (with Petra as its capital) developed around the 2nd century BC. It was articulated following the routes between the Arabian Peninsula and the rest of the region, including the city of Bosra, which became the second capital of the Nabataean kingdom (Piccirillo 1991: 7).

The state of the Nabataeans was absorbed in the Roman Empire in the year AD 106 under Emperor Trajan (Piccirillo 2002: 29).[2] This was a period of prosperity for the urban centers, largely populated by people of Hellenistic culture. The territories were structured according to a new administrative division: the new province was called Arabia, whose jurisdiction spread from the borders of Syria to the Red Sea, including numerous cities of the Decapolis.

The Diocletian administrative reform in the province of Arabia led to important territorial changes. The province extended its borders to the north, while the southern part was reduced in favor of Palestine.[3] Subsequently, the reforms implemented by Emperor Diocletian eventually led to its dismemberment (Bianchi 2007: 15; Piccirillo 2002: 43–8). In the year 358, Palestine (Bradbury 2005) was divided in two along the *limes*, with Palestine to the north and Palestine Salutaris to the south. In this way, the former territory of the province of Arabia was detached from Palestine and became an autonomous area with Petra as its capital city (Hamarneh 2003: 32).

Finally, in the year 400, as attested in the *Codex Theodosianus* (7.4.304; 16.8.29), there was a final change in the eastern provinces. The Three Palestines were then created: Palestine Prima,[4] with a capital at Cesarea (Bianchi 2007: 15); Palestine Secunda,[5] with a capital at Scythopolis (Bianchi 2007: 15); and Palestine Tertia,[6] which had Petra as its administrative center (Fig. 1; Avi-Yonah 1966: 121).

The 7th Century: Two Political and Military Misfortunes Led to the End of the Byzantine Rule and to the Arrival of the Arabs

The 7th century was a period of great disorder for the four Roman provinces, due to the Persian (614–628) and Arab (629) invasions (Piccirillo 2002: 219). The first occupation began in 614 with the Persian king Cosroe II (590–628; Ognibene 2002: 21) who conquered Syria, Arabia, and Palestine, arriving in Jerusalem (Sebeos 24.68), where he killed the population and

[2] Trajan took advantage of the death of the Nabataean king, Rabbel II, to take possession of the kingdom and thus oust Rabbel's son Obodas.

[3] Palestine incorporated the Nabataean cities of the Negev: Shivta, Elusa, Phaino, Ayla, and Petra, while the southern region of Moab remained in the province of Arabia. These changes were made to strengthen the border of the *limes Arabicus* placed along the desert, whose limit was marked by *castra*. The military authority of each province was entrusted to a *dux* and was separated from the civil-administrative authority assigned to a *praeses*.

[4] Palestine Prima included Judea, Idumea, Samaria, and Perea.

[5] Palestine Secunda incorporated Galilee, the Golan Heights, and the cities of the Decapolis, previously assigned to the Palestinian region.

[6] Established from the former territory of the Province of Arabia. The border with Arabia was located at the Wādī Zared. This border, on the north side of Palestine Tertia, was subject to further changes in the early 6th century moving up to Wādī Mūjib/Arnon; the change led to the detachment of the cities of Charach Mouba and Rabbat Mouba from the jurisdiction of Arabia.



1. Plan of the Three Palestines and Arabia (Piccirillo 2002).

then plundered the city,[7] as testified by Strategios, monk of Saint Saba (Piccirillo 2002: 219).[8] In 628, the Byzantine emperor Heraclius reported an important victory over enemy troops and ratified the peace with the defeated Sassanids (Ognibene 2002: 23).

The Muslim invasion began with a defeat in Mu'ta, in the eastern part of Palestine Tertia, on 8 September 629. After the battle, Emperor Heraclius, experiencing great financial difficulty, decided to stop the economic aid to the Arab tribes who lived on the southern borders (Theophanes 336).[9] This led to the beginning of friendly relations between the federated Arab tribes and the Muslim invaders in 630, called the year "of the embassies" (*sanat al-wufud*), during the conquest expedition to the oasis of Tabuk (Schick 1992: 110–1). Through the Islamic conquests and the guidance of the Prophet Muhammad, Ayla Aila, the port of Palestine, was opened, and a peace treaty was signed with the Christian community of the city (Piccirillo 2002: 195–201).

A year after the Prophet Muhammad's death on 8 June 632, the Caliph elected by the Muslim community, Abu Bakr, sent a new expedition (Piccirillo 2002: 195–201). The first clash with part of the Byzantine troops took place in the Wādī Arabah, where Sergio, the *dux* of Palestine Prima who moved from Caesarea, was defeated. Emperor Heraclius, informed of the facts, sent the rest of the army, led by his brother Teodoro (Piccirillo 2002: 220–1). On 13 July 634, the battle took place in *Ajnadayn*, an area between Beit Gibrin and Lidda, where the imperial army suffered its first defeat. The surviving Byzantine army came back to Beisan in the Jordan Valley, to cross the river back to the Golan. The second clash took place in the Jordan Valley, near the city of Ṭabaqat Fiḥl (Pella), where the Byzantines withdrew on 23 January 635 (Piccirillo 2002: 195–201). The decisive conflict was fought on 20 August 636 along the bank of the Yarmuk River. In 638, Jerusalem surrendered too. The pacts were negotiated between the Patriarch Sophronius and Caliph 'Omar (Schick 1998: 75–6).

The First Phase of Arab Domination: The Umayyad and Abbasid Dynasties

The first dynasty of the Umayyads (661–750) settled in Damascus, showing a strong

[7] Sebeos says that after the initial surrender of the city, a revolt broke out between Jews and Christians. Then the Persians laid Jerusalem under siege for 20 days, conquered it, and plundered it for three consecutive days.

[8] Strategios tells of the arrival of the Persians, the destruction of most Christian buildings, and provides a list of the dead. The corpses were collected in streets, churches, and other buildings of the city by a courageous group of buriers led by a notary, Tommaso, and his wife.

[9] Theophanes stated that the reason for the support guaranteed by the Arab border tribes to Muslims led to the defeat against the Arabs. A historian from the early 9th century says that Muslims were able to travel to Mefaa, north of Wādī Mūjib, in January 629 without meeting Byzantine garrisons or federated Arabs in the area.

interest in the Jordanian and Palestinian territory.[10] The administrative structure was based on the 'Umar Pact (Perrin 2000: 43), partly testified by bilingual papyri (in Greek and Arabic) found in some churches in Nessana, in the Negev (Palestine Tertia), dating between the 674 and 690 (Di Nucci 2006: 31).[11]

The Arab administration assured the citizens' respect for churches and freedom of worship. Furthermore, Christians and Jews could not live in neighborhoods separated from the Arabs and had to pay a special tax (*jiziah)*. Then, the state owned only imperial goods and the lands of those killed in war and of emigrants; private property remained private. Those who disagreed with these principles could freely leave with their goods. Thus, the abandonment of churches in the Umayyad period, sometimes recorded by archaeological investigations, had little to do with religious relations between Muslims and Christians, but rather was the result of socioeconomic factors (Piccirillo 1984b: 333–41).[12]

To gain more control over the conquered regions, the Arabs created new military provinces. The territory was divided into *Ajnad* (singular: *Jund*), military districts (Shahid 1994a: 1–11) equivalent to the Themes used to divide the diocese of the East from the 628 to the 636 (Shahid 1994b: 352–76).[13] The Byzantine diocese of the East, made of eleven provinces, changed its name to Bilad al-Sham, made up of four *Ajnads* (*Jund* Filastin, *Jund* al-Urdunn, *Jund* Dimashq, *and Jund* Hims); which were then divided into smaller districts (*kura* Qura). The territories of the provinces of Arabia (Palestine Prima, Secunda and Tertia) were part of two *Ajnads*: *Jund* Filastin (formed by Palestine Prima and Tertia) and *Jund* al-Urdunn (composed of Palestine Secunda, the southern part of Phenicia Maritima, and the northern portion of the Arabia province; Fig. 2). The Ghassanids, the most important of the former foederate tribes, played a prominent role in this military system (Zayadine 2000: 37; Shahid 2002: 380).

Mu'awiya, the first caliph of the Umayyad dynasty, introduced the inheritance succession, which did not belong to the Arab tribal tradition nor to the Muslims in the election of the caliph. He also reorganized the army and introduced an administrative system based on Byzantine models, setting up an advisory board comprised of notables belonging to the former federated Arab tribes (Shahid 2002: 380).

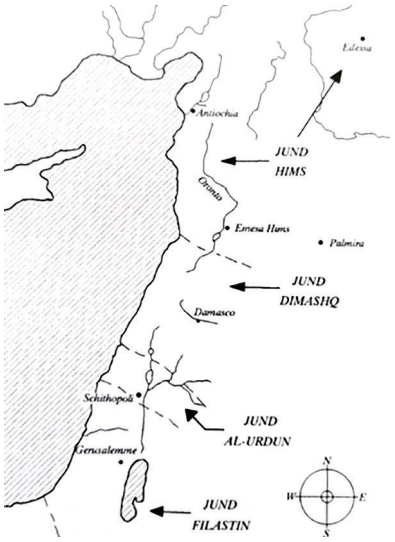
The balance created between the Arab tribes from the south and those from northern Arabia deprived the Umayyad dynasty of its main support against factions that for religious, social, political, and economic reasons, did not accept their exclusion. Among these, there were the "non-Arabs" converted to Islam (*mawali*), the Christians and the Persians, who had hoped to benefit from the same social and economic rights as the Arab Muslims, but who, in fact, were

[10] From the texts of the early Islamic tradition, it appears that the Umayyad dynasty, before the foundation of the new administrative capital of Ramla in the Palestinian plain began, wanted to make Jerusalem (which had taken the name of al-Quds) a religious political center, if not an alternative, certainly on the same level as Mecca, in the hands of the antagonist Abū Zubayr.

[11] The papyri mainly deal with taxation and liturgical rituals.

[12] In fact, the Arab population arises with the increasingly frequent use of the Arabic name accompanied in some cases by that of the tribe to which it belongs. The harassment to which the inhabitants were subjected is also documented, as are some compulsory job services imposed by the new authorities, which constituted one of the causes of the progressive abandonment of the territory.

[13] The diocese of the East was divided, before the Persian conquest, into 11 provinces. With the Byzantine reconquest, the territory was divided into military circumscriptions, and the themes were: theme of Emesa, theme of Damascus, theme of Jordan, theme of Palestine.



2. Plan of the division of the Three Palestines and Arabia into the Arab provinces (Hamarneh 2003).

affiliated as *clientes* to an Arab tribe, and remained as citizens of lower level, often not even exempted from paying the tax imposed on non-Muslims (Bianchi 2007: 22).

Caliph ʿUmar II (717–720) decided to transform the *pro capite* tax into a land tax imposed on all owners of any religion. Then, in order to demonstrate again the Muslim supremacy over the Christian populations, he changed the ancient contribution with a capitation tax imposed only on non-Muslims. The non-Arabs (*mawali*) at first were not considered equal to the Arabs; but the constant struggles between the Arab tribes and their authority led to the disappearance of the difference in social hierarchy. The Arab dominant class disappeared and was replaced by a mixed aristocracy, based on the delegated authorities of the prince.

These divisions within the state were exploited by the descendants of an uncle of the Prophet Muhammad, namely al-Abbas, his great-grandson. Abu al-Abbas, proclaimed himself a caliph in 749, and the Abbasid dynasty began. The Abbasid dynasty (750–809) moved the capital to Baghdad, Mesopotamia, leading to a change in trade routes to the Persian Gulf. The Jordanian area therefore lost importance. The region was abandoned, and with the exception of few urban centers, it remained in the hands of Bedouin tribes (Piccirillo 2002: 253).

Development of Christianity in Jordan

In Jordan, Christianity developed from Palestine through the Jewish province of Perea (Piccirillo 2002: 57). In Arabia, the attestation of a diocese in the 3rd century in Bosra is connected to the names of the bishops Berillo, Ippolito, and Massimo (Piccirillo 2002: 67). In the 4th century, the church was divided in a more articulated way, and within it, a hierarchy was created: bishops, who referred to the bishop of the metropolitan city of the province, who in turn referred to one of the most important episcopal seats: the Patriarchate of Antioch (the Patriarchate of Jerusalem will be added later; Piccirillo 2002: 67–8). From this moment, most of the information regarding the dioceses comes from the acts of the ecclesiastical councils and from the mosaic inscriptions inside Christian places of worship.

In the 4th–6th centuries, information on the development of the dioceses is mainly provided by the acts of the general and local councils.[14] In the Council of Nicaea (325), there was an increase in the episcopal seats, which reached a total of 18 in Palestine, while for Arabia five bishops are mentioned, coming from Bosra, Philadelphia-ʿAmmān, Esbous, Suwaida, and Batanee (Hamarneh 2003: 33). Between the Council of Ephesus (431) and that of Chalcedon (451), the number is doubled, due to the dynamism of Juvenal of Jerusalem (Piccirillo 1989b: 461). In fact, first at the so-called Second Council of Ephesus (449) and then at the

[14] In Palestine and Arabia, the Episcopal See will follow the same administrative division of the empire.

Council of Chalcedon, Juvenal managed to obtain the title of Patriarch, the jurisdiction of the Three Palestinas (Hamarneh 2003: 32), and made Jerusalem a patriarchate (Piccirillo 1989b: 461). Furthermore, with the Council of Chalcedon, 23 bishops were appointed for the Palestinian territory and the diocese of Gerasa was added in Arabia.

In the era of Justinian, there were 28 suffragan seats for Palestine Prima; 13 for Palestine Secunda; nine for Palestine Tertia with the Patriarchate of Jerusalem, and the three metropolitan offices of Petra, Beisan, and Cesarea Palestinae. To these must be added the four bishops of ʿAmmān, Esbus, Gerasa, and Mādābā, dependent on Bosra and consequently on the Patriarchate of Antioch (Abel 1936: 199–202; Bagatti 1982: 26; Fedalto 1983a: I 5–41; Fedalto 1983b: II 261–83). Regarding the further development of each diocesan seats between the 5th century and their disappearance, the importance of mosaic inscriptions in ecclesiastical buildings should be noted where bishops are often mentioned as promoters of the works (or simply remembered as head of the diocese) carried out in cities or villages (Hamarneh 2003: 34).[15]

The period between the 5th and first half of the 7th century is considered to be one of great prosperity, due to the generosity of the central government of the empire, especially towards the great sanctuaries of the Holy Land. In the rest of the Palestinian territories and the province of Arabia, public works were carried out by civil and military officials of the provincial administration, landowners, artisans and traders, officers and soldiers of the army, monks, and the general population (Hamarneh 2008: 62), who were joined by Christian Arab groups, especially the *Banu Ghassan* (Piccirillo 2002: 191–217). In fact, they settled in the abandoned Roman fortified structures, transforming them into large rural agglomerations. Their Christianization is testified by Sozomeno in *Historia Ecclesiastica* during the reign of the emperor Arcadio, but it could have been started in the 4th century, as can be deduced by the mention of Arab bishops in the councils of Seleucia and Antioch.

Christian Communities in Palestine and Arabia from the Second Half of the 7th Century until Their Disappearance

The mosaic floors of the churches dated between the 7th and 9th centuries must be interpreted in continuity with the Byzantine period. The inscriptions mostly come from the province of Arabia, but there are also some from Palestine Tertia. The texts are precious documents, which attest to the continuity of life and peaceful coexistence between the Islamic and Christian communities (Piccirillo 2002: 227). The churches show that political change was not experienced with the drama reported by contemporary literary sources, and that it did not change the everyday way of life of the Christian communities, apart from the payment of taxes *jizyah* and *kharaj* to the Arabs.

The few remaining literary sources describe the Arab period as "a world subject to great misery, sadness, privations and constant difficulties" (Pirone 1991) for Christians. For monastic communities, however, a completely different condition is described. An example is the "Life of Saint Stephen Sabaita" (Pirone 1991), in which the daily life "in the territories governed by the Arabs" is documented.[16] From this work, it is clear that the political change was experienced by the monks of Saint Saba only in a marginal way, and they

[15] They saw reflected in the mosaic floors the great prestige achieved by the important local families who were the great engine of development in the cities and in the countryside, especially in the 6th century (the most prosperous period).

[16] The period of the life of St. Stephen took place between 725 and 794. The original was written in Greek by his disciple Leontius of Damascus around 807 in the graduation of St. Saba.

continued their life as they always had. Despite the difficulties, Leontius (Pirone 1991) sufficiently documents that the lives of Christians continued their normal course. Pilgrimages to holy places continued from the surrounding regions and even from Europe. This peaceful coexistence is also attested through the memories of public and private debates, held at the court of the Caliph, in which theological questions were discussed between the two communities (Piccirillo 2002: 226).

In the same line of continuity with literary sources, regarding the presence of Christian communities in Jordan, the mosaic floors with inscriptions dating from the 7th and 8th centuries must be interpreted, which also give us other information from the Umayyad and Abbasid period. It seems that the communities were able to support church reconstruction and construction projects from the beginning. In many cases they have integrated the episcopal lists, of which otherwise we would not have further references. These testimonies reveal the type of patron, fruition, and chronology of the monument, highlighted by the various interventions that have occurred over the time (Hamarneh 1996: 66).

In these inscriptions, the primary role of the bishop is evident (Tables 1–2; Piccirillo 1980: 328–32) as promoter or witness of the works carried out in the diocese (the city) and the villages.[17] The bishop often gave jobs to the members of the lower hierarchy of the clergy, such as the corepiscopes (Politis 1992: 281–90), the periodeuti (Saliou 2000: 390–411), the presbyters (Piccirillo 1980: 317–50), the deacons (Piccirillo 1987: 177–239), archdeacons (Negev 1981: 61–2), treasurers (Piccirillo 1984a: 329–40), readers (Gatier 1998: 388–9), and members of monastic communities (Piccirillo 1994: 521–38).

In addition to the high ecclesiastical commission, more donations also appear from whole cities and villages, as in the mosaic of the Church of the Virgin in Mādābā (Piccirillo 1982: 373–408; Di Segni 1992: 251–7), or in the first phase of the flooring of the Church of St. Stephen in Umm ar-Raṣāṣ (Piccirillo 1987: 177–239; Piccirillo and Alliata 1994: 241–71). Lay donors, who contribute to the creation of secondary floor, are also mentioned with invocations for help (Piccirillo1987a: 177–239) and commemorations of the deceased, useful for understanding the social structure of the population. There are also cases in which anonymity formulas are used, probably by the choice of the donor (Hamarneh 1996: 55–75).

Furthermore, there are various testimonies of reconstructive work and decoration, of which a significant example comes from the complex of St. Stephen in Umm ar-Raṣāṣ, where an inscription dating to 756 was found. This inscription certifies the commission of a second mosaic in the presbytery area, when the presbytery was modified and raised from the original level in the year 718, as confirmed by the inscription in the mosaic below (Piccirillo 1987a: 177–239; Piccirillo and Alliata 1994: 241–71).

In the 8th century, evidence of Christian communities is apparent in progressive building constructions, like Umm ar-Raṣāṣ, Mādābā, and Jerusalem. In other places, however, the signs of frequentation come from the phenomenon of iconophobia. This crisis has been noted in human and animal figures that have been targeted and deemed to be without theological value, as in the case of iconoclasm. It seems that the manifestation

[17] The names are useful as a safe guide for defining the diocesan territory, understanding where the jurisdiction of the dioceses extended and chronologically following the history of architectural development in cities and villages. An example of the fundamental role of the bishop comes from the inscriptions present in the ecclesiastical buildings of the villages of Khirbet al-Samra and Riḥāb.

Table 1. Episcopal list of the Province of Arabia (Patriarchate of Antioch).

Diocese	Name of the Bishop	Dating
Mādābā	Sergio II	718
	Job	756–762
	Theophane	767
Philadelphia	John	649
	George	687
Bosra	Teodoro	633–638
	George	691
	Stephen	8th century

Table 2. Episcopal list of the Province of Palaestina Tertia (Patriarchate of Jerusalem).

Diocese	Name of the Bishop	Dating
Zoarʿā	Chrestos	691
Areopolis	Stephen	687
Elusa	George	639

of the aversion of the Semitic populations towards animated images of any kind can be identified as the root of the phenomenon. References to this crisis in literary sources are scarce. The only one that could be read as an intervention against iconophobia is the discussion that took place during the Council of Nicea in 787. The priest John of Jerusalem (Ognibene 2002: 133–4) accused Caliph Yazid II of the destruction of the mosaics: "the holy icons and all other things of the same kind were destroyed in every province of his empire" (Piccirillo 2002: 248). Apart from this episode, neither Arab nor contemporary Christian sources make any reference to the iconophobic phenomenon.

The iconophobic crisis affected not only the mosaics of the Umayyad period, but also those of the previous era which were still in use in the 8th century (Piccirillo 2002: 243–8). After the mosaics were damaged, there were immediate restorations with the same polychrome tesserae, or some tesserae of different sizes, or simply lime plaster mixed with sherds. In most cases, the original image was replaced by dis-figurative geometric-floral motifs (Ognibene 2002: 145). Together, the restorative work and the inscriptions testify that the mosaics were used by the Christian community even after the iconophobic crisis and suggest that the dis-figurative interventions and restorations were performed by Christian workers

(Ognibene 2002: 145). Nevertheless, the authorship of the iconophobic order and the duration of the phenomenon are still under discussion. The iconophobia seems to be of Muslim origin, in connection to a similar current present within Islam. However, it has yet to be determined whether the caliphs ever intervened with an order in a Christian church (Piccirillo 2002: 245).

One hypothesis sees this phenomenon as an act prompted by the Christian authorities because of the ʿUmar Pact, which decreed that the churches had to host the prayers of Muslims. Perhaps an additional condition was also placed, namely that the figural representations in the building had to be removed or covered.[18] This hypothesis suggests that the iconophobic intervention was likely initiated by Christians to protect ecclesiastical buildings and accommodate the Islamic community. To prove this hypothesis, however, it is necessary to rely only on data from archaeological research, as clearly stated by Piccirillo (1996: 173–93).

Why Christian communities ultimately left the territory is still unclear. Climate change and epidemics have been proposed as causes, but none of them is entirely likely. Most hypotheses relate to the Bedouinization process. After the Arab invasion, the tribes continued to enter the territories of Palestine and Arabia, causing damage to agriculture and sedentary life in the region, especially in the provinces of Arabia and Palestine Tertia (Piccirillo 2002: 253). Many lands were abandoned or left by farmers and cultivated by new arrivals, who were novice farmers and caused much damage, not knowing the proper cultivation techniques. The consequent abandonment of the countryside led to desertification, erosion of fertile soil, and loss of many areas suitable for agriculture. This explains the presence, noted by archaeologists, of oil mills and wine presses in areas that were then deserted, such as the cities of the Negev, Umm ar-Raṣāṣ, and Mt. Nebo (Piccirillo 2002: 253).

[18] Several ecclesiastical buildings were used by Muslims for prayer, such as the Basilica of St. John in Damascus, the Church of Homs, the Church of St. Sergius in Rasafa, the Church on the Tomb the Mary of Gethsemane, and the Basilica of the Nativity in Bethlehem, despite protests by Christians.

Examples from the Dioceses of the Provinces of Arabia and Palestine Tertia

Diocese of Bosra

The first evidence comes from the diocese of Bosra and can be dated during the clashes between Muslims and the Byzantines (630–636). We are informed that between 634 and 638, the inhabitants of the villages of Riḥāb paved mosaics the churches of St. Menas ("By grace of Jesus Christ God and our savior was built and mosaic and finished the temple of St. Mena in the time of Theodore the most holy and honored by metropolitan God . . ."; Fig. 3), St. Isaiah ("In the time of the most holy Theodore our metropolitan and archbishop this temple of the holy prophet Isaiah was mosaic. . ."), and Khirbat as-Samrā ("Under the most holy and most blessed Archbishop Theodore the mosaic of the holy place of the martyr John was made. . ."; Fig. 4). These texts mention the archbishop and metropolitan, Theodore, who is not mentioned in the list of bishops of the diocese of Bosra.

Given that the city of Bosra, the metropolitan seat of the province of Arabia in whose territory are located the two villages of Riḥāb (Piccirillo 1981a: 76–7) and Khirbat as-Samrā (Gatier 1998: 384–9; Piccirillo 1993: 306), was conquered in 634/35, and factoring in the necessary time for the implementation of these works, it must be deduced that the population of the two villages continued their daily lives as if they were not affected by the events at the eve of the military disaster of 636.

From the floor of the central nave of the Church of St. Constantine in the village

of Riḥāb comes an inscription (Fig. 5) in a frame, in which the commissioning benefactor, named Constantine, wanted to entrust the memory of himself to Christ the Lord. Instead of a figure, two numbers "TM" (= 340) have been written on the white background of framed sector of the mosaic. Leah Di Segni, comparing this case with others in Palestinian and Jordanian territory, in which the *era ab origine mundi* is used, reads this as dating to AD 832 (Di Segni 2006: 578–92). In this way, this can be read as a restoration of a Christian church dating back to the 9th century (in addition, the material found during the excavations date to the 9th–10th centuries as well).

Diocese of Philadelphia-ʿAmmān

Three of the inscriptions from the diocese of Philadelphia-ʿAmmān are of great interest for this topic. They are texts referring to the second phase of the Khilda cult building, dedicated to St. Varus ("O Lord God of Saint Varus. . ."), and dating to the 687 (Fig. 6). St. Varus was actually one of the few saints remembered in these Jordanian inscriptions that date to the Arab period. The restoration was carried out by Bishop George of Philadelphia-ʿAmmān, and thanks to George's son, John, the presbyter (also named John), and their families ("At the time of the most holy and most holy Bishop George, the entire work of the place was restored and completed. Saint with the care of George, John, and the presbyter John and all the members of their families, in the year 750"; Fig. 7; Najjar-Sa'id 1994: 547–60).

From the lower church of the village of Al-Quweisma, however, comes a mosaic inscription which recalls the integral restoration of the church by the presbyter and treasurer Tzobeo in the year 780 (Piccirillo 1984a: 332–3), which according to the Pompeian era of Philadelphia-ʿAmmān, corresponds to AD 717/18, the era of ʿUmar II ("By God's providence and by the zeal and care of Tzobeo the most precious priest and treasurer was restored from the foundations the whole building of this most holy church and was paved in mosaic for his salvation, and that of Macedonio, Abbiba and John his brothers, at the time of the first indiction of the year 780"; Fig. 8). In the presbytery of the same church, it is possible to see a mosaic inscription in Aramaic-Palestinian (Fig. 9) and part of a second text with



3. Inscription in the church of St. Menas in Riḥāb (Piccirillo 1981b).



4. Dedication epigraph in mosaics found in John the Baptist in Khirbat as-Samrā (Piccirillo 1993).



5. St. Constantine a Riḥāb. The disfigured mosaic panel with the two letters TM added during the restoration (Di Segni 2006).



6. Inscription in which the martyr Varus is remembered in the church of Khilda-ʻAmmān (Najjar and Sa'id 1994).

an invocation in Greek ("Oh Lord [help] the village"; Fig. 10). The inscription in Aramaic-Palestinian must be mentioned because, even if it is of Semitic origin, in this text the name *Ḥabbiba* refers to someone who is very likely the same person mentioned in the dedicatory inscription of Tzobeo: there is then epigraphic evidence that demonstrates the contemporaneity of the two Greek inscriptions with this one of Semitic origin. The dating of 717–718 for the Christ-Palestinian inscription is very remarkable, because these types of texts are rarely dated or datable. It also underlines that this church was part of a monastery and that Tzobeo, Macedonio, *Ḥabbiba,* John, Stephen, and Raytou were monks from this holy place, as expressed by the sentence αὐτοῦ ἀδελφῶν. This can also be read in the "Life of St. Stephen Sabaitha" and Abbot Cosma (egumene of the Al-Quweisma monastery) who visited their monastery.

The dedicatory inscription in this church also comes from a special place. In fact, it is located in the lateral nave, facing a wall that shows no sign of any entrance. It will certainly be a topic to be explored.

Diocese of Mādābā

From the diocese of Mādābā come 70 cases, the largest number of mosaic texts in Jordanian territory. At the turn of the 8th century, some cities stand out for their progressive building development: Umm ar-Rasās, Maʻīn, ʻAyn al-Kanisah (near Nebo), and Mādābā.

Maʻīn–Belemounta was founded in the 719/720 on an acropolis within the diocese of Mādābā. The church shows the use of iconographic decoration with vignettes of 11 locations on the Jordan River (Fig. 11). Belemounta is one of the toponyms of the western area of the Jordan. The same toponymal was also found in the southern part of the coeval church of St. Stephen in Umm ar-Raṣāṣ (Piccirillo 1989a: 232–4).

In the dedicatory, incomplete inscription, two biblical passages are mentioned: Psalm 117.20 ("This is the door of the Lord, the righteous will enter through it. . .") and Psalm 86.2 (". . . Love the Lord, the gates of Zion more than all the tents of Jacob"; Figs. 12a–b).

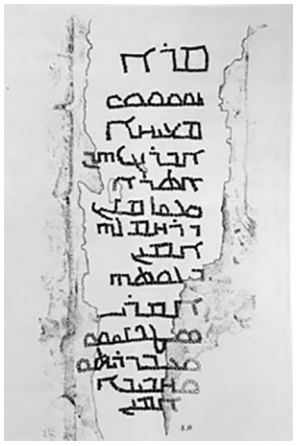
Regarding Umm ar-Raṣāṣ–Kastron Mayfaʻah, it is necessary to recall that in 718 the church dedicated to St. Stephen was



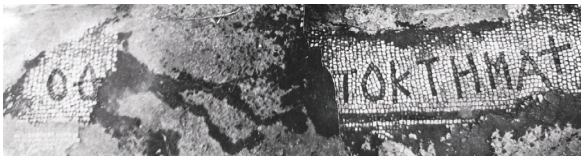
7. Dedicatory inscription of the Church of St. Varus in Khilda-ʿAmmān (Najjar and Sa'id 1994).



8. Inscription in mosaics in lower church of Al-Quweisma (Piccirillo 1993).



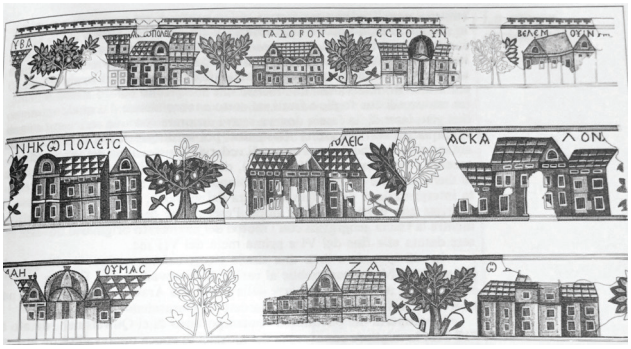
9. Aramaic-Palestinian inscription in mosaics in lower church of Al-Quweisma (Piccirillo 1993).



10. Greek invocation in the lower church of Al-Quweisma (Piccirillo 1984).

built on the northern edge of the town by the bishop Sergius II ("At the time of the most holy Bishop Sergius, the mosaic of the saint was completed and illustrious protodiacon and protomartyr Stephen. . ."; Fig. 13). The mosaic floor of the new foundation cites numerous toponyms east and west of the Jordan River, together with a selected sample of Nile Delta locations, using the usual repertoire of iconographic themes. Particularly interesting is the presence of representations that refer to ecclesiastical and lay evergreens from other villages in the *chore* of Mādābā, offering an important map of the flourishing places within the diocese (Piccirillo and Alliata 1994: 241–69).

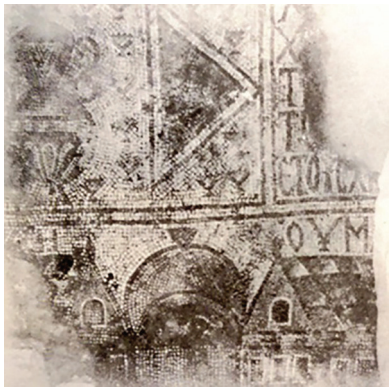
The inscriptions refer to the complex social structure of Kastron Mayfaʿah. The main one recalls the figures of a deacon, archon, and bursar. Among the petitioners, the people who love Christ are mentioned: seven of the most eminent members seem to be listed in a long strip under the inscription. In addition, there is a later restoration dating precisely to 756, initiated by the bishop Job



11. The geographical plan in the church of Maʿīn (Piccirillo 1993).

("By grace of Christ the mosaic of the holy bema was embellished, [precisely] this at the time of our most pious father Job the bishop. . . in month of March, 9th indiction of the year 650"; Fig. 14). Only about 60 inscriptions come from this site, including the topographical vignettes datable to the full 8th century (Piccirillo and Alliata 1994: 241–69).

In the monastery of ʿAyn al-Kanisah, dedicated to the Theotokos in the valley of ʿAyn al-Kanisah at Mt. Nebo, the restoration of the mosaic floor dates to 762, almost coeval with the second phase of St. Stephen, both promoted by bishop Job of Mādābā ("By the providence of God this venerable monastery of the Saint Theotokos was rebuilt at the time of Job, bishop of the Medabesi and George the recluse. For the salvation of those who offered. Fifteenth indiction of the year 6270"; Fig. 15). The reference to the recluse seems important, being a form of asceticism and monasticism not widespread in the Jordanian area. From this text we have a remarkable enrichment of the monastic vocabulary in the region. Furthermore, dating confirms the vitality of the monastic presence in the valleys and on the top of Mt. Nebo (Piccirillo 1995a: 409–20).



12a. Dedicatory inscription in the church of Maʿīn (Piccirillo 1984).



12b. Dedicatory inscription in the church of Maʿīn (Piccirillo 1984).

At the Basilica of the Virgin in Mādābā (Piccirillo 1982: 373–408), the later restoration of the internal part of the building is remembered in a dedicatory inscription, dated to the year 767. The restoration took place thanks to the bishop Theophanes and the help of the entire city of Mādābā ("At the time of our most pious



13. Dedication epigraph (1st phase: 718) from the mosaics of St. Stephen in Umm ar-Raṣāṣ (Piccirillo 1993).

father Bishop Theophanes, this beautiful mosaic work was made of the glorious and venerable house of the holy and immaculate Queen Mary Mother of God. . . It was finished by the grace of God in February of the year 6074, fifth indiction"; Fig. 16). This intervention, which chronologically bears the last date attested in mosaic inscriptions from the Mādābā region, opens a controversial issue on the ecclesiastical organization in the region during the 8th century, and above all, on the abandonment of the religious buildings which, as attested by ceramic finds, occurred during the 9th century (Di Segni 1992: 251–7).



14. Dedication epigraph (756) from the mosaics of the presbyterium of St. Stephen (Piccirillo 1993).

Diocese of Zoarʿā

The end our excursus leads to the diocese of Zoarʿā, and specifically Dayr ʿAyn ʿAbāṭa, where the bishop Jacob built the first part of the building dedicated to Lot in 606. It was then restored in 691 by the chorepiscopus Crestos (Politis 1992: 281–90), with the help of lay donors, as he says in the text: "At the time of the beloved priest and chorepiscopus from God Crestos, the treasurer of Zeno and John Rabebos and Diocetus. The basilica of the holy place was paved in mosaic in the year 586" (AD 691; Fig. 17). This information attests to the presence of a chorepiscopus still at the end of the 7th century; therefore these itinerant officials still existed, maybe to help the bishop in the more distant communities.



15. Dedication epigraph of the second phase of the mosaics from the Theotokos in ʿAyn al-Kanisah of the Virgin in Mādābā (Piccirillo 1993).

Critical Issues

The importance of the mosaics found in Jordanian churches, the chronological continuity (from the 6th to the 8th century) attested in their inscriptions, the refinement of the decorations, and the careful restoration work are striking. These mosaics help

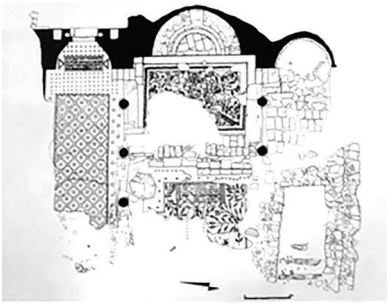


16. Dedication epigraph (767) from the mosaics of the church of the Virgin in Mādābā (Piccirillo 1993).

to reconstruct devotional, cultural, and social paths in a region not sufficiently documented by written sources. They gave way to partial reconstructions of Jordanian episcopal lists, as well as to new information on the Christian communities and private donors, who helped in the construction of the church, and to deeper knowledge about the wealth of the monastic communities during the Arab period.

Moving forward in my study on inscriptions, several points of reflection appeared clearly. One of these concerns the importance of local commissioning on the creation of mosaic floors, as it was the great engine of development for the city and the countryside. Also important is the value of the clergy and ecclesiastical hierarchies, which appear as donors integrated into the local communities, while the bishop appears to be mentioned as the promoter of the work.

Dauphin (1978), in this sense, thinks of an extremely restricted contribution of the bishop, limited to the diocesan centers and not to the adjacent territory, and proposes that the work was done by other members of the minor clergy. The scholar's statement seems unconvincing for Hamarneh (1998), who believes that some inscriptions found in small villages distant from the diocesan center (*i.e.*, Umm ar-Rasās or Khirbat as-Samrā) bear dedications from bishops. Hamarneh bases her reconstruction on the epigraphic findings that allowed for the creation of episcopal lists and which suggested the constant presence of the bishop, both in the main city of a certain diocese and in the surrounding area. But only the case of Umm ar-Rasās points out how the entire population of the rural village got involved in its decoration, with a greater number of lay people than clergymen. Probably the bishop is only remembered in the inscriptions as a pastor of his own diocese, but this does not show his active intervention in a particular city. Of great importance may be the presence in the 7th century of a chorepiscopo in the diocese of Zoarʿā, and in the 8th century of a periodeuta in the diocese of Gaza, moving among communities to replace the bishop. Furthermore, in order to find a solution to the problem, a new study could compare the epigraphic attestations for their chronology, their original site, and the ecclesiastical or



17. Dedication epigraph of mosaics in St. Lot in Dayr ʿAyn ʿAbāṭa (Piccirillo 1993).

secular hierarchical components that are appointed. In addition, it should not be forgotten that in the 8th century some of the most important cities began to depopulate, with people moving further inland to rural areas, where in fact communities will have a longer life span.

A real mystery, on the other hand, is the city of Jarash, which presents only epigraphic records dating back to the first half of the 7th century (611). Strangely, no attestation can be dated to the transition period from the Byzantine age to the Arab age, but not even to a later period. With great certainty, however, we can say that a Christian community was still present in the city, because ceramic elements were found in the excavations of ecclesiastical buildings dating back to the 7th–8th century. Among these, a terracotta lamp with Arabic inscription dated to 125 of the Egira (AD 737), which came out of the workshop of the potter David, son of Mustafa. A cross on the bottom is also added, and testifies how the humble object was intended for the use of Christians.

Even the phenomenon of iconophobia still leaves several questions. There are systematic—partial or total—destructions aimed at making the images of living beings present on mosaics and liturgical furnishings unreadable. The attention that characterizes this phenomenon, which can be seen in the full rearrangement of the floors, makes it possible to identify the material executors of these interventions in the Christians themselves. The issue relating to the instigators of these destructive operations remains widely discussed to date, since the iconophobic phenomenon is not only registered in the churches, but is also found in the synagogues of the region.

It should be noted that the floors installed in the Umayyad period (such as the mosaic of the lower church of Al-Quweisma dated 719/720, the one of the church on the acropolis of Maʿīn with the same chronology, as well as the first level of the floor mosaic of the Church of St. Stephen of Umm ar-Raṣāṣ dating to 718) show the memory of figural representations used in the original decorative program. Subsequent interventions, such as the new 756 floor located in the presbyterial area of the Church of St. Stephen of Umm ar-Raṣāṣ, placed above the previous one (which was presumably figured), show geometric decoration indicating that the iconophobic intervention should be placed chronologically around or before that date.

Finally, a question that Piccirillo asked himself was: "when and why did the dissolution of this world take place with the abandon of Jordanian cities, villages and countryside?" (Piccirillo 2002). The causes of this are still to be understood.

In conclusion, we can say that, in addition to literary sources, Byzantine-Arab inscriptions can help us in answering many open-ended questions about the borders of the dioceses and increase episcopal lists that still partial and poor of this period. They also help us to appreciate the wealth of the Christian villages, still active despite the presence of the Arabs, and above all, to understand why there was a mass abandonment of the region at some point. According to the archaeological findings and the few existing sources, it is possible that peaceful coexistence was attested until the 9th–10th century, when Muslims seemingly decided to end the policy of religious tolerance.

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Rural Properties in Byzantine and Islamic *Arabia* and *Palaestina Tertia*: Church, State, and Landowning Élite

The socio-economic assets of marginal lands in the Byzantine East were much dependent on the development of rural landscape in the provinces of *Arabia* and *Palaestina Tertia* in the 5th–8th/9th centuries. The considerable number of village-based communities, revealed by long-running sursveys and excavations, attest to a profound secular and ecclesiastic impact on landscape exploitation (Hamarneh 2003: 34–43; Walmsley 2005: 511–3).

Most scholars agree that the mid-5th century witnessed an interplay of social and spatial norms that placed special emphasis on the larger function of frontier zones (Fiema 2002: 131). In this context, local populations settled in marginal areas, on the edge of the desert, and provided agricultural labor and military protection (Fiema 2002: 132). The pattern also reflected administrative readjustments and the gradual decrease of the influence exerted by municipal governments, which reshaped the function of Late Antique cities. Church institutions gained instead more relevance, as illustrated by the establishment of diocesan centres in the 4th–5th centuries (Fig. 1). The bishop's authority in urban administration was formally recognised by laws, promulgated in AD 409 for the West and repeated in AD 505 for the East (Sarady 2006: 184–5). Subsequently, Emperor Justinian, through *Novella* 131, recognised these obligations; hence the Church became a driving force in the social fabric by promoting building projects, not only of edifices connected directly with its duties, such as churches and charitable institutions, but also of civic structures such as defensive walls, baths, public inns, and prisons (Gatier 1985: 299–300; Feissel 1989: 821–3; Hamarneh 2013: 416–7).

The ecclesiastical hegemony apparently limited the agency of local elites, who instead were obliged to direct their interests toward rural settlements, especially in

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1. Plan of the Three Palestines and Arabia (by M. Ben Jeddou).

the 6th century. The attention towards the countryside revitalised the economy, created a new social order, and led to the development of a provincial aristocracy consisting primarily of landowners. Greek dedicatory inscriptions hint at the involvement of private donors in the building of rural churches and paving them with mosaics, attesting to the full spatial integration of Christian monuments into the fabric of villages.

Archaeological excavations bear witness to the growth of large agricultural settlements, mainly represented by villages that rose on, and incorporated, abandoned Roman *castra*. Most of these settlements illustrate an important building policy that may reflect a growing interest of the Church in these villages, and particularly in the land it possessed (among others Umm ar-Raṣāṣ/Mefa'a in the bishopric of Mādabā, serves as a fine example; Fig. 2). Thriving rural settlements were associated with extensive stretches of centuriated fields spreading beyond the village limits, with hamlets and industrial installations, notably wine and



2. Aerial photo of Umm ar-Raṣāṣ (courtesy of APAAME_20170920_MND-0179).

olive presses (Hamarneh 2013: 63).

The epigraphic evidence indicates that the main euergetistic activities in villages were conducted by the religious authorities, at local or diocesan levels. They performed structuring efforts that sharply modified the topography of settlements both internally and externally. Provincial or municipal authorities rarely acted in their official capacity, but rather as private sponsors, just as the provincial aristocracy or more humble village dwellers. Additionally, inscriptions on rare occasions single out the occupation of lay donors, and it is hardly ever connected to agriculture; laymen are identified as soldiers,[1] mosaicists, merchants, or controllers of weights (Hamarneh 2003: 230–8). This *ex silentio* implies that most donating communities were well structured within the agrarian context and performed tasks strictly connected to the exploitation of land. The agricultural labour was reflected instead in the rich decorative repertoire of the mosaic pavements, owing the fact that local sponsors may have had a responsibility

[1] The papyri of Nessana refer to several soldiers involved in buying land in the town (*P. Ness.* 3.14–30).

in choosing decorations that expressed their toil and daily realities.

Within the briefly sketched framework, the reconstruction of land property in quantitative and qualitative terms remains uncertain; though a definition of a hierarchic order of small and medium sized landowners can be evinced in *Novella* 138 of Justin II of AD 566 (Lemerle 1979: 26; Decker 2009: 66–7). More effective reconstructions of forms of transactions related to agricultural land ownership can be glimpsed from the corpus of Nessana and the Petra Papyri. Economic stratification is also suggested in texts concerned with rural church sponsorship and may allow for the reconstruction of specific patterns according to the order in which the names are listed.[2]

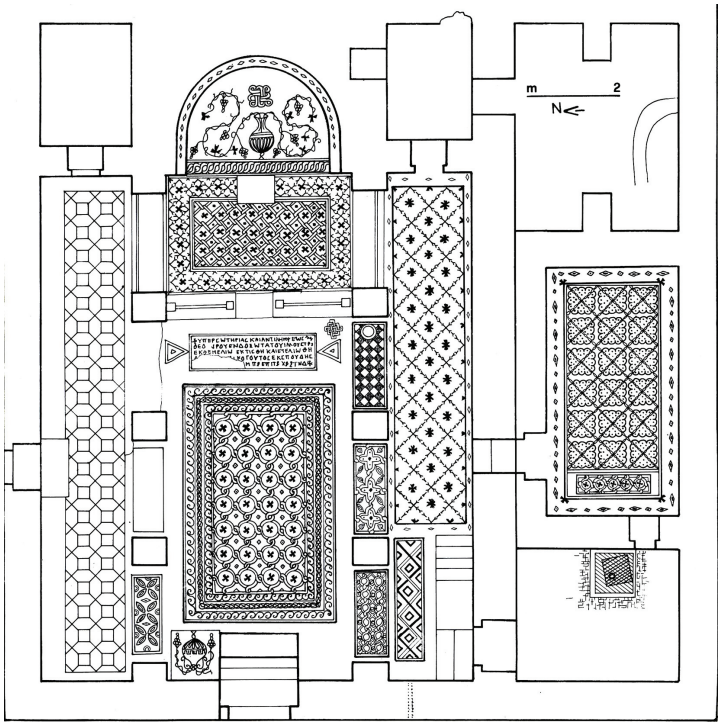
Significant contribution to broaden our understanding of the landscape of the village and the place of men within that landscape is provided by inscriptions mentioning specific tasks of administration. The first case is that of the involvement of an *epitropos* (a term designating a procurator or an administrator) in the construction of the Church of ad-Dayr in Maʿin (the biblical Baʿal Maon/Belemonta [Piccirillo 1989: 245]; Fig. 3). The church inscription, dated to the 6th century, does not mention Church officials. Instead it lists Theodore, the most glorious *illustris*, and the efforts of the *epitropos* (administrator) in building the holy house from its foundations (Gatier 1986: 193–4; Di Segni 1995: 314–6; Fig. 4).[3] One may notice that the main donor, to whom all honours are attributed, acts in his private capacity, together with an administrator, who probably managed Theodore's private estate on the outskirts of the town. This interpretation can be supported by an episode mentioned by Cyril of Scythopolis in the *Life of Sabas*. Following dissension amongst his opponents in the Great Laura, Sabas was forced to leave for Nicopolis (ʿAmwas), where he dwelled in seclusion under a carob tree. The *epitropos* of the site came to see him and constructed a cell on the spot that soon developed into a *coenobium* (*Vita Sabae* 35 in Schwartz 1939: 120–1; Baldelli *et al.* 2012: 262–3). The episode may indicate that the tree grew on an extensive private estate that required an administrator (*epitropos*). The term is also mentioned by Sozomenos in his *Historia Ecclesiastica*. He relates that Calemerus, the *epitropos* of an estate in Kaphar-Zechariah near Eleutheropolis, was well disposed towards the owner, but hard, discontented, and unjust towards his neighbouring peasants. However, these defects were apparently accepted and did not prevent Calemerus from receiving instructions to find the tomb of Prophet Zacharias in a garden nearby (Sozomenus 17; Walford 1855: 423–4). The term is also listed in various contexts in the Petra Papyri (*e.g.*, *P. Petra* 6a *ca.* AD 573 (?); *P. Petra* 98 [Kaimio and Lehtinen 2018: 203]; *P. Petra* 74 *ca.* AD 559 [Arjava and Vesterinen 2007: 95]).

Large villages, that cannot be considered as one unique domain, may have consisted of several stretches of privately owned land, which required specific agents/trustees or administrators representing the landlords. A system that reflected in church inscriptions with reference to the *pistikos* attested both individually or collectively.[4] According to

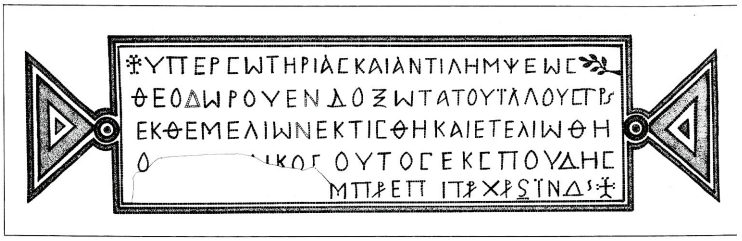
[2] The inscriptions found in *Arabia* and *Palaestina Tertia* do not mention the extension of the area laid in mosaics offered by each donor. One may speculate that the name order together with texts inserted in independent small spaces may reflect not only the prominence of the social standing but also point to the quantity of economic investment. Insights to such practice are provided by the Greek inscriptions of the church discovered in ʿUquerbat near Hama in Syria (Jaghnoon 2019: 8–15).

[3] The text: 'For the preservation and succor of Theodore/the most glorious illustrious/This holy house was built from the foundations by the effort of (name lost) the clarissimus epitropos in the sixth indiction' (after Gatier 1986: 193–4).

[4] Piccirillo translates *pistikos* as an adjective meaning faithful.



3. Ad-Dayr church of Ma'in (after Piccirillo 1989).



1. † Ὑπὲρ σωτηρίας καὶ ἀντιλήμψεως
2. Θεοδώρου ἐνδοξωτάτου ἰλλουστρ(ίου)
3. ἐκ θεμελίω[ν] ἐκτίσθη καὶ ἐτελιώθη
4. ὁ ἅ[γιος] οἶκος οὗτος ἐκ σπουδῆς
5. [....λα]μπρ(οτάτου) ἐπιτρ(όπου) χρ(όνων) ϛ̄ ἰνδ(ικτιῶνος) †

4. The inscription of ad-Dayr church of Ma'in (after Piccirillo 1989).

Di Segni and Feissel, it may refer to trustees or administrators who managed property or revenues for third parties (Di Segni 1995: 316; Feissel 2006: 261).

The inscription in the Church of Bishop Sergius at Umm ar-Raṣāṣ/Kastron Mefa'a (dated to AD 587) lists five persons among the donors defined as *pistikoi*

1 Κ(ύρι)ε ὁ Θ(εὸ)ς βοήθησον τοὺς καμόντας
2 τὸ ψήφειν τοῦτον ‹ὧν› ὁ Κ(ύριο)ς γινώσκει
3 τὰ ὀνόματα. Ἐν τοῖς χρόνοις Σοέλου
4 Κασσισεου Αβδαλλου Οβεδου Ἡλίου πιστικοί.



5. The inscription of Bishop Sergius Church of Umm ar-Raṣāṣ (after Piccirillo 1994).

or administrators (Fig. 5), rather than faithful as suggested instead by Piccirillo (1994: 259). However, it may also refer to a function of trusted agent as mentioned in the *Spiritual Meadow* of John Moschus (*Pratum* 79, p. 87 iii: 2936)[5]. This plurality of significant values given to a *pistikos* allows us a glimpse of its compatibility with a rural environment in which administration of property and commerce were entwined.

The term *pistikos* is used, according to the integration of the partially conserved mosaic inscription, in the dedicatory text of the church of the Reliquary at Umm ar-Raṣāṣ dated to 586 (Piccirillo 2006: 384–5). Another *pistikos* is listed by name in the 8th century pavement of St Stephen's Church in the same village (Piccirillo 1994: 247). The complexity of the agrarian economy of Kastron Mefa'a (Umm ar-Raṣāṣ), the extension of the fenced fields, terraces, and dams, visible in the aerial photographs, suggest extensive fractioned properties, either single or collective, part of which required professional administrators, hinted to by the donorship of at least six *pistikoi* in the aforementioned churches in the second half of the 6th century.[6]

A church built on private property,[7] or with private funds, could be also the case of that of ar-Rashidiya (near Ṭafilah) in AD 573/74 (Mahamid 2003: 7–16). The dedicatory inscription does not refer to members of the local or diocesan clergy, it mentions only Megale, *Christ-Loving* as founder and a mosaicist from *Aelia* (Jerusalem; Fig. 6).[8] The prominence of the dedicatory inscription, set in a medallion in the main nave, suggests that the status of the woman was that of a wealthy local aristocrat who exercised her authority as patron and almsgiver by building the church on privately owned land or with her own wealth. In addition, there are no siblings or relatives associated with the woman in the text (Di Segni 2006: 587–9). This allowed

[5] According to different interpretation it may designate a village magistrate who held a collegial office for a fixed term as in inscriptions from the Hauran (Di Segni 1995: 316).

[6] Julian the *pistikos* is mentioned in the inscription of Beth Ther in *Judaea* dated to the late 6th or 7th century (Avi Yonah 1932: 142; Di Segni 1995: 315).

[7] The church rises on the eastern limits of a small settlement. It consists of a three naves basilica (15.5 x 25 m), built not far from a wine press (Mahamid 2003: 12).

[8] 'Entering hither thou will see the virgin mother of Christ, the ineffable Logos, dispensation of God, and if thou believe, thou shall be saved. With God's help this mosaic was finished in the month Peritius of the year 468, indiction 7, for the salvation of Christ-loving Megale. Work done by Andrew of Jerusalem, mosaic layer' (after Di Segni 2006).

	ΕΝΤΑΥΘΑΕΙ	Ἐνταῦθα εἰ-
	CΕΛΘΩΝΚΑΤΑΝΟΗ	σέλθων κατανοή-
	CICΜΗΤΕΡΑΠΑΡΘΕΝΟΝ	σ(ε)ις μητέρα πάρθενον
4	ΧΥΑΦΡΑCΤΟΝΛΟΓΟΝΘΥ	Χ(ριστο)ῦ, ἄφραστον λόγον, Θ(εο)ῦ
	ΟΙΚΟΝΟΜΙΑΝΚΑΙΕΙΠΙCΤΕΥ	οἰκονομίαν, καὶ εἰ πιστεύ-
	CΗCCΩΘΗCΕΙCΥΝΘΩΕΤΕΛΙΩ	σης σωθήσει. Σὺν Θ(ε)ῷ ἐτελ(ε)ιώ-
	ΘΗΗΨΗΦΩCICΜΠΕΡΙΤΙΩ	θη ἡ ψήφωσις μη(νὶ) Περιτίῳ
8	ΤΟΥΕΤSΥΞΗΙΝΔSΖΥΠΕΡ	τοῦ ἔτ(ους) υξη' ἰνδ(ικτιῶνος) ζ', ὑπὲρ
	CΩΤΗΡΙΑCΜΕΓΑΛΙCΤΗC	σωτηρίας Μεγάλις τῆς
	ΦΙΛΟΧΡΙCΤΟΥΕΡΓ?ΓΕ	φιλοχρίστου. Ἔργ(ον) γε-
	ΝΑΜΕΝΟΝΔΙΑΑΝΔΡΕ	νάμενον διὰ Ἀνδρέ-
12	ΟΥΕΛΗΩΤΟΥ	ου Ἐληώτου
	Ψ ɬ	ψι(φιστοῦ).

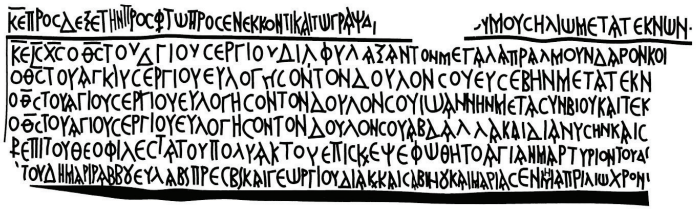
6. The church inscription of ar-Rashidiya (after Di Segni 2006).



7. Areta's inscription in St. Sergius Church of Nitl (by author).

Di Segni to suggest that the woman, devoted to the Theotokos (to whom the church is dedicated), may have taken vows of religious life, as such practice is documented in the *Spiritual Meadow* of John Moschus (*Pratum* 127 and 206; Maisano 2002: 152–3, 220–1; Di Segni 2006: 588).

The private nature of churches built to exalt social and political standing can be evidenced in two significant cases linked to the patronage of the Ghassanid elite in Arabia. The sites of Nitl and Tall al-'Umayrī, can be considered as part of their extended domains or/and under their sphere of influence. Namely in the 6th century Church of St Sergius at Nitl, a *lamprotatos* Thaalaba the *Phylarchos* and Areta son of al-Aretha (Fig. 7) are mentioned (Piccirillo 2001: 282). The dedicatory inscription of Tall al-'Umayrī falls into a similar context. The text, dated around AD 569, provides a list of founders collectively invoking the protec-



8. Dedicatory inscription of St. Sergius Church of al-Umayrī East (after Fisher 2015).

tion of St Sergius on the *megaloprepestatos* (*magnificentissimus*)[9] Almoundaros the *komes*, and plea for the blessings of the saint for themselves and their own household (Bevan *et al.* 2015: 333; Fig. 8).

In some cases, wealthy donors contributed to the building of different churches in the same village; such were the brothers Stephanos and Elias, sons of Comitissa, mentioned twice in the 6th century Church of Saints Lot and Procopius and in that of St George at Khirbat al-Mukhayyaṭ (Piccirillo 1989: 180, 187). The two brothers were probably wealthier, at least in terms of landholdings and the yield of those holdings than the others anonymous villagers, who they however flank in their prayer to the saint to accept the offering and the toil of the community. Humbler donations may represent small communities of free farmers, as suggested by the inscription of the Church of St Theodore at Suf, in which it is specified that the villagers themselves paid the workers and provided the artisans (Gatier and Villeneuve 1993: 4; Feissel 2006: 265).[10]

Whilst church inscriptions mirror the official aspect of the local political powers, shared social status, and the display of wealth, papyri and hagiographic sources allow a view from a different perspective. They mirror the impact of a booming rural economy based on patterns of dependency, such as villagers leasing land from urban residents or from monasteries, who acted as landowners in the village. Peasants supplied the landlords with agricultural produce in order to obtain direct payments or short-term financing (Bagnall 2005: 556). Monasteries acted as land owners, and in that capacity received donations of land and peasants. According to Theodorus of Petra, the *coenobium* of Theodosius received two estates from the *Comes Orientis* and owned a pig farm and a village that supplied the *coenobium* with victuals (*Vita Theodosii* 80 and 85 [Usener 1850]; Di Segni 2005: 30.). Cyril of Schytopolis in the Life of St Sabas mentions several landowners of Mādabā who provided wheat and pulses to the *coenobium* and the *laura* (*Vita Sabae* 45–6 [Baldelli *et al.* 2012: 280–2]). He also refers to an incident that happened to a Saracen camel rider transporting wheat from *Machaberos* – Mekawer that was purchased by the *oikonomos* of the monastery (*Vita Sabae* 81 [Baldelli *et al.* 2012: 339–40]). In life of Gerasimus, the Saracen driver of a camel caravan is forced to abandon the camels after crossing the Jordan with their load of wheat (*Vita Gesasimi* 8 [Di Segni 1991: 71–2]). In the Life of St George of Choziba, the agent of the monastery arrives

[9] The junior/intermediate title evidences the complexity of the system of the Jafnid phylarchate and the procedure of imperial recognition via honorific titles (Bavan *et al.* 2015: 334–5).

[10] The donation of village communities may have included not only material means (as money or kind), but also labour.

from *Arabia* to ask the abbot for 60 *solidi* to buy wheat (*Vita sancti Georgii Chozibitae* 25 [Di Segni 1991: 99]).

The relationship between a collective and rural society also could be glimpsed in the inscriptions of the *martyrium* churches of Ya'amun and Khallit Isa-Bayt Idis (Melhem and al-Husan 2001: 33–50; Feissel 2006: 272–3 n. 869), dated respectively to AD 499/500 and AD 507. The inscriptions mention the *gerontes*/elders, which could be either a title conferring dignity to the monks of a monastery or a council of elders, who represented leading sponsors in the village community. It is however unclear whether the *sunkomentes* (co-villagers) mentioned in the inscriptions were tenants of the monastery or simply village dwellers.

The picture captured by the Petra Papyri gives an idea of the possessions of some of the urban citizens, mainly wealthy landowners, in terms of legal procedures and juridical terminology. Koenen (1996: 184) estimated that the total size of the property divided in *P.Petra* 17 as 85 acres (34.4 ha), which summed to other properties mentioned in the same document adds up to 134 acres (54.23 ha).[11] This was comprised of vineyards, grain fields, houses, threshing floors with granaries, etc., though it did not represent, according to Koenen, the total land holdings of the family (Koenen *et al.* 2013: 88–90). He conceded that there may well have been other properties not mentioned in the document.

The corpus of Petra Papyri discusses issues related to property rights, tax obligation, several types of negotiated contracts, and methods of settling disputes relating to private agricultural property (Frösén *et al.* 2002: 101–4). From the texts which refer mainly to family affairs, one may suggest that the upper classes of 6th century Petra were not much different from their contemporaries in other cities of *Palaestina* and *Arabia*.

Rural property detailed in the Petra Papyri covered a variety of private domains in villages that included farmhouses, hamlets, gardens, vineyards, orchards, and agricultural installations such as cisterns, threshing floors, stables, and water channels. Agricultural produce was mostly wine, wheat in lesser proportion, few olive groves, and fruit, while farming methods made intensive use of terraced fenced plots irrigated by complex dam systems.[12] Fields were leased out or farmed out, and there are cases of emphyteutic lease (Koenen 1996: 184; Gagos and Frösén 1998: 480). Most of the lands had fixed boundaries and were under Petra's communal tax authority rather than the imperial *fiscus*. The tax amount was determined by the total area of land registered in the city, included property in nearby villages of *Palaestina Tertia*, and was assessed through the local *collegium* of tax-collectors.[13] Large villages presumably entrusted an *archon* with the task of representing them for tax payments on their behalf. The term *archon* designated both economic and civil functions within the community, and is mentioned in the inscription of Kastron Zizion (Zizia) dated to AD 580 (Gatier 1986: 182; Di Segni 1995: 321), in some late 7th century papyri from Nessana (Kraemer 1958: n. 58, 1), and in the dedicatory inscription of St Stephen's Church in Kastron Mefa'a (Umm ar-Raṣāṣ)

[11] The land in the Petra Papyri was measured in *iugera*, Frösén argues that the size of the units of measurement likely varied depending on the productivity of the land or the type of crops cultivated (Frösén *et al.* 2002: 101–4). According to the classification of White, an estate of 80–500 *iugera* (21–131.5 ha) was considered to be a medium-sized property (White 1970: 387–88; Kouki 2012: 125–6).

[12] Much similar land use system can be identified in the aerial photographs of several large agricultural sites in *Arabia* and *Palaestina Tertia* as for example Umm ar-Raṣāṣ, Udruh, al-Ḥumaymā, Khirbat Khau, etc.

[13] It was estimated that in the late 4th century Asia Minor, 100 *iugera* of grain fields were taxed as 15 *iugera* of vineyards (Thonemann 2007: 465; Koenen *et al.* 2013: 90).

dated to AD 718 or to AD 756, in which the *archon* additionally holds the minor office of deacon (Piccirillo 1994: 244–5).

Monasteries situated near or in Petra collected rent, labour, and services from peasants and took charge of charitable institutions. *P.Petra* 6a dated to AD 573, mentions a donation *propter mortem* divided in two parts, one given to the Holy House of the Saint High Priest Aaron (Fig. 9). The receiving party is represented by Kerykos, the presbyter and abbot of the Monastery (appointed as administrator), the other half of the propriety was left to the *xenodochion* of the Saint and Triumphant Martyr Kerykos situated in Petra (Frösén 2018: 122). A similar context is described in the draft of a will in *P.Petra* 86v that deals with bequests in favour of pious institutions of movable and immovable properties, with revenues and tenants given to a *xenodochion* to provide assistance to needy travellers, a *xeneon*, the monastery of Aaron, as well as to other institutions (Arjava and Lehtinen 2018: 93–9).

Besides donations, land was also acquired through direct contracts between clergy members and private owners. In *P.Petra* 25, a presbyter representing the Church or Monastery of the Saint and Martyr Theodore of *Ammatha*, bought from a Deacon in AD 558/59, an *epoikion* (hamlet/farm) and a piece of well-irrigated, cultivable land, and *georgia* which may point to agricultural works connected to it, in the village of Augustopolis.[14] Particular attention

[14] The reference to agricultural labour (γεωργία) appears also in *P.Petra* 30 and *P.Petra* 48. It may also stand for a private long-term (emphyteutic) lease as in *P.Petra* 86r (Koenen *et al.* 2013: 4, 7–10). Similar cases are documented in Egypt as P. KRU 113 which mentions the donation of tools and irrigation equipment to the monastery of Apa Phoibammon (Dayr al-Baharī; Crum and Steindorff 1971: 344–6). *Georgos* may also stand for peasant, farm labourer, or landless peasant, see Banaji 2001: 91–4, 108, 253; Decker 2009: 66.



9. Aerial view of the monastery of Aaron near Petra (courtesy APAAME_20171001_REB-0642).

should be lent to the definition of a type of property described in the document by the term *patrimonium*, probably because such property was subject, in this specific case, to the imperial treasury instead of the fiscal system of Petra.

Landed property and agricultural exploitation after the Arab conquest seem to have been equally intense within the framework of a new administrative system in *Jund al-Urdun* and *Jund Dimash* (Fig. 10). The significant number of churches and monasteries renovated was due to the fact that in these areas the Umayyad administration did not hinder building projects. The intent was to maintain control over Christian rural areas and not to reduce their own tax revenues (Hamarneh 2020). Muslim communities and military elite preferred cities and the newly established military towns/*misr* (Walmsley 2007: 344–5; Pini 2019: 207–13), while Christians



10. Map of the *Jund* (by M. Ben Jeddou).

continued to dwell in smaller towns and in the countryside.

Apparently, this could be the case illustrated by the inscription of the lower church of al-Quweismeh dated to AD 717/718, in which the Lord's benediction is invoked for the *ktema* a term that may well stand for an estate, a property or a domain inhabited by tenants. In the Greek papyri from Egypt, the noun means grainfields and vineyards, a similar meaning is accorded also in the Petra Papyri (Koenen *et al.* 2013: 13).

The functionality of the Byzantine agricultural system encouraged the Umayyads to establish private domains that operated on the same principle. The most common pattern featured large estates with residential areas, fields, water irrigation, and storage facilities. The land in these estates was cultivated by free labourers, either newly converted Muslims or Christians (*mawali*). The Arab sources elaborate on the interest of members of the Umayyad upper class in large scale agricultural investment in the Balqa and on the edges of the Badija (Hamarneh 2004: 65–6; Walmsley 2007: 335). Although the information in the sources are reported in retrospect, they allow us to imagine a central system managed by figures of different social standing linked to Umayyad court. This system, however, was also implemented to settle large numbers of Muslims into regions that remained predominantly Christian (Whitcomb 2016: 13; Hamarneh 2017: 118–9).

In this political context, the Church paid particular attention to the office of the *chorepiscopos* (bishop of the *chora*), which designated the itinerant bishop who was responsible for villages. Although the office seems attested in the inscriptions of *Palaestina* in the 5th–6th centuries, it appears specifically mentioned to the east of the Jordan only from the 7th century in the dedicatory inscriptions of village churches. Kassiseus, the *chorepiscopos* of the Monastery of Saint Gellon, is named in the church of Khirbat Daria (Gerasa/Pella), dated to the 7th century. The inscription of the church of Khirbat ad-Duwayr (Pella) dated to AD 593/602 refers to Bishop Paul and *chorepiscopos* Roman, while that of the Church of St Lot at Zoara, which is dated to AD 691, records the name of *chorepiscopos* Chrestos (Hamarneh 2003: 225–6). The country bishop was probably responsible for the spiritual care of villages/hamlets which lacked a church (or were not able to build one due to restrictions), and according to a far-fetched but possible hypothesis, cared for those who provided labour on Umayyad estates. A similar interpretation may also be put forward for the term *periodeutes*, a title given to a cleric of any rank of a country community to serve as link between the bishop and the people. A *periodeutes* is named in the church mosaic inscription of St John the Baptist at Rihāb, dated to AD 619/20 (Hamarneh 2003: 226).

The Church was a central feature of country life to which it provided rational organisation (for example acting as the landlord of agricultural land, vineyards, orchards, and pastures), besides redirecting part of its income to euergetism and sponsorship activities. It interacted with local landowners, creating ultimately a fairly well-structured society with mutual interests and concerns. The village and the land it exploited, either through private estates, tenants, or small landowners were not only the basis of the fiscal system of the area in the 6th–7th centuries. It was also the expression of the prestige and economic power of local and provincial aristocracy. In historical terms it also seems that reliance on local resources did actually replace international trade, thus reflecting the decrease in importance of the area in the minds of central government, especially after the Arab conquest. The involvement of the Umayyads and Abbasids gradually led to the rise of a new type of land ownership

in the countryside, ultimately creating a new, although chronologically limited, equilibrium.

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Notes on a Possible Early *Miḥrab* in the Area E Church at Abila

As with most matters of significance, the nature of Christian-Muslim relations in the earliest periods is complicated. Our understanding is limited in part because of the nature of the literary sources. On the Muslim side, many of them are late and often burdened with the agendas and concerns of later generations. On the Christian side, the sources are very fragmented and likewise perspectival in nature. Recent scholarship has helped to shed light on these issues. For example, although not without its challengers, the work of Fred Donner (2012) on the "believers" movement in the Early Medieval Period has opened up many fresh insights into what Walmsley (2007: 146–8) and others have called the "plasticity" of traditions in transition during this important period. As scholars of several generations ago did with Christianity, it is common now to ask how we even ought to speak about "Islam," especially vis-à-vis Christianity and Judaism, in the earliest decades after the conquest. In a similar vein, Robert Hoyland's (1998) work on the perceptions of non-Muslims of the early "Muslim" "believers," as well as his integration of this material into discussion of the conquests (2015), also brings fresh perspectives into our understanding of the literary sources used for the reconstruction of this important period. Much work has been, and continues to be, done on the literary sources relevant to this discussion.

On the material side, significant strides have also been made over the past several decades on the archaeology of the Early Medieval Period in the Levant. Our understanding of the Early Medieval Period in Jordan is much clearer and much more precise as a result of the excellent work that has been done at many sites in Jordan and in other countries in the region. All of this has significant bearing on our understanding of the "Islamic" presence at Abila of the Decapolis in northwest Jordan in the Early Medieval Period, which is the topic of this article.

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The excavation site is located in northwest Jordan approximately 20 km east of the Jordan River and 5 km south of the Yarmouk River. Abila is approximately 20 km north of the modern city of Irbid, and along with Pella, Gadara/Umm Qays, Capitolias/Bayt Rās, and to the east a bit further Umm al-Jimāl, form an important "northern constellation" of significant archaeological sites in the north of Jordan, all of which had significant occupation in the Early Medieval Period. During the first two seasons of excavation at Abila, in the early 1980s, work centered on surveys of the site. The work of those initial surveys concluded that around the two main *Talls*, occupation began at least in the second half of the 3rd millennium BC and continued into the Middle Islamic Periods, with some light occupation through the Ottoman period. The preponderance of sherds collected in the surveys of those early years, though, were dated between the 2nd and the 7th centuries AD.

After the initial surveys of the site were completed in the early 1980's, excavation focused on the apex of the north and south *Talls*, where it was clear that there was significant occupation. In time, excavation uncovered one large basilica on the North *Tall*, two basilicas on the South *Tall*, one more just east of the South *Tall*, and then one more down by the Roman bridge east of the North *Tall*. There is also what appears to be a Christian monastic complex in what we call Area B, that we are tentatively dating to the late 7th or early 8th century, but was likely was in use into the 9th century and beyond (Mare 1993; Wineland 2001; Lucke 2002; Vila 2005; 2016: 157–66).

The focus of this article is on the transition from Late Antiquity into the Early Medieval Period, specifically with regard to the material expression of religious faith of both Christians and the emergent Muslims. I will be discussing three structures at the site. The first is what I believe to be a mosque built sometime in the late 8th or early 9th century. The second is what I believe to be a *muṣalla* that I will argue was built in the middle of the 8th century. The third is what I believe may be a prayer space in our Area E church, used by the nascent Muslims at some point prior to the mid 8th century earthquake, and as I will show, possibly quite a bit earlier. In all of these areas of the site, there is still ongoing excavation, and so many of the conclusions that I will be making are somewhat preliminary and await further investigation for more firm results. Nonetheless, the findings thus far are intriguing.

The first structure under discussion is a large rectangular building on the top of the North *Tall* at Abila (Fig. 1). Only limited excavation has been done in this area, so the following discussion is based on the initial surveys of the area, one season of excavation in 1984, and evidence of what is visible from the surface. My assumption throughout, though, will be that it is a congregational mosque and so the comparative material will be other mosque structures. The structure on Area A was built 1.5 m due east of the main Byzantine basilica on the North *Tall* and measures 34.5 m in width E/W by 19 m in length N/S enclosing a total area of approximately 650 m^2. The orientation of the building is 164° south-east, where the *qibla* at Abila is at roughly 160°.[1] At present we are aware of only one entrance that is visible on the north side, entering into the building to the south, but it is likely that we will find two other entrances in the middle and the west half of the north side of the building. Thus, when seen in light of the comparative material gathered by Walmsley and Damgaard (2005) in their work on the congregational mosque at Jarash and over 30 other sites, the structure at Abila is on the smaller side, not quite as square as many of

[1] Though, of course, orientation of the earliest mosques was less a matter of precise scientific orientation than of general direction (King 1982a; 1982b).



1. Aerial photo of the possible mosque in Area A. Photo credit RHB, APAAME.

the earliest mosques but very much in line proportionally with mosques dated between AD 750 and 950. In addition, Mattia Guidetti, in his discussion of the contiguity of churches and mosques, argues, "When it came time to build a congregational mosque, the site selected was often an urban area adjoining an extant main church" (Guidetti 2015: 11–27; 2017: 52). And with numbers of the examples that Guidetti mentions, it is common for mosque structures to be built on the east side of the churches when the limitations of space and geography permit.

With regard to the date of the structure under discussion, during the 1984 season at Abila while excavating the Byzantine basilica, Duane Roller from Wilfried Laurier University opened a square that fell on top of the NW corner of this building.[2] After determining that the structure was clearly built with spolia from the destruction of the Byzantine church, the excavators decided that the large rectangular building must be "Umayyad." According to their assumptions, the church was likely destroyed in either the Sassanid or Islamic invasions of the early 7th century (Roller 1984: 20), and therefore the

[2] For a discussion of the excavation of the building, see Wineland 2001: esp. 25–8.

building must be an "Umayyad" structure, likely a public building. Today, apart from the archaeological and literary evidence of the destruction of a few specific sites, no one believes that there was widespread destruction for either the Sassanid or the so-called "Islamic" invasions. And in fact, later excavation made it clear that the Byzantine basilica at the summit of Area A, like most of the major buildings at Abila, fell almost certainly in the earthquake of AD 749. Since then, what I am calling a congregational mosque was built with spolia that post-dates the destruction of the church, the construction of this building is likely from the "Abbasid" period, that is, sometime after the middle of the 8th century or later. Apart from more thorough excavation of this area, the only thing that remains in identifying it more conclusively as a congregational mosque is the locating of the *Miḥrab*. In the near future we hope to excavate this structure and will be able to determine more conclusively if indeed it is a congregational mosque. At present, though, all indications seem to point in that direction.

Another structure at Abila that I propose may have been a place of Muslim worship is found in Area B, just to the east of our "monastic" complex near what has been called the "theater cavea." During the 1994 and 1996 seasons of excavation a very crudely built structure was uncovered in a plaza north of the "theater cavea." The structure measures 8.5 m N/S and 10.5 m E/W giving a total enclosed area of approximately 90 m^2. The north wall consists of upright column drums, and at one point, an Ionic capital resting on a base, and in parts these elements are resting on 15 cm of soil or crudely placed blocks. In the middle of this northern wall there is a threshold that is 140 cm wide, providing entrance into the structure from the north going south (Fig. 2). And, at least on the east side of the threshold, there are cut ashlars that seem to form a cap on top of the column drums at a height of 1.25 m. The west wall was formed from the remains of a pre-existing structure, made of finely cut and fitted ashlars. In the southwestern corner, five courses of these ashlars rise *in situ* to a height of 1.8 m. The east wall was formed of very crudely laid ashlars, column drums, capitals, and bases, and seems to abruptly end running from the south to the north at about 4 m. And the south wall is constructed of finely cut and well laid ashlars that adjoin the west wall at the corner, and then run to the east 4.5 m before breaking off. The floor surface in the structure is the larger 2 cm square white tesserae and contain no design. The floor seems to have been laid in conjunction with the finely built walls on the west and south sides, while the poorly constructed walls on the north and the east are laid on top of the mosaic. The orientation of the structure is 168° south-east and so is fairly close to the *qibla* at Abila. Unfortunately, the south wall where the direction might have been marked either with standing stones, or possibly a *Miḥrab*, is missing. Pottery found in the excavation of this area ranged from what the excavators identified as Late Byzantine through Umayyad, with a small amount of Abbasid pottery in the fill above the floor surface. It is thus possible that the structure was something other than a *muṣalla*, though any other identification is less likely, given what we do know about the structure. Possibly also significant is that the structure is located adjacent and to the east of a Christian monastic complex in what is called Area B[3]. Thus, we have here a roughly built square structure that is oriented toward the south, with the only visible entrance on the north wall, entering the building toward the south. In the absence of a *Miḥrab*, obviously, it is somewhat conjectural to suppose that the building served as a mosque/*muṣalla*, but no less likely than other functions that it

[3] The excavations at Area B are discussed by Wineland 2001; Mare *et al.* 1997.



2. Possible *muṣalla* in Area B. Photo credit TS, Abila Excavation.

might have served.

The final area that I will discuss is, by far, the most interesting, and is found in our Area E church, located just west of the Roman bridge and on the eastern edge of the North *Tall*. Unlike most of the other churches at Abila that are tri-apsidal with all of the apses facing east, the Area E church has the north and south apses facing north and south respectively in a clover leaf or cruciform shape, forming a nave and two north and two south aisles (Menninga 2004: 40–9; Smith 2018: 1–24). To the west are the narthex and the atrium which runs up against a retaining wall along the side of the North *Tall*. Evidence on the floor of the atrium, with the indentations in the floor of large ashlars that fell from a great height as well as the lay of fallen columns, give clear indication that the structure suffered catastrophic damage in an earthquake. In a chapel in the southwest corner of the atrium, a cracked altar screen and column, along with this green glazed pot (among many similar mid-8th century vessels), likewise give testimony to the structure having been destroyed in the massive earthquake that struck the region in AD 749.

What interests us most today, though, is the pastophoria on the south side of the church. The pastophoria itself measures 8 m E/W by 4 m N/S in a rectangular shape. And most interesting is that on the south wall of the pastophoria, excavation uncovered three niches each of which measure 85 cm wide by 210 m in height. The western and middle



3. Possible *Miḥrab* in the Area E church. Photo credit TS, Abila Excavation.

niche were filled in with plaster and only the eastern most niche was left open, leaving a feature that looks suspiciously similar to a *Miḥrab* (Fig. 3). Being on the south wall of the church, it is indeed oriented roughly toward the *qibla*, and so I was immensely hopeful that we might in fact have *Miḥrab*, and thus a Muslim prayer space in our Area E church. And, given the fact that the church continued to function as such until it was leveled by the mid 8th century earthquake, if it is a *Miḥrab*, then it seemed likely that the church was used for both Christian and Muslim worship simultaneously.

Suleiman Bashear and Mattia Guidetti discuss numbers of examples in the literary sources of this sort of phenomena (Bashear 1991: 267–82; Guidett 2017). And there are a few excavated examples in the region of such a thing happening. Rina Avner's work at the Kathisma church (Avner 2010: 41–2) and the example of Shivta, discussed by Jodi Magness (2003: 185–7) and especially Gideon Avni (1994; 2014) are two. In Jordan, there are possible examples of this at Umm as-Surab (Gilento 2015: 329–60) and Sama where in both cases, the apses were walled off—though neither example contains a clear *Miḥrab* (King 1983: 111–36; Gilento 2014). Other potential cases include the Numerianos and West churches at Umm al-Jimāl (DeVries 2000: 39–45), where the apses were likewise blocked off, and possibly the church of the Bishop Isaiah at Jarash.[4] None of these examples are totally

[4] This is the position of Cherie Lenzen (1988). Note that her results are disputed by Vincent Clark (1986).

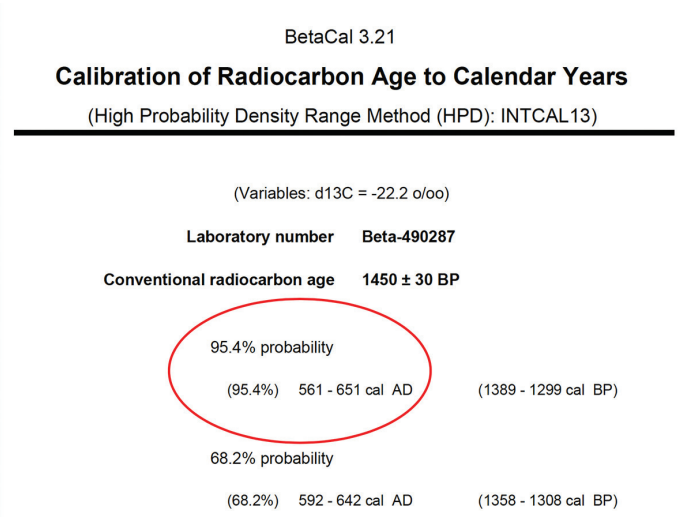
clear, and there are scholars who dispute the dating to the modifications of the churches, and even whether they were used as places of Muslim prayer at all. Nonetheless, the literary sources do indeed talk of Muslim prayer in Christian churches.

One final element in this discussion that raised some significant concerns for me was the date when the two western niches were filled in with plaster. If the two western niches were filled in prior to the rise of Islam, then obviously we would be looking at the open niche as something other than a *Miḥrab*. So, during our 2014 season of excavation we were able to extract a charred olive pit from the plaster in the middle niche for testing. The C14 results were discouraging, not because they predated the rise of Islam, but rather because the date seemed too early to be plausible for the creation of a *Miḥrab* in the remaining open niche (Fig. 4). The dates on the olive pit came back with a 95% probability between AD 561 and 651—that is, at the latest, only 15 years after the Battle of the Yarmouk, just a few kilometers away (Vila 2018: 1–10).

The form of the niche, it seems to me, is much too early to have been constructed as a *Miḥrab* since the pointed arch form of later *Miḥrab* was not in use in the earliest periods. But, it is possible that the "Muslim" believers simply adopted this architectural feature in the church as a way of indicating the *qibla*, which just happened to be stylistically very much like what many *Miḥrab* would look like in the decades to follow. But nevertheless, it is still very early for a *Miḥrab* and very early for "Muslim" prayer to be taking place within a church.[5] Be that as it may, I am inclined at present to assert with only a modicum of trepidation that we do have here a very early example of a Muslim prayer space inside the south pastophoria of our Area E church at Abila.

In conclusion, I would suggest that the nascent Muslims, the believers, prayed at Abila first in the south pastophoria of our

[5] Although, this is where Fred Donner's very interesting suggestions about the nature of the early Islamic polity may come into play. If Donner's controversial suggestions are correct, the "believers" may have seen themselves in significant continuity with the local Christian population at Abila, and indeed, the Christians of Abila may not have considered them to be more than possibly a "heretical" sect of Arab Christians.



4. Results of carbon dating of olive pit from Area E. Photo credit YM, Abila Excavation.

Area E church, beginning as early as the middle of the 7th century. When that structure was destroyed in the massive earthquake of AD 749, they moved to a temporary and very crudely built *muṣalla* just east of our Area B monastic complex. Then, using spolia from the Area A church that was also destroyed in the earthquake, they constructed a more permanent, congregational mosque on the apex of the North *Tall*. Further excavation of this structure will hopefully make such a designation more clear.

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The Rupestrian Chapel of al-Wuʿayra and the Hermitic Landscape of Christian Petra

Abstract

After the identification of a rupestrian chapel at al-Wuʿayra, opening a new perspective on the history of the site, the authors discuss the possible character of this new pre-Crusader *facies* of al-Wuʿayra and present a preliminary overview on the topographical and typological aspects of the hermitic settlement of Christian Petra. The latter has been for many centuries an important part of the religious geography of the town, whose vitality, at least as devotional reference point, is demonstrated by its survival after the abandonment of the town and its churches. Beside the more impressive religious buildings, mainly located in the middle of the town or in specific spots in the surrounding area, an extraordinary, extended, and diffused net of hermitic installations, up until now less known by historians and neglected by archaeologists, starts to be brought to light. Being simple reoccupations of Nabataean complexes of different purposes, through more or less substantial modification, or new foundations purposely accommodating natural cavities, some of the most interesting aspects of the phenomenon are the reasons guiding the choice of the spot, the building techniques, and the organisation. The paper is intended to offer both a contextualisation of the rupestrian chapel of al-Wuʿayra and the preliminary results of the still progressing survey of hermitic installations, enriching the available data for Southern Jordan.

Introduction

The site of al-Wuʿayra, the major Crusader military installation of Petra controlling access to the ancient town area and the north-south road connections between Shawbak and the Red Sea, has a particular meaning for the history of medieval archaeology in Jordan because it underwent the first excavation by R. Brown

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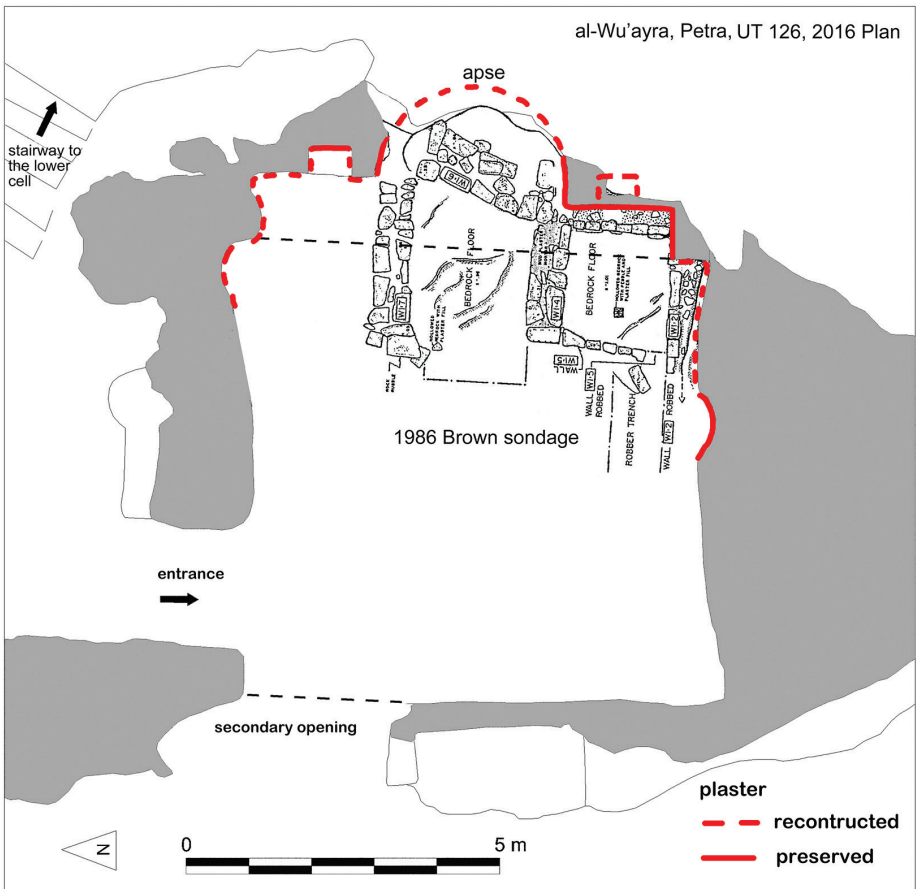
in 1987 (Brown 1987) only a few months prior to the commencement of the new research by the "Medieval Petra" Italian Archaeological Mission by the University of Florence (SAGAS Department). The first step of the research was dedicated to preparatory surveys and diagnostic studies of the site, followed by a series of sondages located in some selected spots: the southern ditch (TU 83-84), the church (TU 119), the narthex (TU 116), the north postern (TU 120), the churchyard (TU 109) and a Late Islamic dwelling unit (TU 115). Later on, most of the efforts of the research team were dedicated to the major castle of Shawbak, 25 km to the north of Petra. A new phase of the research at al-Wu'ayra started in 2011 aiming at increasing and extending the analyses to the pre- and post-Crusader archaeological horizons in order to have a better understanding of the 12th century phases. On the other hand, the extension of the investigations to the area outside the castle keep, approximately corresponding to three-fourths of the whole surface of al-Wu'ayra, was needed in order to have a more comprehensive knowledge of the whole site. This area is the one where rock cut structures are more abundant and visible, but most of the surface is unsuitable for excavations, due to the rough condition. Taking into consideration the geomorphological and archaeological features of the site, the application of "light archaeology" methodology was chosen as the most appropriate. This "experimental" activity was given an opportunity in order to check its efficacy in the field. The intensification of the research in the last five years confirmed its effectiveness both in terms of quality and quantity of results (Vanni Desideri and Sassu 2014; Vanni Desideri and Vannini 2016; 2017; Leporatti and Vanni Desideri 2018; Vanni Desideri and Leporatti 2020; Vanni Desideri *et al.* forthcoming).

Apart from the problematic Nabataean presence, mostly indicated by residual finds and rock cut structures (Vanni Desideri 2020) and the identification of the Late Islamic dry-stone village, the most important results achieved up until now concern the pre-Crusader horizon. The presence of such a phase was already inferred on the basis of particular types of building techniques (Vanni Desideri and Sassu 2014: 101 fig. 8) dispersed at certain spots as well as the kind of hydraulic plaster used in the southern cistern, with pottery sherds inset, comparable to a technique known in some early Christian hermitic cells around the Monastery of Mount Nebo (see Bianchi in this volume).

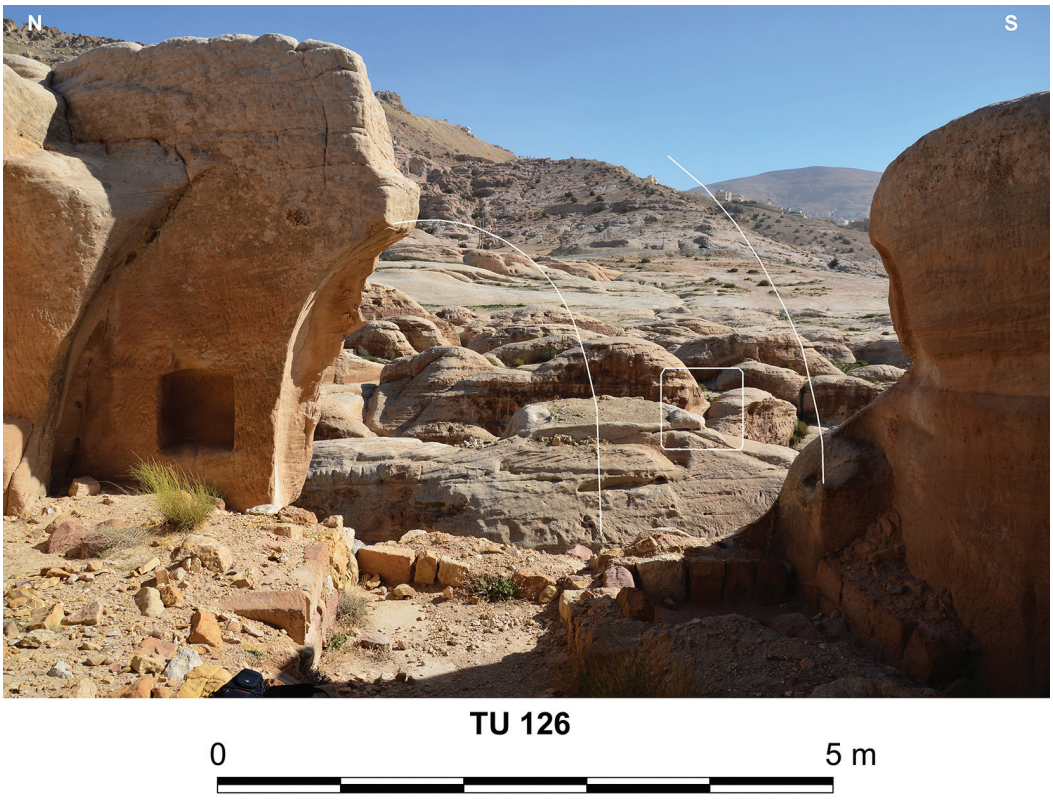
During the 2016 campaign the so-called 'Nabataean rock cut chamber' (TU 126) underwent a new archaeological reading. In 1987, the spot was first investigated by R. Brown through sondage aiming at verifying the mediaeval phase of the cavity, but unfortunately the same author had to admit that the unstratified deposit and the poor number of finds were not significant from a chronological nor interpretive point of view (Brown 1987).

This time the cavity was investigated through light archaeology methodology. It is located outside of the southern ditch of the Crusader castle keep, to the very southern border of the site, isolated on every side except to the north where the entrance is located (TU 126). Its approximately square plan (Fig. 1) and almost regular elevation seems to reveal more skilled work than in the known rupestrian churches in the surrounding areas. The registration and mapping of every trace of rock cuttings and single remains of plaster *in situ* led to a new interpretation of the structure as a Christian chapel (Leporatti and Vanni Desideri 2018). All fragments of plaster are homogeneous in consistence, appearance, adhesiveness, and thickness, thus most probably belonging to a same covering, once applied to the whole cavity and belonging to its first phase.



1. Al-Wu'ayra. Plan of TU 126 with Brown's excavation and reconstruction of the apse. Survey by the authors.

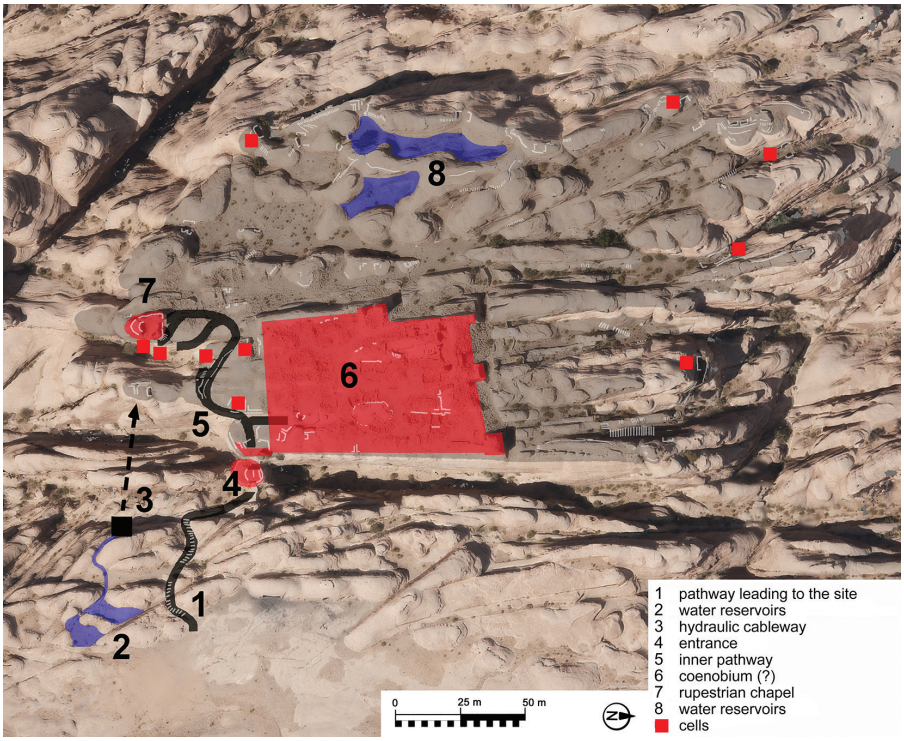
Although the presbytery is poorly preserved, lacking the whole south portion because of an old rock sliding, it is possible to reconstruct its plan thanks to the still preserved fragments of plaster once completely covering its walls and to propose a reconstruction of its setting (Fig. 2). In particular, a thick layer of plaster is visible at the base of the east wall due to the protection of a Late Islamic dry-stone wall. The presbytery, canonically oriented towards the east, is included underneath a triumphal arch, whose pillars, springing from the north and south corners, are still preserved. Only the northern portion of the shallow apse still survives with a rectangular niche. This new interpretation lends support to the interpretation of the square hollow noticed by Brown on the sandstone floor, 1.70 m from the south portion of the presbytery wall, as a socket for the insertion of a pillar for the chancel screen. Outside the presbytery and along the south wall, a shallow niche is preserved, once covered by the same kind of plaster. The access to the chapel is located laterally, in the only coplanar bedrock surface at the west end of the north wall. The opening on the west wall is a Late Islamic modification meant at transforming the cavity into a



2. Al-Wu'ayra. Reconstruction of the presbytery of the chapel (TU 126).



3. Al-Wu'ayra. Sculptured leg of a seat from TU 150, a possible piece of the furniture of the chapel.



4. Reconstructed topography of pre-Crusader Al-Wuʿayra. Orthophoto plan obtained from photos kindly provided by APAAME (APAAME_20171001_REB0599-0613 and APAAME_20171001_RHB-0334-0344).

dwelling unit, as part of the larger village established in front of the chapel (Vanni Desideri and Sassu 2014: 98–9 figs. 3–5; Vanni Desideri and Vannini 2016: 203 fig. 10). The dimension of the chapel fits with the smaller examples of cave churches of the Judean Desert monasteries (Hirschfeld 1992: 128 table 5).

A very rare piece of furniture most probably belonging to the chapel, gathered among the collapse of a nearby house of the Late Islamic village (TU 150), integrates the archaeological data concerning TU 126. It is the leg of a seat featuring two feet of a goat (or sheep) carved into the sandstone slab, realistically representing the hoofs partially covered by fleece (Fig. 3). Altogether with a twin piece, unfortunately lost, it would have supported a seat probably located inside the niche flanking the presbytery on the south wall.

At the moment the chronology of the chapel is difficult to determine and even sondage would not be useful due to the scarcely significant archaeological deposit, as already pointed out by Brown's sondages (Brown 1987). Its pre-Crusader chronology relies mostly on some structural details revealing substantial modifications during the Crusader period. In particular, the northern impost of the presbyterial arch shows indent and an upper flattening most probably meant at insetting masonry arches, whose elements are in fact scattered in the cavity, maybe supporting a probable upper floor for defensive purpose (watchtower). These arches are built up with blocks of a lithotype introduced at the site by Crusaders and processed with a peculiar stone dressing technique.

The same can be said about the seat leg, which stands as a real *unicum* at least in the area. At the moment it is only possible to propose a generic dating to Early Medieval time, since the chapel already existed in Crusader period. In fact, already R. Brown quoted the presence of building materials peculiar of that period, such as a yellow sandstone keystone with an engraved cross over a double spiral motif (Brown 1988: 42), unfortunately lost, and other arch pieces of the same kind are still recognisable on the site.[1] The secondary flattening of the top of the left springer of the presbyterial arch and these elements, of a peculiar lithotype processed with a technique introduced at al-Wuʿayra by the Crusaders, seem to indicate that the chapel underwent some modifications maybe in order to replace the original ceiling (a barrel vault?) with arches. The aim was probably at adding an upper floor to be used as an observation post, while at the ground floor the chapel could have kept its original use.

Among the various questions springing from the identification of the church, the most important concern the interpretation of the type of settlement and the corresponding material traces connected with the chapel and its chronology. From this perspective it is necessary to reconsider the pre-Crusader archaeological evidence and some of the rupestrian cavities of al-Wuʿayra. Among the ten rock cut structures recognised so far, and tentatively interpreted as hermitic cells, different typologies can be identified. The more complex examples appear as rearrangements of ancient cavities while others are very simple artificial and shallow cavities to be completed with wooden structures.

It is then possible to propose a reconstruction of the topography of pre-Crusader al-Wuʿayra including a communal settlement (*coenobium*), corresponding to the later Crusader castle keep, surrounded by an open hermitic settlement (*laura*) of at least ten cells provided with a chapel (Fig. 4). Some features in the area of the castle keep seem to support this interpretation, as for instance the typology of building technique not corresponding to the Crusader period building technique. It is the case of the curtain wall beside the gate, the walls coating the tower in front of the gate, and the already mentioned plastering technique of the southern cistern, comprising a double gate system.[2]

As to the topographic settling of al-Wuʿayra during this phase, it is very interesting to note the inner communication system of the settlement. Starting from a common access, one pathway led directly to the chapel and to the area of the dispersed cells (*laura?*), and a second one led inside the central and more organised part of the settlement (*coenobium*?). The topographic configuration, including scattered cells and a *coenobium*, has some parallel examples in Transjordan, for instance Mount Nebo, while the monastery of Saint Lot seems to match other examples of monasteries located in Palestine, such as those in the Judean Desert (Hirschfeld 1990; Di Segni 1991).

There are also clues possibly implying a somehow particular meaning of the chapel. First of all, starting from the gate, it was possible to reach the chapel without crossing the central settlement through a direct rock cut pathway. Furthermore, half of the cells identified so far are concentrated in the surroundings of the chapel. Two of them are carved into the sandstone slope at different heights (Fig. 5) and the upper one (TU126a), directly below the apse, is

[1] The motif of the cross associated to the double spiral is of a long-lasting local tradition as can be inferred, for instance, by the 6th century refectory capital of the monastery of Martyrius (Magen and Talgam 1990: 109 fig. 24).

[2] The presence of a double gate system in the monastery of Choziba is inferred by the life of George of Choziba (Hirschfeld 1992: 163).

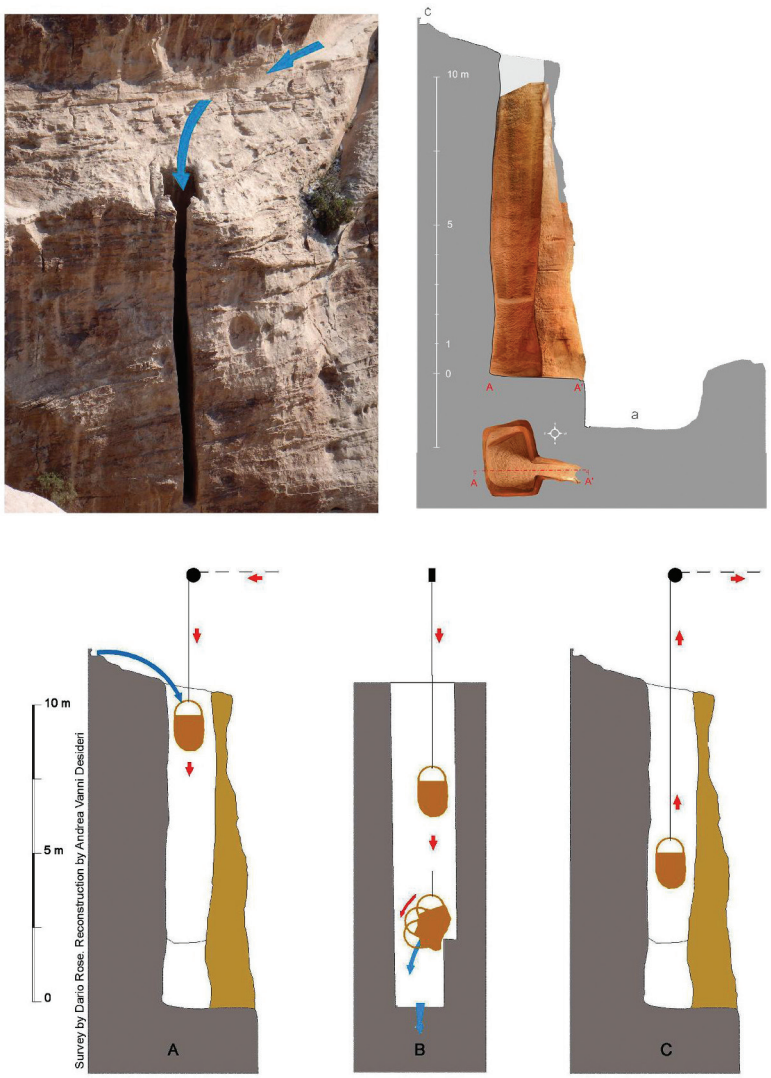


5. Al-Wuʿayra. View from the East of the chapel (TU 126) with adjoining structures (TU 126 a, b).

probably responsible of the collapse of its southern part. Its rough alcove, provided with horizontal postholes and niches, is reachable through a stairway, purposely carved around the external north-east corner of the chapel. The lower one (TU126b), closely similar to the other, is reachable through a narrow passage dug into the sandstone. In the same area TU 83 is particularly meaningful because it is carved into the counterscarp of the southern ditch, proving that the latter already existed and, as a consequence, indicating its pre-Crusader chronology.

If these elements indicate a monastic settlement, then a series of further hypotheses and questions arise concerning the reconstruction of the global history of the site, a task that can only be addressed through the progression of the research. Anyway, the individuation of the rupestrian chapel provides a new perspective on the history of the site and on the study of the topography of Christian Petra so far described (Schick 2001; Blanquez Pérez 2014).

The extension of the archaeological analysis also led to the identification of a complicated hydraulic network and mechanism. It is located outside the east border of al-Wu'ayra, on the rocky plateau close to the Beida-Wādī Musa road. Water flowing from a spring located on the western Shara mountainside was intercepted through a rock cut channel and led into a double water reservoir including two basins obtained by blocking two natural depressions through dams. Water stored in this reservoir powered a mechanism, possibly meant to transport goods or items



6. Al-Wu'ayra. Remains of the pre-Crusader hydraulic mechanism and conjectural reconstruction of the operating sequence.

into the settlement crossing the Wādī al-Wu'ayra, *i.e.*, a sort of cableway (Fig. 6). [3] The mechanism has nothing to do with the military function of al-Wu'ayra during the Crusader period, mainly due to its unprotected and vulnerable location. Instead, it fits well with the monastic characteristics of the site.

The interpretation of pre-Crusader al-Wu'ayra as a monastic settlement does not contrast with the already supposed previous presence of a Late Roman fortification if we consider the common settling behaviour of early medieval monks in the area. In fact, they usually profited from abandoned military installations, as for instance indicated by the foundation of the Castellion reported in the *Life of Mar Saba* (di Scitopoli 2012: xxvii;

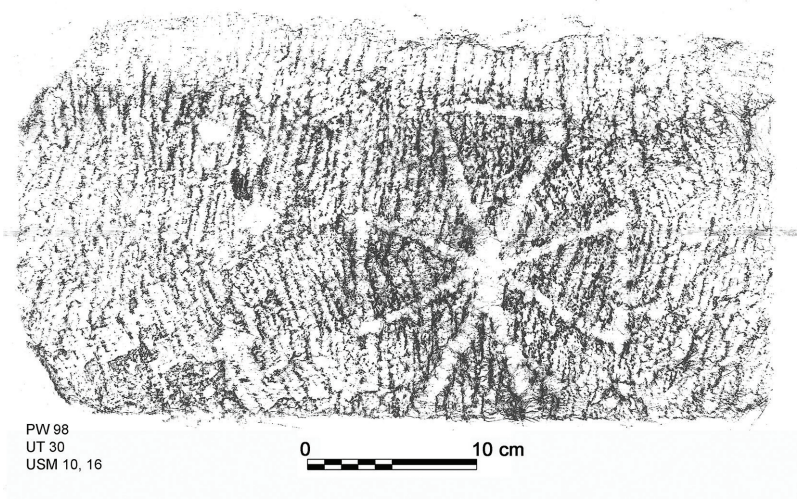
[3] A first description of the system is provided in Vanni Desideri and Vannini 2017; Vanni Desideri and Leporatti 2020.

Hirschfeld 1990: 33–4 fig. 39; 1992: 52 fig. 27–28). At the moment it is not possible to determine whether the monastery was still vital when the Crusaders settled at the site. Nevertheless, they could have profited from Christian presence and from an existing somehow fortified monastery (*castron*) easily transformable into a real military stronghold. In this case, the only real Crusader addition to the previous buildings corresponds to those already identified by the research on the basis of a peculiar building technique (Vanni-Desideri and Sassu 2014: 101 fig. 8 type 1): *i.e.*, the church, the west and the north-east towers, and the northern curtain wall provided with arrow slits. But obviously at the same time they also could have reused or rearranged in a more or less radical way the buildings they found on the site. From this perspective, the block with an engraved cross carved on the base of the left jamb of the arrow slit of the north-east tower of the castle, judging from its location, must be interpreted as a reuse of Early Christian building material (Fig. 7; Vanni-Desideri and Sassu 2014: 101 fig. 10).

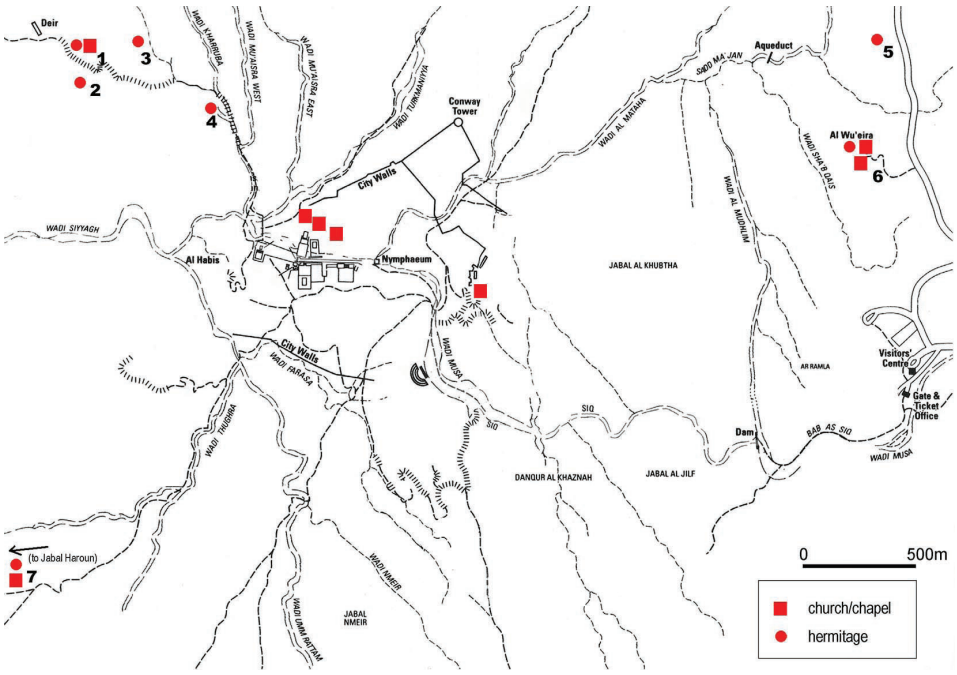
The Hermitic Installation Survey

The newly recognised rupestrian chapel together with its related monastic settlement is situated in a religious landscape that the ongoing surveys by the Medieval Petra Mission by the University of Florence are progressively revealing in its extension and variety, contributing to a more complete and articulate knowledge of the Christian settlement in the area of Petra.

The survey of monastic/hermitic installations in the area of Petra originated from the need for a contextualisation of the new Early Medieval phase recognised at al-Wuʿayra, at the same time contributing to a better knowledge of the articulated religious life in Christian time. This research focused on a less monumental but widespread phenomenon, which survived many centuries after the abandonment of the major monumental Christian foundations, that will help us to achieve a more comprehensive knowledge of the articulate topography of Christian Petra and to reveal the variety and consistency of archaeological documents as well as their chronological, functional, and



7. Al-Wuʿayra. North-east tower. Frottage of the sandstone block with cross reused during Crusader times.



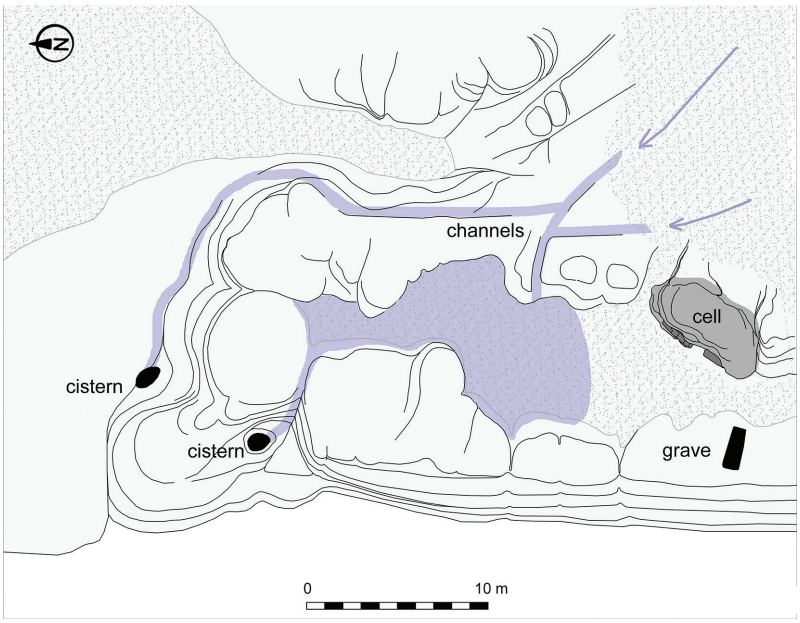
8. The area of the thematic survey of hermitic installations. Plan after Schmidt modified by the authors.

typological coordinates.

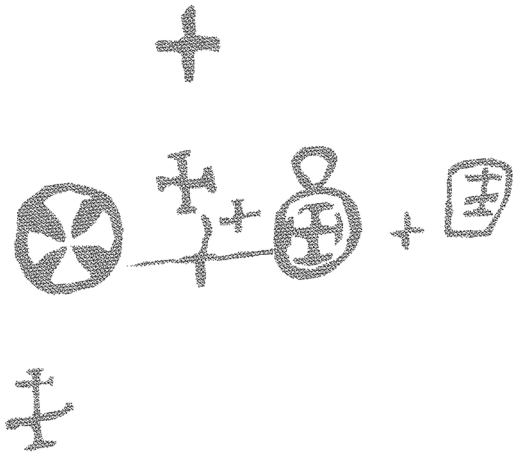
At the moment, the survey is concentrated on the areas around al-Wu'ayra and the eastern mountainside of Petra (Fig. 8).

Apart from the several clues of hermitic presence scattered all over the suburb of Petra (Schick 2001), an artificial dwelling cave has been identified on Jebel Urf ad-Dik, some 100 m to the north of al-Wu'ayra. The complex, located next to a couple of ancient cisterns, includes an artificial cavity, later reused by Bedouin shepherds as a shelter for their flocks. The cell, dug into a sandstone outcropping, is provided with two irregular inner benches (Fig. 9) and on the back wall an engraved cross is barely visible among some badly preserved graffiti. In front of the cell, a rectangular grave is cut into the sandstone bedrock. Christian symbols are engraved on many rocks and Nabataean monuments along the way up to the Dayr. A Greek cross is on the right jamb of a tomb close to the Lion's Triclinium, another one is traced on a betyl at the Qattar ad-Dayr meant at Christianising the pagan idol (Dalman 1908; Fig. 11). Further up, another cross engraved on a rock seems to mark the entrance in the area of the hermitic settlement. Nearly in front of it, an irregular natural cavity hanging over the so-called Klausenschlucht is decorated with a large panel with several crosses and a pendant (Fig. 10).

The research at the moment concentrated on the complex and long-lasting monastic/hermitic sparse settlement located below and around the ad-Dayr. Albert of Aachen and Foucher de Chartres already noticed the presence of Greek monks in the area (Runciman 1993: 343 n. 1, 364–5 n. 1) apparently lasting until the late 19th century (Politis 2001: 589). According to Gianmartino Arconati Visconti, when he visited the Deir in 1865, the Christian



9. Jebel Urf ad-Dik. The hermitic complex. Survey by S. Leporatti.

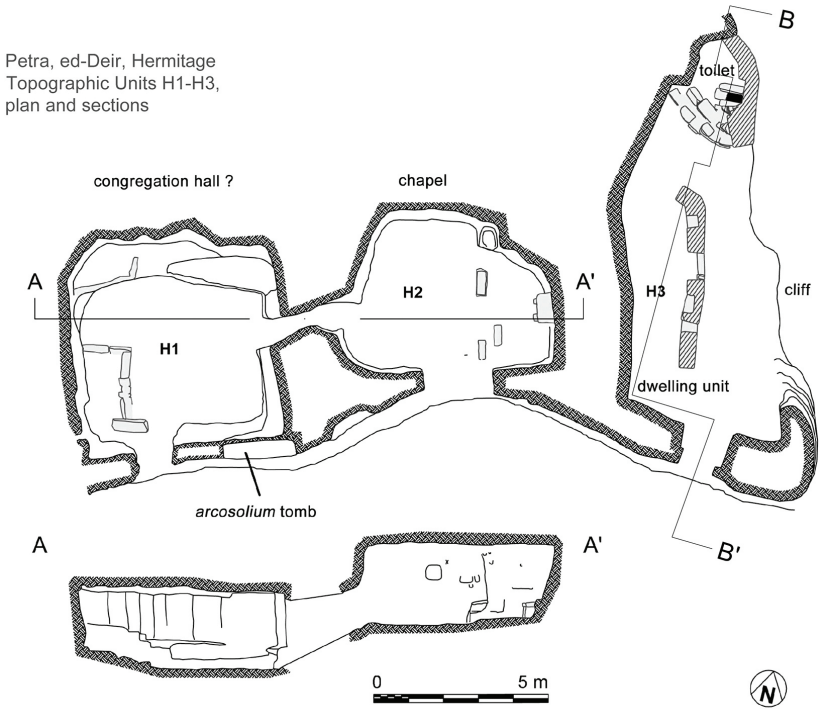


10. The Hermitage. Cluster of engraved crosses. Note the presence of a possible pendant. Survey by A. Vanni Desideri.

epigraph painted on the entablature of the monument, noticed by Burkhardt around 50 years before, had already vanished (Arconati Visconti 1875; 354).

The hermitic settlement is located across the Klausenchlucht, but apparently its core corresponds with the Hermitage. It consists of three artificial caves dug into the vertical cut of a Nabataean quarry, on a terrace facing south-east. The complex in its original setting included some buildings surrounding a courtyard on the same terrace where a large arcosolium tomb is also visible,[4] nowadays only indicated by a heap of collapsed materials and some clues of wall basements. Among these cavities a room is recognisable (TU H1), whose possible function as a congregation hall is indicated by benches along the walls, connected to a chapel (TU H2) followed to the east a dwelling unit (TU H3). The latter profits from a natural shelter hanging over a narrow *wādī*, enlarged, regularised, and completed by drystone structures in order to accommodate a single hermit (Fig. 11). Accordingly, it is provided with a narrow toilet separated from the living room (Fig. 12). The site is scattered with a

[4] For arcosolium tomb comparison in the area, see Avni Dahari 1990: 302–4 figs. 1–4; Burri *et al.* 2011: 292 figs. 7a–c.

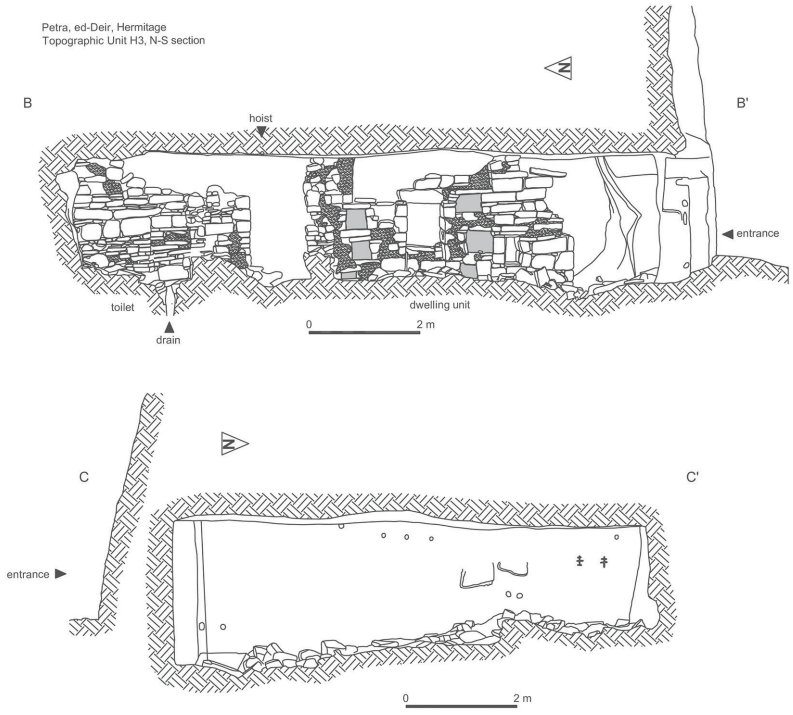


11. The Hermitage. Survey by the authors.

quantity of painted and engraved epigraphs in Greek and Arabic with Christian symbols and monograms.[5] The complex clearly demonstrates its link with the settlement opposite, on the west *wādī* side, due to a small opening carved into the corresponding wall of TU H1 in order to have a visual connection with another hermitic complex. The latter profits of two Nabataean funerary complexes already surveyed by Dalman (1908: 441–2 abb. 196). The presence of Christian hermits is here indicated by a number of red painted or engraved crosses.

The hermitic settlement of the Hermitage seems to benefit from two water supplies located in a nearby *wādī*. Both complexes are meant at collecting rainwater filtering through permeable geological formations and flowing along an impermeable layer, as in the case of the water catching system of the monastery of Khallat ad-Danabîya in the Judean desert (Goldfus 1990: 229–30). The largest one, or Lower Qattar ad-Dayr (Fig. 13), established in Nabataean time as a real sanctuary provided with idols, epigraphs, and a triclinium, was already surveyed by Dalman (1908: 252 abb. 192) who also noted the Christianisation of a betyl. In addition, an example of destruction of idols (maybe block idols) is to be underlined and a more explicit clue of the hermitic presence, strictly connected to the water catching system, was revealed by research in the surroundings. It consists of a small Nabataean cave tomb reoccupied by a Christian anchorite who

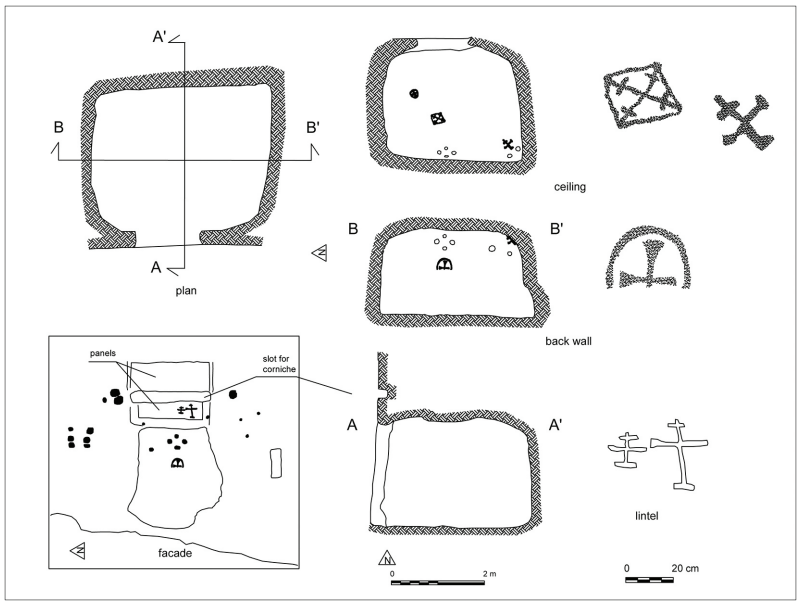
[5] The various epigraphs are under tracing and study by J. Maczuga, Universität Bonn.



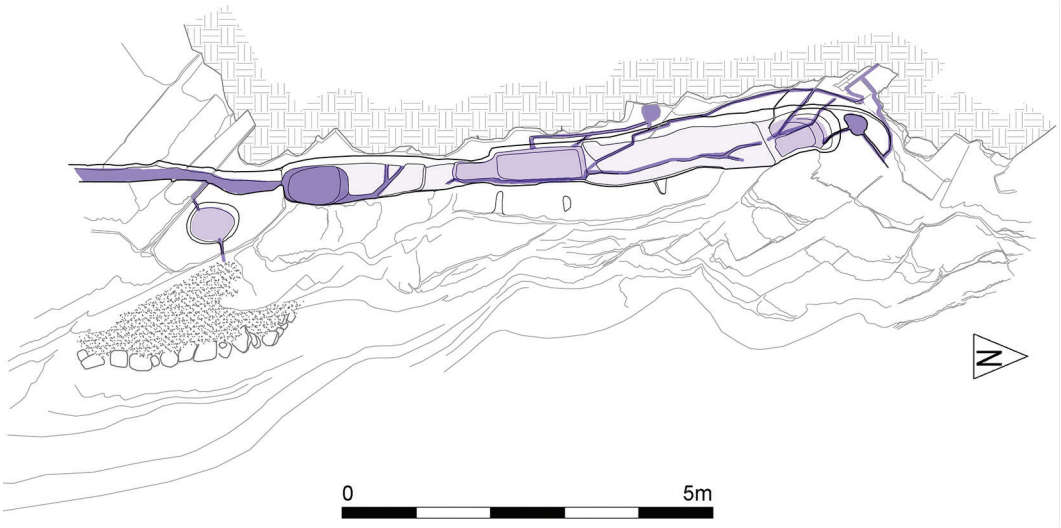
12. The Hermitage. The dwelling unit (TU H3). Survey by A. Vanni Desideri.



13. Lower Qattar ad-Dayr. Survey by S. Leporatti.



14. Lower Qattar ad-Dayr. Hermitic cell. Survey by A. Vanni Desideri.



15. Upper Qattar ad-Dayr. Survey by S. Leporatti.

left a number of engraved and red or yellow painted crosses on the walls and on the ceiling (Fig. 14).

Further up in the mountain, a new small water catching system was surveyed and conventionally indicated as Upper or Small Qattar ad-Dayr (Fig. 15). This complex of rock cut channels and basins was certainly established in early Christian time, due to the fact that no archaeological or epigraphic

Nabataean traces are visible at the site, but a cross overlooks the battery of water-catching basins.

A completely new perspective opens up for the research that the mission's next programs intend to tackle: on one hand, by deepening the analysis on the site through sondages aimed at solving specific problems, on the other hand, trying to contextualise the case in question by completing the surveys already started in the area of Petra with the aim at reconstructing the topography of the Christian hermitic settlements.

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Islamic Faynān: The Settlement History of a Mining Region in Southern Jordan between the 7th and 19th Centuries AD

Introduction

The Faynān region is a copper-rich, semi-arid landscape in the lowlands of Wādī ʿAraba, *ca.* 30 km south of Wādī al-Ḥasā and *ca*. 130 km north of al-ʿAqaba. For the purposes of the present paper, the region is defined primarily as the area surrounding the Wādī Fīdān–Wādī Faynān–Wādī al-Ghuwayr drainage system in the south and the Wādī al-Ghuwayba–Wādī al-Jāriya system in the north. The major economic resource of the region is copper ore, primarily copper oxides contained in the Burj Dolomite Limestone Shale (BDS) and Umm ʿIshrīn/Massive Brown Sandstone (MBS) formations (Rabbʿa 1994; Hauptmann 2007). Since the development of extractive copper metallurgy in the 4th millennium BC, these resources have been the *raison d'ĕtre* for most settlement in the region (*e.g.*, Levy *et al.* 2001; Hauptmann 2007). As this paper will show, however, this was not always the case, and the Late Byzantine and Early Islamic period settlement represents an important exception to this trend. The primary goal of this paper is to present a summary of the results of excavations by the UC San Diego Edom Lowlands Regional Archaeology Project (ELRAP) in the Faynān region, focusing on those sites that provide insight into the Islamic period. While ELRAP has conducted excavations at dozens of sites in the region, focusing primarily on Iron Age copper metallurgy (*ca.* 1200–586 BC; Levy *et al.* 2014), this paper summarizes the results of excavations at four sites: the 1999 and 2000 field seasons at Khirbat Ḥamrat Ifdān, the 2004 field season at Wādī Fidān 50a, and the 2011 and 2012 field seasons at Khirbat Faynān and Khirbat Nuqayb al-ʿUsaymir (Fig. 1).

The Late Byzantine Period

The Late Roman and Early Byzantine periods represent one of the peaks of

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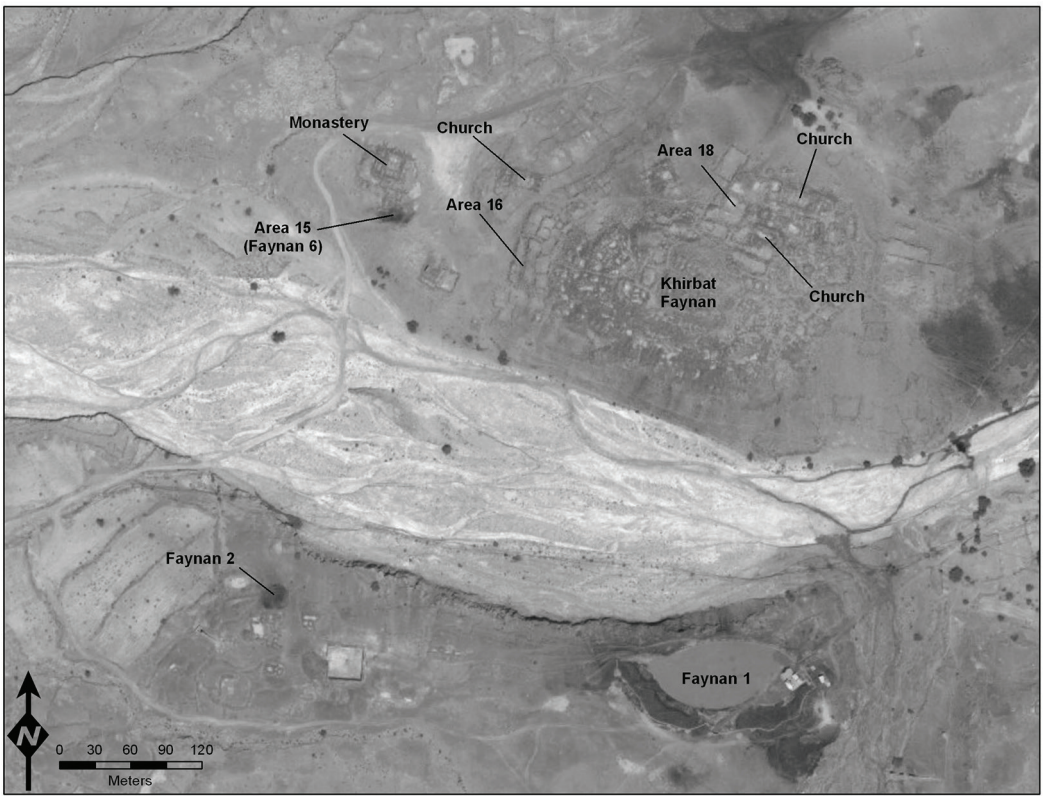
Amman: Department of Antiquities, 2022



1. Map of the Faynān region showing the locations of the main sites discussed in the text (Basemap: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; Map: IWNJ).

industrial activity in Faynān, with an estimated production of 2,500–7,000 tons of copper (Hauptmann 2007: 147). During this period, settlement was concentrated around Khirbat Faynān, the *metallum*, or imperial mine, then called Phaino (Fig. 2). This is also the only period for which we have written historical attestation of industrial activity in Faynān, primarily due to the concern of Byzantine authors like Eusebius of Caesarea with Christian martyrs who had been condemned to the mines (Knauf and Lenzen 1987: 83; Najjar and Levy 2011). The end of this production phase has been the subject of some debate. Researchers associated with the Deutsches Bergbau-Museum (DBM) surveys of the region, such as Kind *et al.* (2005: 192), have tended to favor earlier dates, placing the end of copper production in the late 4th century AD. Researchers associated with the Council for British Research in the Levant's (CBRL) Wādī Faynān Landscape Survey (WFLS) have tended to favor later dates, seeing continuity of production at least into the late 5th century, and potentially into the 6th or 7th (Mattingly *et al.* 2007: 333). This is a difficult question to answer, as dating the end of production relies to a large extent on absence of evidence. Currently, the safest inference can be drawn from the radiocarbon sequence from the DBM probe



2. Satellite photo of Khirbat Faynān with key features and ELRAP excavation areas labeled (Basemap: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; Map: IWNJ).

of the Faynān 1 slag mound, the primary Roman and Byzantine slag mound adjacent to Khirbat Faynān. The latest date from this probe has a calibrated 2σ range of 2nd–early 4th century AD (Hauptmann 2007: 89), and allowing for error from the "old-wood" effect (Hauptmann 2007: 155; Ben-Yosef *et al.* 2012: 63), this may indicate that smelting continued as late as the late 5th century. The site certainly continued to be settled even after copper production scaled down and came to an end, however.

Excavations in Area 16 Terrace 2 (preliminary report in Levy *et al.* 2012: 430–5), on the western side of the mound, revealed a Roman and Byzantine structure occupied at least into the second half of the 6th century AD, as demonstrated by the presence of Late Roman D (LRD) Form 9A (Hayes 1972: 379–82) and other 6th century forms (Fig. 3). The collapse of this structure may have been the result of the Areopolis (al-Rabba) earthquake of *ca.* AD 597 (Zayadine 1971; Ambraseys 2009: 216; Rucker and Niemi 2010), although this identification is still tentative. The Area 8 "monastery," *ca.* 130 m to the northwest, has been dated by a dedicatory inscription to AD 587/8 (Alt 1935: 65; Sartre 1993: 146), and residual late 6th–early 7th century sherds were found during excavation of the Middle Islamic period Area 15 slag mound,



3. Balloon photo of 2011 excavations in Khirbat Faynān Area 16, showing the location of each terrace (Photo: Craig Smitheram, UC San Diego Levantine and Cyber-Archaeology Laboratory; Map: IWNJ).



4. Balloon photo of the 2012 excavations in Khirbat Faynān Area 18, showing the location of key features (Photo: Matthew D. Howland, UCSD LCAL; Map: IWNJ).

built up against one of the monastery walls. Excavations in Area 18, on the northern side of the mound, exposed a cistern complex built in the 5th–6th century, based on the presence of an LRD sherd in the leveling fill below the earliest floor and a radiocarbon date from the fill above the floor (Fig. 4). Occupation of the complex continued into the Early Islamic period, although how long the cistern remained in use is unclear. The presence of burials in the cistern itself suggests a history similar to the Area K.II cistern at Dayr ʿAyn ʿAbāṭā in Ghawr aṣ-Ṣāfī, which was in use as a cistern in the 5th and 6th centuries, but by the end of the 7th century had been repurposed for burials (Politis 2012: 122).

It is perhaps notable that each of these occupation areas at Khirbat Faynān is close to at least one of the site's five churches—Area 16 is near Church 3, Area 8 contains Church 6, and Area 18 is close to Churches 1 and 2 (Mattingly *et al.* 2007: 513)—given the site's increasing religious importance in the 5th and 6th centuries (Mattingly *et al.* 2007: 333). Indeed, the evidence seems to indicate that by the end of the 5th century, Faynān's status as a site of martyrdom and, possibly, a destination for pilgrims replaced copper production as the primary rationale for continued settlement.

The Early Islamic Period

By the beginning of the Early Islamic period, Faynān had essentially disappeared from historical sources. The last writer to mention it was George of Cyprus (1890: 54), who in the early 7th century listed Faynān as a place in the province of Arabia, though he says nothing else about it. We must, therefore, rely on archaeology for our understanding of settlement in the region.

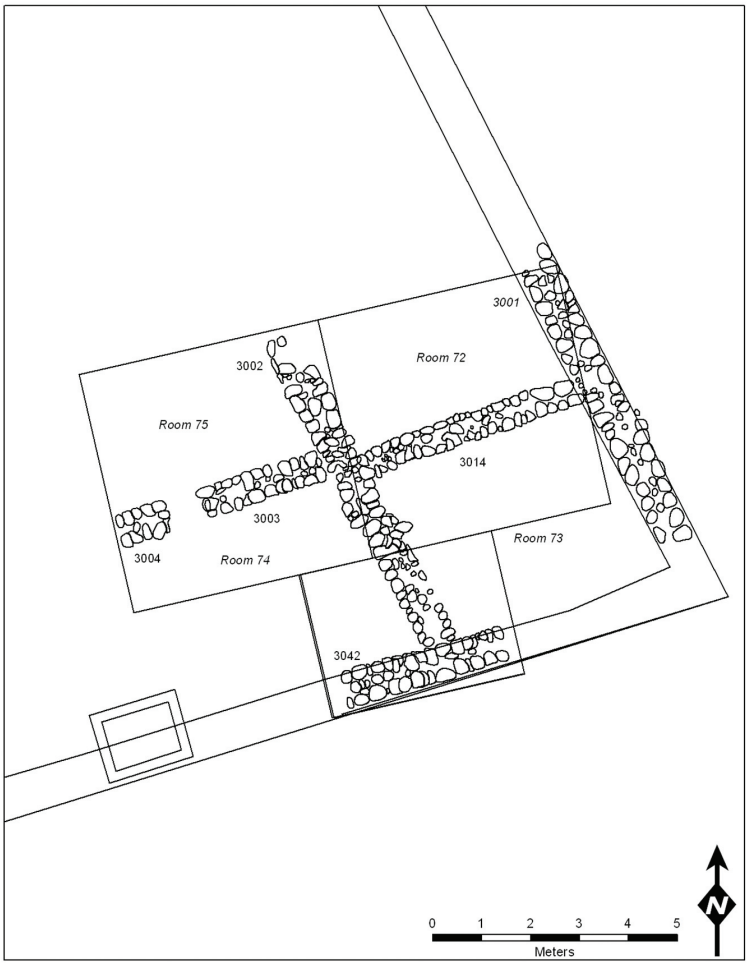
The WFLS team reports a lack of Early Islamic period architecture in the vicinity of Khirbat Faynān and suggests that this indicates an economic shift from mining to pastoralism in the region (Newson *et al.* 2007: 363). They are certainly correct that mining had largely ceased by the 7th century, and so far no evidence of Early Islamic copper production has been found in Faynān. Instead, during this period copper production seems to have been concentrated primarily in the hinterland of Ayla (al-ʿAqaba) in southern Wādī ʿAraba (Jones *et al.* 2017). Nonetheless, the results of the ELRAP excavations in Area 18 indicate that Khirbat Faynān itself was still occupied. Although the stratigraphy of this area remains uncertain due to unforeseen circumstances preventing the completion of work at the site, three basic phases of occupation could be reconstructed. The first, described above, was a Late Byzantine phase associated with the construction and initial use of the cistern complex. The second phase contained material dating primarily to the 6th–8th century, with the most interesting diagnostic forms including a mid-7th century (or later) Egyptian Red-Brown Ovoid Amphora (Watson 1995: 319; Taxel and Fantalkin 2011: 89) and an 8th–9th century schist bowl. It is not clear whether the cistern continued to be used for water storage during this period, although the fact that a counterweight was found in the room adjacent to the cistern in this phase suggests this as a possibility. The nature of occupation at the site during this period is also not entirely clear, but may represent continuity of the site's religious importance into the Early Islamic period. Ruben and colleagues (1997: 439) suggest that the Area 8 monastery "was partly rebuilt during Islamic times, possibly as a khan," which would not rule out a continuing function as a monastery. Examples of Late Byzantine "monastery hostels" have been found at Jabal an-Nabī Hārūn in Petra and other sites in the southern Levant (Whiting 2016). Excavation in Area 8 would be required to confirm this function and clarify the dating of this potential reconstruction, however. Indeed, further excavation across the site

is necessary before the extent and nature of the Early Islamic settlement can really be understood. Regardless of the exact nature of the 6th–8th century occupation phase, a substantial amount of collapse was found above this phase in Area 18, indicating destruction of the building probably at some point in the 8th century. We very tentatively suggest that this may be related to one of the major earthquakes of the mid-8th century, which also caused damage in Petra (Ambraseys 2009: 230–8; Bikai and Perry 2012: 96).

The last phase of occupation in Area 18, dated by ceramics to the late 8th–9th century, and probably continuing later, is of a rather different character. In this phase, the cistern had almost certainly gone out of use, and the excavations uncovered a thick layer of ash and charcoal associated with a concentration of marble finds, including several broken floor tiles and hundreds of white mosaic tesserae. This seems to indicate that, by the 9th century, at least one, and probably both, of the nearby churches had gone out of use, and Area 18 was being used primarily for lime burning. The practice of burning marble to produce lime is common in the region, as evidenced by the Early Islamic period limekilns at the ʿAmmān Citadel (Arce 2003) and 6th century lime production at the Petra Pool Complex (Bedal 2003: 80–2), among many other examples. Beyond this, little can be said about the final Early Islamic period occupation of Khirbat Faynān, or the period spanning the 9th through 13th centuries.

At Khirbat Ḥamrat Ifdān, *ca.* 10 km to the northwest, where Wādī Fidān narrows and cuts through Jabal Ḥamrat Ifidān, a slightly different picture emerges. The primary evidence comes from excavation of a probable farmhouse, Area L, in the southern portion of the site (Fig. 5). The earliest phase of this structure, Stratum L-IIB, can be dated on the basis of relatively limited ceramic evidence to the 6th–8th century AD. Whether this represents the earliest date of the structure is unclear, but the building is similar to other residential structures of the period, *e.g.*, the Umayyad buildings in Maʿān (Genequand 2003: 29–31), although on a rather less impressive scale. Construction of the farmhouse may have involved rebuilding and expanding a Nabataean-Roman building, as residual 1st–2nd century AD sherds were found during the excavation and the central wall of the building predates the outer Stratum L-IIB walls, but no deposits of this period were found in the excavation area before reaching Iron Age and Early Bronze Age layers below. The mudbrick walls and thatched roof of Stratum L-IIB seem to have collapsed at some point in the 8th century—possibly in the same mid-8th century earthquake mentioned above as potentially bringing about the end of the second occupation in Khirbat Faynān Area 18—and were rebuilt shortly thereafter. The next phase of occupation, Stratum L-IIA, has been dated by a radiocarbon sample and ceramics, including Mahesh Ware (Whitcomb 1989), to the mid-8th–9th century.

In many other areas of the site, evidence of reuse of earlier structures or new, often ephemeral, features were found dating to the Early Islamic period, suggesting that Area L was the core of an active agricultural estate. This is supported by the recent publication of Arabic papyrus fragments found during excavations by the Barqā Landscape Project in the northern portions of the site, which may hint at administrative activities during this period (Friedman *et al.* 2017). Friedman and colleagues (2017: 286) also mention a possible open mosque with its *miḥrāb* oriented toward Jerusalem, rather than Mecca, but note that this feature had disappeared by the 1999 excavations of the site. The description of this structure bears a striking resemblance to a structure assigned to site-wide Stratum II, dating to the Early Bronze Age IV (Levy *et al.* 2002: 434 fig.



5. Map of the 2000 excavation in Khirbat Ḥamrat Ifdān Area L (Map: IWNJ).

5B). The ephemeral later phases in many of these areas were rather difficult to date, however, and the structure may in fact be a later one containing primarily residual Early Bronze Age artifacts. Of particular note also was a heavily-worn Umayyad post-reform *fals* dating to the 8th century, surface collected in Area D, which is at present the only 8th century coin that has been found in the Faynān region (*cf*. Kind *et al*. 2005: 188).

At the mouth of Wādī Fidān, *ca*. 2 km northwest of Khirbat Ḥamrat Ifdān, is Wādī Fidān 50a, a Roman watchtower or *castellum* and well. It is likely the site identified by Glueck (1935: 20) as Rujm Ḥamrat Ifdān. The site was badly disturbed by bulldozing in the late 1970s, and ELRAP excavations in 2004 recovered mostly mixed material. Nonetheless, it is worth noting that the assemblage recovered from the *castellum* included sherds dating to the Early Islamic period, indicating that the Early Islamic occupation of Wādī Fidān was not limited to Khirbat Ḥamrat Ifdān. This is especially interesting when considering that the site is adjacent to Wādī Fidān 50, identified as a Roman/Byzantine caravanserai with an associated field system (Levy *et al*.

2001: 175 table 2). Wādī Fidān 50 was the largest site identified during the 1998 Wādī Fidān Survey, but has not been excavated or further investigated. The presence of Early Islamic ceramics at Wādī Fidān 50a, however, suggests the possibility of a third relatively large site in Faynān where occupation continued into the Early Islamic period.

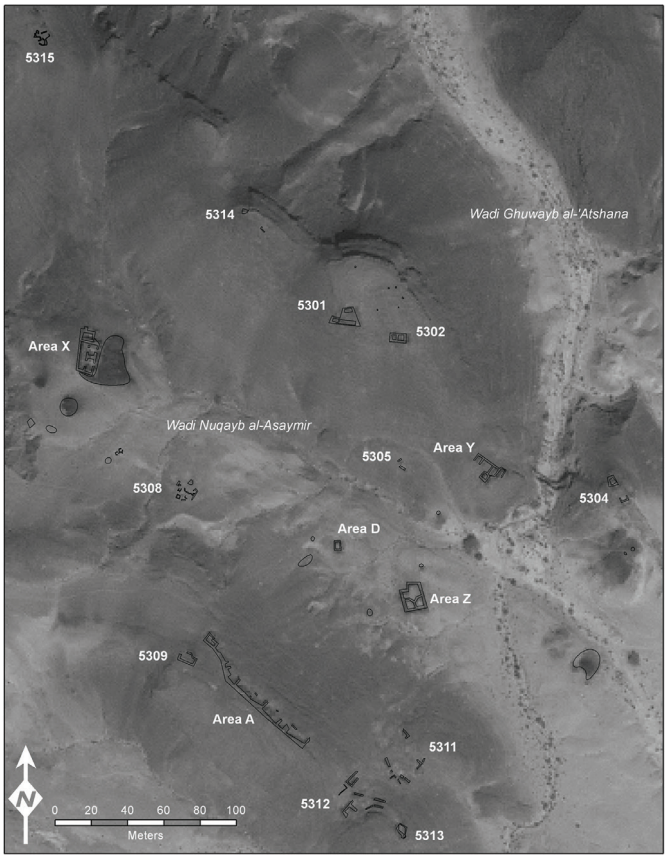
Based on the evidence from ELRAP excavations described above, a picture of two different Early Islamic period settlement systems in Faynān can be pieced together. In the eastern part of the region, at Khirbat Faynān, Early Islamic settlement seems mostly to have been a continuation of the Late Byzantine settlement. The community was likely still a Christian one, although perhaps smaller than it had been in the 6th century. By the later 8th century, the site's churches had gone out of use, at least to judge from the evidence that their marble furnishings were being recycled for lime in Area 18. Whether this was the result of a mid-8th century earthquake is uncertain, and caution is essential in identifying earthquake destructions, particularly on the basis of limited excavation. The identification of destructions of roughly similar date at Khirbat Faynān and Khirbat Ḥamrat Ifdān may lend support to this explanation, though. Khirbat Faynān continued to be settled into the 9th century, but we do not yet know the extent and nature of this settlement. In the western part of the Faynān region, settlement followed a different pattern. In the Early Islamic period, a farmhouse was built at Khirbat Ḥamrat Ifdan. By the early to mid-8th century, the site's occupants were probably Muslims, to judge from the fact that they were keeping records in Arabic (Friedman *et al.* 2017). Considering the presence of Early Islamic period ceramics at Wādī Fidān 50a, other settlements likely existed in Wādī Fidān at this time, although further work is required to investigate this. Both the eastern and western settlements seem to have been abandoned at some point in the 9th century, and evidence for settlement is very limited until the revival of copper mining activities in the early 13th century.

The Middle Islamic Period

As in the Early Islamic period, Faynān is unfortunately mostly absent from Middle Islamic period written sources. The sole specific reference to the region is a formulaic account of the Exodus itinerary, drawn primarily from Jerome's *Letter 78*. Essentially the same account appears in a number of medieval pilgrimage guides, including those of "Fetellus" (1971: 20) and "Pseudo-Beda"/Anonymous Pilgrim VI (1894: 45), and asserts that the stations of Selmona and Fynon "are not found in the order of history." Again, we must rely on archaeology to piece together a picture of settlement in the region.

The most important site of this period in Faynān is Khirbat Nuqayb al-ʿUsaymir, located just west of Wādī al-Ghuwayb al-ʿAṭshāna, *ca.* 1 km south of where it splits from the main channel of Wādī al-Ghuwayba, and also *ca.* 1 km southeast of the large Iron Age smelting center of Khirbat an-Nuḥās (Levy *et al.* 2014). During the 2011 and 2012 field seasons, ELRAP conducted excavations in five areas of the site: Area A, a likely residential structure on the site's southern hill with very shallow deposits; Area D, a small outbuilding containing a hearth; Area X, the primary smelting workshop (preliminary report in Levy *et al.* 2012: 426–30); Area Y, a structure of uncertain function on the site's northern hill with very shallow deposits; and Area Z, a public building with evidence of dining and food preparation, later repurposed as a refining or blacksmithing workshop (Figs. 6–7).

Analysis of finds collected during the 2002 Wādī al-Ghuwayba Survey (Levy *et al.* 2003; Jones *et al.* 2012), as well as



6. Map of Khirbat Nuqayb al-ʾUsaymir, with ELRAP excavation areas and survey features labeled (Image: IKONOS satellite imagery courtesy of GeoEye. GeoEye data is owned by GeoEye, Inc. All rights are reserved by GeoEye, Inc.; Map: IWNJ).

ceramics (Hauptmann *et al.* 1985: 190, 192) and coins (Kind *et al.* 2005: 179 Table 1, 188) collected on DBM surveys of the site, had already indicated that the site was primarily occupied in the early 13th century AD, or the Ayyūbid period. Based on the evidence from the excavations, this is the only part of the Middle Islamic period during which the site was occupied. While some artifacts typical of the Early Islamic or earlier Middle Islamic period were found at the site (*e.g.*, a handful of glazed, wheel-made cooking pot sherds and the base of a schist cooking bowl) these seem to have been brought to the site in the 13th century, as no other evidence of earlier occupation was found. Like-



7. Balloon photo of Khirbat Nuqayb al-ʾUsaymir Area Z, with 2012 excavation area indicated by white polygon (Photo: Matthew D. Howland, UCSD LCAL; Map: IWNJ).

wise, the metallurgical occupation seems to have ended in the mid-13th century, as no material typical of the Mamlūk period was found.

To briefly summarize the excavations, the deposits in Areas A and Y were very shallow, and in both areas bedrock was reached at a depth of only 25–50cm. This is due to fairly severe erosion of these hillside areas, mostly during seasonal rains (Howland *et al.* 2018). Although finds in these areas were limited, the excavations did produce some insight into the settlement history of the site, notably evidence for a fire in Area A either shortly before or sometime after it went out of use.

The site's main smelting workshop was excavated in Area X, and preliminary discussions of this excavation have appeared previously. In this area, excavations revealed a smelting furnace and two piles of charcoal, which allowed for a partial reconstruction of the *chaîne opératoire* of Middle Islamic copper production at the site (Levy *et al.* 2012: 426–30; Jones 2016). Finds from this area were also rather limited, however. The fact that the recovered artifacts were related primarily to the last smelting operation at the site led to the conclusion that the workshop had been regularly cleaned as part of the process of copper production, and debris discarded on the slag mound outside of the building's entrance, to the east.

The excavations in Area Z produced a wider range of artifacts. The ceramics included undecorated wheel-made wares, "early" hand-made wares, and typical Hand-Made Geometrically Painted Wares, all of which are rather difficult to date, but also stonepaste wares belonging primarily to Mason's (2004: 98–100) Syrian Stonepaste-bodied Groups 4 and 6, dating to the late 12th century and late 12th–early 13th century, respectively, as well as early 13th century slipper lamps with high tongue handles (Avissar and Stern 2005: 126–7). In addition to this, several Ayyūbid coins of al-ʿĀdil I were found in Area Z, dating to the second decade of the 13th century. Area Z was also the only excavation area at Khirbat Nuqayb al-ʾUsaymir that produced evidence for multiple phases of occupation. In the first phase, Stratum Z-2b, the building seems to have been used as a public dining and food preparation space, and a pit excavated in the northeastern corner of the building contained substantial amounts of charcoal, bone, and eggshell mixed with cooking and table wares. Major modifications to the building were undertaken at the beginning of Stratum Z-2a, the most significant of which involved blocking several of its entrances and narrowing the main entrance to build bins against the walls. The bin against the eastern wall was filled with charcoal, iron fragments, and blacksmithing cinders, and the bin against the southern wall contained a gray, ashy fill. This seems to indicate that the building was repurposed for refining or blacksmithing, or perhaps both. The small building in Area D seems to have been constructed in tandem with this modification as a replacement food preparation area. Excavations there uncovered a small staircase leading to a hearth.

While a specific foundation date for Khirbat Nuqayb al-ʾUsaymir is difficult to determine, it is reasonable to suggest that it was likely built during the period AD 1198–1218, when al-ʿĀdil I's son, al-Muʿaẓẓam ʿIsa controlled al-Karak and ash-Shawbak, and invested particularly in ash-Shawbak, *ca*. 20 km southeast of Khirbat Nuqayb al-ʾUsaymir (Ghawanma 1982: 180–1; Brown 1988: 242). The site seems to have been abandoned at some point in the mid-13th century, perhaps coinciding with the transition to Mamlūk rule in the region in AD 1263. If the suggestion that the site was established primarily to provision the sugar industry with copper is correct (Jones *et al.* 2012), then this abandonment may relate to a changed political-economic situation in

which it was more efficient to import copper than to produce it in Faynān.

Copper smelting also took place at Khirbat Faynān in the early 13th century, though this activity does not seem to have involved substantial construction of new architecture. Evidence for this activity instead comes from two slag mounds, which DBM surveys identified as Faynān 2, near the Roman reservoir across the *wādī* from the main site, and Faynān 6, built up against the Area 8 monastery (Hauptmann 2007: 97, 103). In 2012, a small excavation was conducted in Faynān 6, or Area 15 in the ELRAP grid system. Although few datable artifacts were recovered, which is to be expected for a slag mound, a sequence of radiocarbon dates demonstrates that the chronology of production essentially matches that of Khirbat Nuqayb al-'Usaymir. This is particularly interesting, given that a DBM team collected five 14th century Mamlūk coins at Khirbat Faynān (Kind *et al*. 2005: 188). Some Middle Islamic period ceramics were found in the upper levels of the excavations in Areas 16 and 18, and may be evidence of limited settlement at the site in this period, but copper production does not seem to have been carried out here any later than at Khirbat Nuqayb al-'Usaymir.

The Late Islamic Period

For the Late Islamic period, excavations lend support to the picture of seasonal use by nomadic pastoralists painted by most of the archaeological surveys of Faynān. At Khirbat Faynān, excavations produced little evidence for the Late Islamic period, and, at present, little can be said. At Khirbat Nuqayb al-'Usaymir, several buildings seem to have been modified in this period, notably Area Z. The unique quadrantal rooms in the southern portion of the building were formed by relatively shallow walls, built on a surface substantially higher than the Middle Islamic period surfaces. Unpainted hand-made wares, which made up 65% of the ceramic assemblage from the 2002 survey (Jones *et al.* 2012: 82), made up only 27% of the excavated assemblage, suggesting perhaps that the survey ceramic assemblage contained a mixture of Middle Islamic material associated with copper production, and Late Islamic material—primarily unpainted hand-made pottery—associated with later pastoralist use of the site. The lack of Gaza Ware and chibouk (tobacco pipe) heads may, however, indicate a date primarily in the earlier part of this period, perhaps before the 17th century.

In contrast to this, excavations at Khirbat Ḥamrat Ifdān recovered a limited amount of later Late Islamic material, including Gaza Ware, indicating pastoralist use of the site probably in the 19th or early 20th century. This is roughly contemporary with Palmer's (1871: 456–8) account of passing through Wādī Fidān, in which he describes his rather strained interactions with the ʿAmarīn, who live in the area today. Likewise, at Wādī Fidān 50a, the aforementioned bulldozer activity had, prior to the 2004 excavations, badly disturbed the grave of a woman who had been buried with a number of late 19th century tokens and imitations of Ottoman coins sewn to her garments.

Conclusion

Although copper production was, in a long-term perspective, the main driver for settlement in the Faynān region, focusing on the Late Byzantine and Islamic periods reveals a pattern where this is instead exceptional. During the Late Byzantine and Early Islamic periods, settlement in the eastern portion of the region was in many ways related to the memory of copper production, in the sense that Khirbat Faynān's religious importance was certainly related to the martyrs sent to their deaths in the mines. Copper production, however, had by this point mostly ceased. Although the latest part of this period involved an industry of sorts, this was the production

of lime, rather than metal. In the western portion of the region, Early Islamic settlement was driven by agriculture, to judge from the apparent estate established at Khirbat Ḥamrat Ifdān. In this view spanning the 7th through 19th centuries, copper production appears as the exception, rather than the rule. Although this activity accounts for the most visible record of Middle Islamic period settlement in the region, particularly at Khirbat Nuqayb al-ʾUsaymir, the industry was active for perhaps six decades, at most. By the 14th century, the picture that emerges is one of seasonal use of the region by mobile pastoralists, a pattern that continued into the 19th and early 20th centuries.

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Sediments in Ancient Ruins in Jordan as Archives of Dust Deposition and Land Use

Abstract

Archaeological structures are usually subject to sedimentation after their abandonment. These sediments ("debris") come partly from collapse and are often removed as quickly as possible in order to study artifacts and the intact remains of the structures. However, in the semi-arid and arid climates of Jordan, sediments of the debris contain (or consist of) aeolian dust. Thus they represent a potential environmental archive comparable to the famous loess sequences of the Negev. The latter mostly lack Holocene layers, meaning that the debris preserved in archaeological sites might be suited to continue dust records through the Holocene. A systematic comparison of sediments preserved in different archaeological structures (hilltop ruins, cisterns, and terraces), actual dust storms, and natural sediments around Petra in southern Jordan is presented in this contribution. Results suggest that long-range deposition of silty, calcareous sediment continues until today and that the terrace sediments and the material culture associated with them allow for reconstructions of ancient land use patterns.

Introduction

Pleistocene desert loess deposits in the central and northern Negev desert have been investigated as important records of dust deposition, accumulation, and soil development (Yaalon and Dan 1974; Bruins 1976; Bruins and Yaalon 1979; 1992; Issar and Bruins 1983; Bowman *et al.,* 1986; Goldberg 1986; Gerson and Amit 1987; Goodfriend and Magaritz 1988; Zilberman 1992; Crouvi *et al.* 2008; 2009). In Jordan, loess-like sediments were postulated (Bender 1974; Cordova 2007), but have been documented only in few cases (see summaries in Lucke *et al.* 2013; 2019a). Holocene deposits of settling dust were hardly recorded (Faershtein *et al.* 2016).

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This limits interpretations of Pleistocene loess, because it is not certain whether its dust sources and climate were similar to the current situation.

In order to fully understand the significance of terrestrial archives of aeolian sediments, they should be compared with dust in the atmosphere. A comparison of Holocene aeolian sediments with current dust could therefore significantly improve the understanding of dust deposition in drylands. The absence of Holocene loess in the Negev has been attributed to pronounced rainfalls which lead to erosion rather than accumulation (Avni *et al.* 2006). In addition, stronger winds during the Pleistocene (with its comparatively longer time frame than the Holocene) have been proposed to produce silt-sized particles by abrasion of mobilized sand dunes (Crouvi *et al.* 2008; Enzel *et al.* 2010). However, Swet *et al.* (2019) could not identify abrasion of silt-sized particles from quartz grains during wind tunnel experiments. Therefore, it seems likely that other processes than aeolian abrasion governed dust supply. Silt deposition may have been mainly a result of medium-range transport (Roskin *et al.* 2014).

Variations of the dust dynamics may have played an important role for landscape changes in the southern Levant. Reduced amounts of settling dust at the onset of the Holocene were suggested by Faershtein *et al.* (2016) to lead to smaller sediment loads, and thus more intense runoff with stronger discharges. Changes of fluvial dynamics from sediment aggradation to incision and erosion and vice versa may thus have been less the result of rainfall variations or base-level changes, but could mainly have been triggered by dust supply.

Archaeological Structures as Holocene Dust Archives?

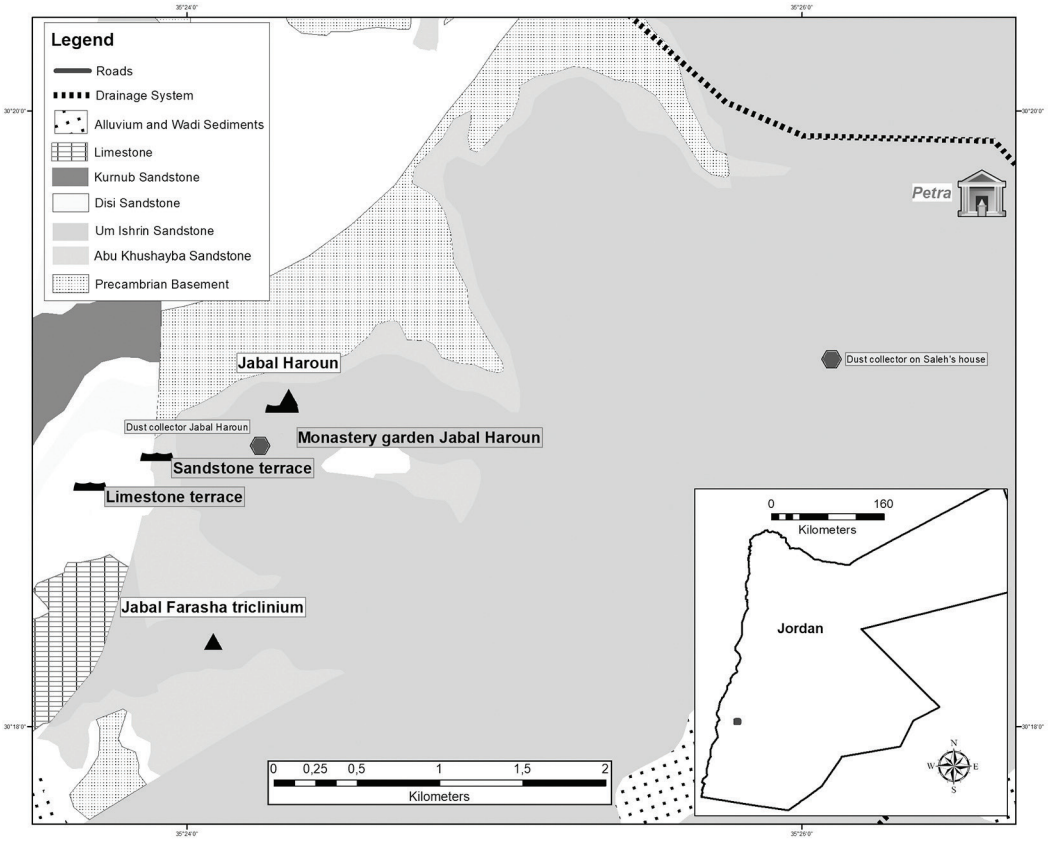
The Negev loess provides fertile soils for agriculture where irrigation by collected runoff or from cisterns is practiced. Ancient agricultural terraces in the Negev reduced runoff and consequently, incision and erosion diminished (Avni *et al.* 2019). Sediments that accumulated behind ancient terrace walls were found to contain a significant portion of (partly reworked) aeolian dust (Bruins and Jongmans 2012). Aeolian dust accumulated, as well, in the ruins of houses and other built structures (Lucke *et al.* 2005; 2019a; 2019b; Lucke 2008; Porat *et al.* 2013; Junge *et al.* 2016; 2018). Sediments in archaeological ruins, hitherto unexplored, are thus potential environmental archives of Holocene dust dynamics in the southern Levant.

We investigated sediments potentially comprising Holocene dust from the following structures at Jabal Hārūn near Petra in Jordan (Fig. 1):

- Ruins on hilltops: aeolian sediments were deposited after their abandonment.
- Agricultural terraces: accreted sediments until they reached the top of the terrace walls.
- Current dust collected in dry traps: standard marble traps were continuously sampled.

Study Area: The Sandstone Mountains near Petra

The study sites lie in the vicinity of Petra, at the mountain Jabal Hārūn (site of the pilgrimage sanctuary of Aaron/Haroun) where comprehensive surveys of off-site archaeological material were carried out by the Finnish Jabal Hārūn Project (FJHP; Kouki and Lavento 2013). The climate is arid (BWh classification according to Köppen–Geiger system, Peel *et al.* 2007), with rains occurring mostly from November to March. Mean annual rainfall in the Petra region is 153 mm (Wādī Musā weather station, 1984–2011), with high variations: 274 mm in the wettest season 1987/88 during the above-mentioned period, or 42 mm in the



1. Overview and geological map of the study area. Hilltop ruins are marked with triangles, terraces with wall symbols, and collectors of current dust with hexagons.

driest season of 2010–2011.

The area is dominated by Cambrian continental sandstones of 900–1200 m elevation, with Horst structures related to the Dead Sea transform fault that led to a highly diverse geology. Patches of limestones and igneous rocks are present at the surface (Barjous 2003). Soils and sediments in the region have a significant sand fraction, derived from local fans and eroded sandstones (Lucke and Bäumler 2007). However, calcareous sediments within archaeological structures have a significant silt fraction, which represent long-range dust transport during the Holocene (Lucke 2017; Lucke *et al.* 2019a; 2019b).

The various archaeological ruins investigated during our project have been described elsewhere in detail (Lucke *et al.* 2019a; 2019b; forthcoming). This contribution focuses on summarizing evidence from two hilltop ruins and three terraces. One of the latter is situated in remains of a rectangular enclosure next to the ruins of a monastery on Jabal Haroun, which is suspected to represent the remains of a garden (Silvonen *et al.* 2013).

The Monastery Garden (Rectangular Enclosure) of Jabal Hārūn

This area may have been irrigated with water from large cisterns in the monastery,



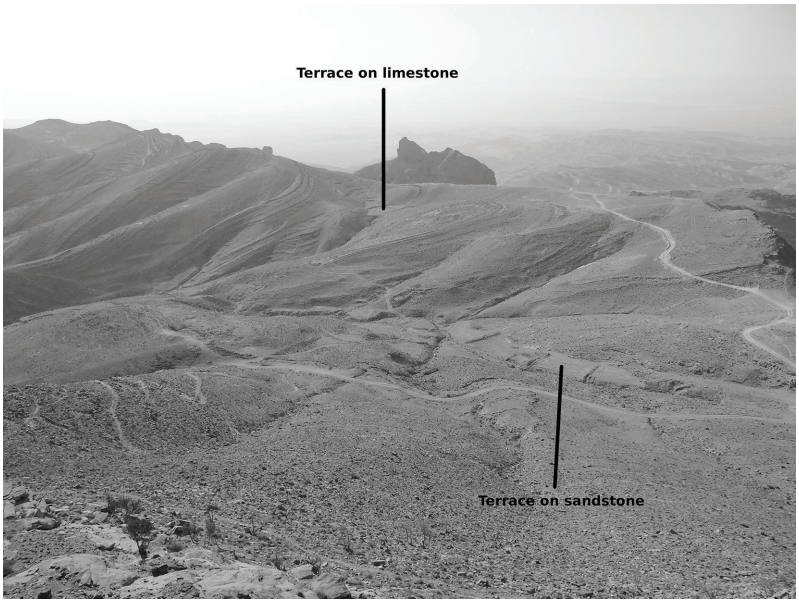
2. View from the summit of Jabal Hārūn at the remains of a rectangular structure next to the ruins of the monastery.

as its potential catchment for the collection of runoff is very small. We excavated a profile near the center of the enclosure (N 30.31665, E 35.40518; Fig. 2). It was 70 cm deep and contained various pieces of charcoal, bones, and pottery, suggesting the deposition of garbage probably representing manure (Lucke *et al.* forthcoming). The soil was classified as Protic Arenosol (Alcalic, Ochric) according to WRB (2015). Our survey of the pottery cover found 0.24 pieces/m^2, preliminarily dated to the Byzantine-Umayyad (transitional?) period, with a small Nabatean component and probably some Late Islamic sherds. The profile contained a few Late Byzantine and Early Islamic pottery sherds at the surface, two Early Byzantine pottery pieces in 40 cm depth, and some Late Roman pottery at the bottom. For more detailed description, see Lucke *et al.* (2019a; forthcoming).

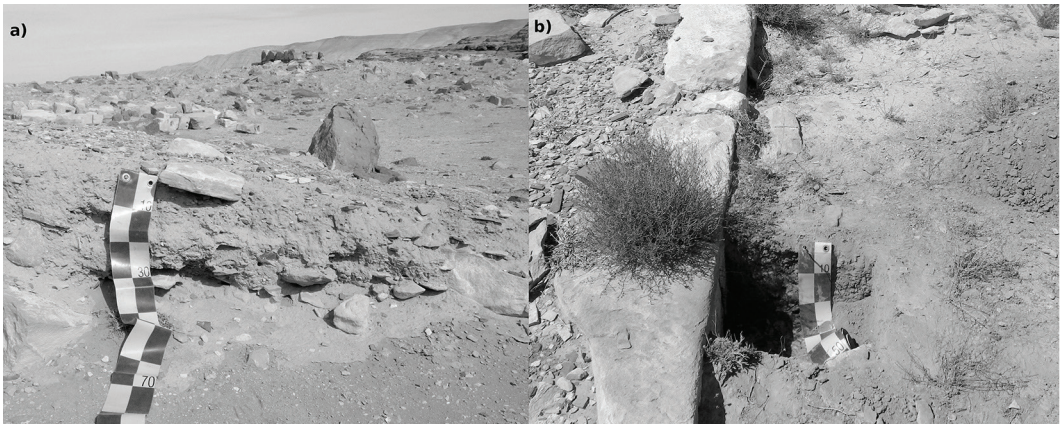
The Terraces

The western slope of Jabal Hārūn hosts one of the largest runoff cultivation systems of the mountain, associated with a sandstone scarp and ridge of dolomitic limestone (Fig. 3). We excavated one profile in a terrace on sandstone, in the center of sector C of site 33 of the FJHP (N 30.31404, E 35.39839). It was 140 cm deep, with silt-dominated sediment from 140–70 cm depth. From 70 cm to the top, the soil was sand-dominated. Sediments reached the top of the wall, *i.e.*, the structure had completely filled. The soil was classified as Protic Calcaric Arenosol (Colluvic) over Protic Calcaric Regosol (Colluvic). Our pottery survey found 0.06 pieces/m^2, mainly Nabatean from the 1st–2nd century AD, and few Late Roman, Byzantine, Early Islamic, and Late Islamic sherds. For more detailed descriptions, see Lucke *et al.* (2019; forthcoming).

The second terrace profile is located on a slope of dolomitic Turonian limestone (Wādī as-Sīr formation; Barjous 2003—FJHP area K, site 60; N 30.31244, E 35.39476; Fig. 3). It was 70 cm deep and contained homogeneous, silt-dominated sediments. The soil was classified as Protic



3. View from Jabal Hārūn at the two investigated terraces.



4. a) Soil covering the hilltop ruin of the monastery on Jabal Hārūn, b) soil covering the hilltop ruin of Jabal Farāsha.

Calcaric Regosol (Colluvic) according to WRB (2015). Our pottery survey found 0.06 pottery pieces/m^2, all dating to the 1st–2nd century AD.

The Hilltop Ruins

The debris covering ruins of archaeological structures in the investigation region comprise significant shares of calcareous silt, which are most likely of aeolian origin, in particular in case of hilltop ruins. As the ruins of the monastery on Jabal Hārūn are located on a flat sandstone plateau surrounded by ravines, they represent such a hilltop situation. The uppermost 10 cm of sediments exhibited a vesicular layer below a clast cover, and showed strong reaction to HCl (Fig. 4a; N 30.31734, E 35.40418). Vesicular layers are known to result from

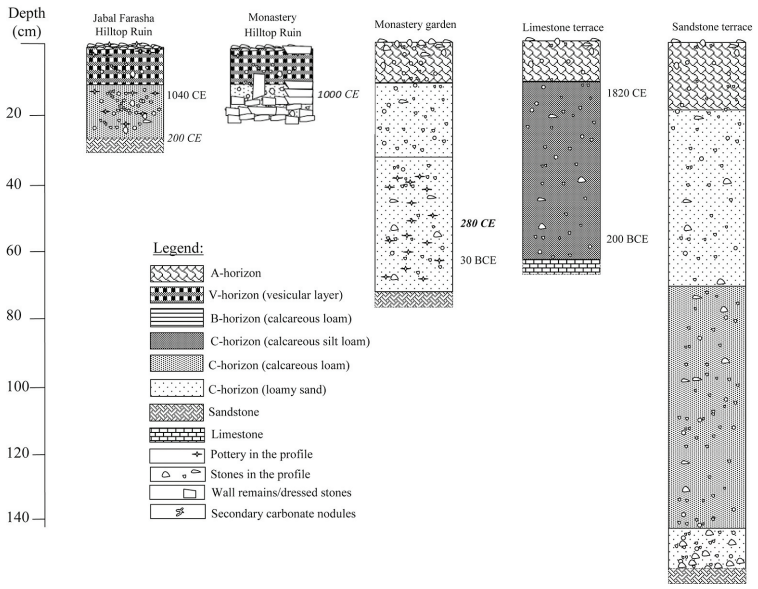
processes of aeolian sedimentation (Turk 2012). At the remaining walls of the monastery, it could be observed that mortar made from mud had been used to close gaps in the walls during their construction. Therefore caution was exercised not to sample such mud mortar remains, but only the aeolian, post-abandonment sediments covering the monastery. Due to the elevated position of the sampled profile, fluvial deposition seemed very unlikely. The soil was classified as Protic Arenosol (Aridic, Aeolic) according to WRB (2015).

In addition, sediments covering the remains of a Nabatean triclinium on Jabal Farāsha were sampled, facing Jabal Hārūn to the south-west (N 30.30445, E 35.40141; Fig. 4b). Again, a clast cover and vesicular layer were present at the surface. The soil that developed in these aeolian sediments was classified as Calcaric Leptosol (Protic) according to WRB (2015).

Results

Substrates of Soils Covering Archaeological Ruins

Fig. 5 summarizes the sampled profiles. More detailed results were presented elsewhere (Lucke *et al.* 2019a; 2019b), and this contribution summarizes those results relevant for archaeology. The hilltop ruin soils exhibit vesicular layers below a crust and clast pavement, which clearly demonstrate their formation directly during aeolian deposition processes. Current dust samples deposited with precipitation in the Petra region consists of similar, calcareous silt loam (Lucke *et al.* 2019a; 2019b). Vesicular horizons could not be discerned in terrace soils, but the substrates are very similar. This suggests that fluvial deposition processes and plowing destroy bedding structures and homogenize substrates, but that the parent material of terrace soils is mainly of aeolian origin, too (Lucke *et al.* 2019b).



5. Summary of substrates and soil horizons of the studied profiles. Available OSL-ages are given in normal letters, ages from archaeological context in italics, and 14C-ages in bold and italics (see Lucke *et al.* 2019a; 2019b for detailed age results).

While the terrace on dolomitic limestone showed very homogeneous soil cover, a sandy layer poor in $CaCO_3$ was present in the upper part of the sandstone terrace profile. This indicates an increasing contribution from weathering sandstones, probably connected with a lack of maintenance of terraces covering the sandstone scarp during the Middle Ages (Lucke *et al.* forthcoming).

Compared to the triclinium on Jabal Farāsha, the monastery ruin soil showed elevated sand contents. This indicates that either weathered sandstone rocks surrounding the plateau provided a significant aeolian sand contribution, or that mud mortar was blown out of the walls (Lucke *et al.* 2019a).

In the hilltop ruins, there was no evidence of hiati. Average sedimentation rates in the hilltop ruin of the triclinium on Jabal Farāsha could be calculated as 0.14 mm/a, or ~125 g m^2 a^{-1} (Lucke *et al.* 2019b), which is very similar to results from current dust collection in the Negev (Kidron *et al.* 2014), and higher than those of Pleistocene hilltop loess (Crouvi *et al.* 2009). On Jabal Hārūn, however, deposition rates were twice as high than on Jabal Farāsha. This seems connected with the presence of rock cliffs overlooking the plateau where the monastery is located, providing a significant, aeolian sand fraction from weathering sandstones (Lucke *et al.* 2019b). As well, an aeolian contribution of the dolomitic limestone could clearly be identified in both terrace profiles due to elevated Mg-contents (Lucke *et al.* 2019b). This points to a prominent role of local dust sources.

Fluvial processes such as runoff irrigation of the terraces seem to play a role for the speed of sediment aggradation, but not the composition of the substrates. There is no connection between fluvial catchment size and sediment properties. Aeolian processes and sources dominate; therefore, the composition and primary deposition of substrates in all archaeological soils is dominated by aeolian sediments, which are only re-distributed by runoff.

In-Situ Soil Formation?

Parameters of soil weathering intensity suggest that in-situ soil development is minimal or absent, but that the soils covering archaeological ruins in the Petra region consist of mixtures of diverse pre-weathered materials from various sources (Lucke *et al.* 2019b). These mixtures could be modeled statistically, indicating that a certain grain size distribution including most particle size classes, plus rather high concentrations of various major and trace elements, is characteristic of soils covering archaeological structures (Lucke *et al.* 2019b). They can be distinguished from dust, rocks, and natural soils with high certainty. Their composition points to an important role of accretion processes, whereas deflation seems absent. Soils covering archaeological ruins are characterized by higher shares of fine fractions, in particular a relative enrichment of silt associated with elevated contents of various major and trace elements (Lucke *et al.* 2019a; 2019b).

Role of Precipitation

Dust samples associated with snow and rain show a very different composition than other dust samples. They are characterized by higher contents of silt and $CaCO_3$, and are depleted in SiO_2, but enriched by all other major and trace elements (Lucke *et al.* 2019b). This suggests that these elements, as well as extractable iron and magnetic susceptibilities, are bound to a calcareous silt fraction that settles to a higher degree when associated with precipitation. In addition, the snow dust sample was exceptionally large, and snowfall in the Petra region associated with minimal runoff. As the snow melts slowly, water infiltrates more or less completely into soils, minimizing erosion and fostering vegetation and biological soil crusts (Lucke *et al.* 2019a). If snowfall

was more frequent in the Negev during the Pleistocene, this could be one explanation of increased dust deposition during that time.

Role of Wall Remains, Clast Covers, (Biological) Soil Crusts, and Vegetation

Biological soil crusts are known to trap and fix dust < 50 µm (Danin and Ganor 1991), and similar sediment-fixing effects could be connected with the clast covers at the surface (similar to "desert pavements," McFadden *et al.* 1998). Vegetation, in contrast, could so far only be shown to trap sand (Kidron 2019). Sediment accretion in hilltop ruins could therefore be connected with the presence of biological soil crusts and clast covers. The ruins reduce or prevent runoff, provide wind shadow, retain rainwater to some degree, and vegetation is usually minimal. All surfaces of hilltop ruins soils were covered by clasts and crusts. These conditions could explain why dust accumulates there, but not in most of the natural landscape.

Terraces as Archives of Past Land Use

Lucke *et al.* (forthcoming) were able to retrieve palynofacies debris, pollen, and phytoliths from terrace soils. Remains of aquatic species suggest standing water in puddles behind terrace walls, and possibly also in reservoirs for several months, indicating that massive barrages originally served for the collection, storage, and re-distribution of runoff water. This indicates the presence of a sophisticated irrigation system. As well, contents of plant-extractable phosphate as well as elevated biomarker ratios marking the presence of human excrements indicate manuring (Lucke *et al.* forthcoming). These were largest in the monastery garden, suggesting that densities of off-site pottery scatters likely correspond to manuring intensities, as found elsewhere in Jordan (Lucke *et al.* 2019). This points to a systematic agricultural use of the terraces near Petra during antiquity.

Discussion and Conclusion

One basic premise of most studies dealing with desert loess is that primary (hilltop) terrestrial sediments represent more or less directly the material that was moved through the atmosphere (*e.g.*, Crouvi *et al.* 2008; 2009; 2010). Formation of desert loess was therefore mainly approached from the supply side, based on the assumption that its genesis depended primarily on generation and transport of sufficient silt through the atmosphere (see summary in Smalley *et al.* 2019). Considered silt-generating processes were mainly collision of dune sand grains during aeolian transport (Enzel *et al.* 2010) as an origin from glacial grinding seems unlikely.

However, various other processes such as fluvial comminution, aeolian abrasion, insolation weathering, salt weathering, frost shattering, volcanism, and deep weathering of saprolite can produce silt and develop a range of local dust sources (Wright 2007; Ojha *et al.* 2018). Fluvial comminution in turbulent flow, such as during the frequent flash floods in the southern Levant, was found the most effective short-time process of silt production (Wright *et al.* 1998). This suggests that local sources such as fans of wadis may provide significant amounts of silt-sized sediment. In addition, settling and suspended dust in the atmosphere were found to differ (Singer *et al.* 2003; 2004). This could be due to changing local sources that are mobilized during variable storm events (Yaalon and Ginzbourg 1966; Offer and Goossens 2001; Ganor and Foner 2001; Crouvi *et al.* 2017), mix with suspended dust, potentially form aggregates or coatings during transport (Mahowald *et al.* 2014; Kok *et al.* 2017) and thus possibly "harvest" suspended dust from remote sources (Lucke *et al.* 2019b). Formation of aggregates and/or clay and oxide coatings might be enhanced under precipitation, which could explain the different composition of dust samples that were associated with rainfall and snow

(Lucke *et al.* 2019a, 2019b). In this context, the sampling method of current dust plays a role: Kidron *et al.* (2014) showed systematic differences between dry and wet dust samplers.

Aeolian sediments in archaeological structures near Petra indicate that vegetation, surface crusts, and clast pavements play key roles for dust fixation (Kidron 2019; Lucke *et al.* 2019a). The formation and composition of desert loess might therefore not only be a function of remote dust sources, but also of local dust supply, and of deposition processes leading to (possibly selective) fixation of aeolian material (Lucke *et al.* 2019a; 2019b).

The importance of local sources for dust deposition in the Levant could in general have been underestimated due to a focus on well-rounded or subangular quartz grains indicating aeolian abrasion. Earlier studies found that hilltop ruins in northern Jordan likely comprise a significant dust component but disregarded the evidence from soil structure and substrate composition as particles proved under the microscope to consist largely of angular or weakly rounded calcite fragments (Lucke *et al.* 2005; 2014; Lucke 2008; Kemnitz and Lucke 2019). However, in light of the evidence for a significant contribution of local sources from southern Jordan, it seems well possible that such particles are transported by wind from the surrounding limestone rocks. This suggests that aeolian deposition in hilltop ruins is a common process in arid and semi-arid areas, which may have supplied approximately 20 cm of hilltop ruin soil cover during the past 2000 years in northern Jordan (Lucke 2008; Lucke *et al.* 2019).

Archaeological missions excavating hilltop ruins should consider investigating debris as important, hitherto unexplored environmental archive of post-abandonment dust deposition.

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"The Times They Are A-Changin'": The Built Environment as a Resilience Marker of Social Identities in the Transjordan

Introduction

The final verses from one of Bob Dylan's most famous songs, "The Times They Are A-Changin'," sparked a heated debate on the profound meaning behind his lyrics, in particular the word "a-changin'." Was it simply a bizarre way of writing "a changing," meaning that the zeitgeist of a society, and therefore its institutions, is in a continuous state of flux, or was it meant to be interpreted that nothing really changes? This particular term and the discussion it evokes has particular relevance for how Middle Eastern societies in the past, across time and space, dealt with different sort of "crises" (environmental, political, or economic), and in particular how (resilience) strategies manifested themselves within the built environment of archaeological sites. Some sites are entirely abandoned, while others shrank in size but continued to be occupied. At the same time, other sites continued to be occupied over a long period or experienced cases of reoccupation after a short period of abandonment.

Investigating these multifaceted and diverse strategies, what form they take on a site, and interpreting how the various factors (and perhaps "crises") may have influenced or tested these strategies is challenging. However, we may begin to carefully reconstruct patterns through cross-chronological parallels in some identifiable recurring features in the built environment of several sites across the Middle East. This paper will present some of the preliminary results of the postdoctoral project conducted by the author in 2018 at the Annemarie Schimmel Kolleg at the University of Bonn, which examined various patterns of spatial change and continuity on sites in the Transjordan and their relationship to the phenomenon of reoccupation and to potential social phenomena including "crises." More specifically, it will be argued that despite

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the onset of crises, the social structures of local rural communities, and their building traditions, might have helped to endure and survive them. In particular, the social flexibility of the "segmentary structures", *i.e.*, societies "formed by several lineages which consider themselves as descending from a common ancestor" (Fabietti 2010: 349), and the economic adaptivity of so-called "pastoral" groups are two key elements that help explain the recurring reoccupation of sites in the Transjordan, following short-term breaks in their occupation, and the maintenance of their organizational and spatial principles. It is important to underscore that the idea of continuity across periods of "crises," such as the Byzantine-Early Islamic Transition or the arrival of the Mamluks. This continuity should not be viewed as a complete "absence of change," as appears to be suggested in some scholarly literature, since evidence of change itself is ever present within settlements. The physical evidence for both continuity and change lies in what structures and features were maintained, which can possibly be understood in the light of socioeconomic identities, and reveal the reasons why such changes in the built environment may have (or not) occurred.

Patterns of change and continuity have been studied mostly in urban settlements, largely neglecting rural settlements. In this respect, Tall Ḥisbān represents a privileged case-study, for a number of reasons. The excavation of a series of residential complexes from the site of Tall Ḥisbān, near Mādābā, was an integral part of this research and represents the core data of this present study.[1]

This methodological approach is particularly useful when trying to reconstruct re-occupational patterns and looking into a wide spectrum of possible causes. However, additional comparisons with better preserved sites, such as Jarash and Umm al-Jimāl, will allow us to draw some more information on patterns of spatial continuity and discontinuity, which are more difficult to discern at Tall Ḥisbān.

"Crises" and the Built Environment

"Crises" in various forms are recurring themes in archaeological research. Military invasions and other political shifts, extreme weather events (*e.g.*, earthquakes, plagues, or droughts), socioeconomic changes (*e.g.*, "nomadisation," "sedentarization," or the arrival of new social groups) are often presented as turning points in the history of a site or of an entire region. The ancient Greek term *krísis* has multiple meanings, most commonly interpreted as "decision or choice;" it was also used as a medical term meaning the "turning point in the course of a disease."[2] The word, as well as the verb it derives from, implies the division between two or more different possibilities or states, without a positive or negative acceptation. In the case of an illness, the crisis represents probably the highest level of suffering, after which the patient either recovers or passes

[1] Tall Ḥisbān was occupied almost uninterruptedly from the Iron Age until the Late Islamic period. It underwent frequent fluctuations in settlement strategies, with periods characterized—functionally and morphologically—by a more marked urban orientation, while others with a predominant rural orientation. Tall Ḥisbān was a predominant urban center in the region at least in two phases of its history, with a recognized urban status: it was a *polis* in 2nd century AD under the Roman administration of the province of Arabia and later became a medina during the 16th century during the Mamluk occupation of the Balqa. Furthermore, the site was and still is investigated with a markedly interdisciplinary approach, taking a wide spectrum of archaeological evidence into account. I am particularly grateful to Prof. Bethany J. Walker (Rheinische Friedrich-Wilhelms-Universität Bonn; co-director of the Tall Ḥisbān excavation) for having me involved in the Tall Ḥisbān project since 2016 as a square supervisor and architectural surveyor and to the Annemarie Schimmel Kolleg for awarding me the one-year postdoctoral Junior fellowship, allowing me to participate on field work.

[2] *Treccani Encyclopedia*, translated from Italian by the author: "crisi."

away. In this acceptation, it might be worth reconsidering the common understanding of the term within archaeological debates, opening to richer and more complex view of transitional phases rather than a strictly negative connotation.

This more nuanced conception of what a crisis connotes is particularly relevant to how we may perceive change(s) that occur within a settlement, especially those which were occupied over long periods of time. The built environment, including buildings and the other structural features present in a settlement, like roads and other infrastructure, carries the physical marks of change and can reflect the complex developments a site endured during its history. It therefore represents, with all its combined components, a precious resource to try to understand and possibly disentangle these complex and diversified developments and re-occupational patterns. As the medical use of the term "crisis" suggests, the changes undergone at a settlement in themselves do not have a positive or negative connotation. On the contrary, the transformation of settlement features is proof of dynamicity and activity, potentially indicating a positive improvement of former conditions. The debate on the Late Antique transformation of the urban built environment has more recently explored this hypothesis (Kennedy 1985; Di Segni 1995; Shboul and Walmsley 1998; Di Segni 1999; Avni 2014: 40–106), diverging from the former catastrophist views about the end of the Classic city (see for instance Ward-Perkins 2005).

More than a simple turning point, the term "crisis" often carries a negative connotation for a settlement due to the idea of a clear-cut disruption, often for the worse, between the periods before and after it. The topic of transition between two phases that are clearly distinguishable from one another, thanks to some sort of crisis, is frequent in the scientific literature and can be mentioned for several different chronological horizons. There are several "crises" related to the transition between Byzantine and Early Islamic periods (among which: Donner 1981; Walmsley 2012; Sijpesteijn 2013; Avni 2014; Fowden 2014; Harper 2017: 199–287), which are particularly relevant for the present paper, for which a broad range of explanations have been offered. The debate around these transitional periods and crisis centers around the matter of discontinuity or continuity between them and prompts an important question: how disruptive was an event or a specific series of events?

In more recent discourse, absolute or monocausal explanations tend to be avoided to explain changes in the material culture of settlements, both urban and rural, as a result of a specific event or series of events, and more attention has been devoted to the identification of coexisting elements of "continuity" and "discontinuity" within the same transitional phase, questioning the use of the term "crisis" itself (see in particular Avni 2014: 300–53). It is beyond the scope of the present paper to consider the debate on "crises" during the Byzantine-Early Islamic and Middle Islamic transitions or to provide a detailed history of the respective periods in detail. Investigating rural settlements, though often understudied and thus less present in the debate, yields much useful data also for the interpretation of the urban evolution in respect to settlements' continuity and/or discontinuity when faced with periods of transition and crises. As recently suggested also by the author (Pini 2019a; Pini 2019b), rural settlements show evident signs of dynamicity during the last period of Byzantine occupation across the Middle East, especially between the 5th and the 7th centuries. This dynamicity is materialized in the development of a particularly consistent intermediate level of settlement that is not entirely urban nor entirely rural. The discontinuity with the earlier occupation phase is present in several Jordanian sites, including Tall Ḥisbān and

Umm al-Jimāl, is particularly marked, since the earlier Hellenistic and Roman architectonical phases are almost entirely erased by the Byzantine developments. The newly created built environment, however, maintains a certain degree of dynamicity, particularly evident on the domestic level and when looking at blocks and quarters (see discussion below). At the same time, though, other sites and/or chronological phases—for instance the Late Byzantine–Early Islamic transition in almost all the case studies—show a less radical degree of transformation, without the systematic destruction of the previous architecture and urban features.

Despite the specificity of each single settlement and the multiplicity of possible developments that sometimes occur at the same time within the same site—as it will be shown for the Middle Islamic occupation of Tall Ḥisbān—the paper will draw attention to the two most recurring phenomena in the case studies: the "conjunctive" development of the built environment (*i.e.*, the progressive accumulation of structures to previous constructions) and the systematic re-occupation of previous complexes, mostly in the form of reuse of pillaged building materials. A further element of interest is to recognize the same or similar patterns in chronological phases distant from one another, namely for the Classical and Late Antique phases and much later periods such as the Middle Islamic phase, when several sites experienced a renewed, or at least archaeologically more visible, architectural activity. The core of the archaeological evidence presented here will discuss the Middle Islamic re-occupation of earlier structures, showing an incredibly vast variety of forms. The comparison between the following case studies attests that the built environment in the Middle Islamic periods underwent changes following similar patterns that occurred during the Byzantine period. In some sites, the systematic re-use of earlier structures is spotted possibly at an even higher rate during the Middle Islamic than in previous phases, with diversified patterns occurring even within the same site. Tall Ḥisbān, in light of its long occupation and its massive Byzantine and Middle Islamic remains, is an ideal case study to further investigate this systematic re-use of structures and place these patterns within the context of potential (resilience) strategies and facing crisis.[3]

Tall Ḥisbān, Crises, and Resilience Strategies in the Built Environment

The archaeological site of Tall Ḥisbān (Ḥisbān in MEGA-J; reference number: 2735), north of the modern town of Mādābā, lies on top of a hill dominating a vast and fertile plain to the East and a *wādī* leading to the Jordan Valley to the West. The first archaeological investigations—planned within the context of the Madaba Plains Project—started in 1969, with a series of archaeological excavations and regional surveys on and around the so-called "acropolis" of the site, the proper tall. Despite the privileged focus on the Biblical period, a major effort was reserved to the reconstruction of a general chronology of the settlement, or at least of the portion of the ancient site that is now enclosed by the fence of the archaeological park (Ferch *et al.* 1989; LaBianca 1990; Walker and LaBianca 2003; Walker 2013a: 161ff; Walker *et al.* 2017a; 2017b; Walker and LaBianca 2018).

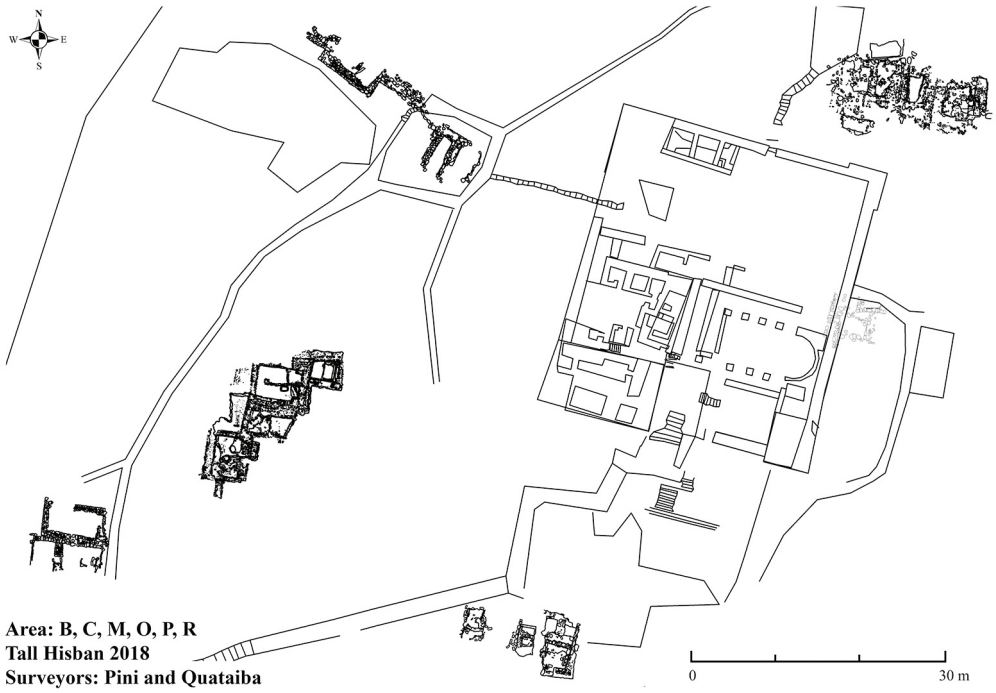
Øystein LaBianca's "Food Systems Theory" (LaBianca 1990) was the first theoretical and systematic attempt to

[3] Most data on Tall Ḥisbān presented in the present paper were gathered during the 2016 and 2018 field seasons and are preliminary results of the study; the archaeological excavation is still ongoing and further campaigns are planned for the coming years. The results thus far have allowed to address the issue of re-occupation patterns within a site and represent an indispensable foundation on which future study and analyses can be based upon.

explain the settlement's dynamics and changes within the settlement across its long and almost uninterrupted occupation since the Iron Age until the final Ottoman phase. He described the site's history based on the first archaeological data gathered through excavation and regional surveys, as a constant fluctuation between "Low and High Intensity" phases, in which the site and its hinterland respectively testified either a more subsistence-oriented, pastoral and rural site or a marked urban, market-oriented and sedentarized one. The Iron Age, Byzantine, and Mamluk phases were already recognized from this first study as periods of major expansion and more intense occupation of the site, and possibly were more represented in the archaeological record.

The fluctuations in the settlement's built environment appear to follow the different socioeconomic orientations the site assumed in the course of the site's history. It is not entirely surprising that most of the architectural remains on site are dated to the Byzantine and Mamluk periods, albeit it is impossible to precisely determine how the later re-occupations have affected our perception of earlier phases. It is indeed well attested, through both historical sources and numismatic finds, that from the 3rd century, the site benefitted from its official urban status being recognized as a *polis* (Mitchel 1992: 95–124). This is an impression that is also evidenced by large monuments—most notably a temple on top of the hill and a monumental stairway conducting to the acropolis—whose building materials were reemployed in later structures.

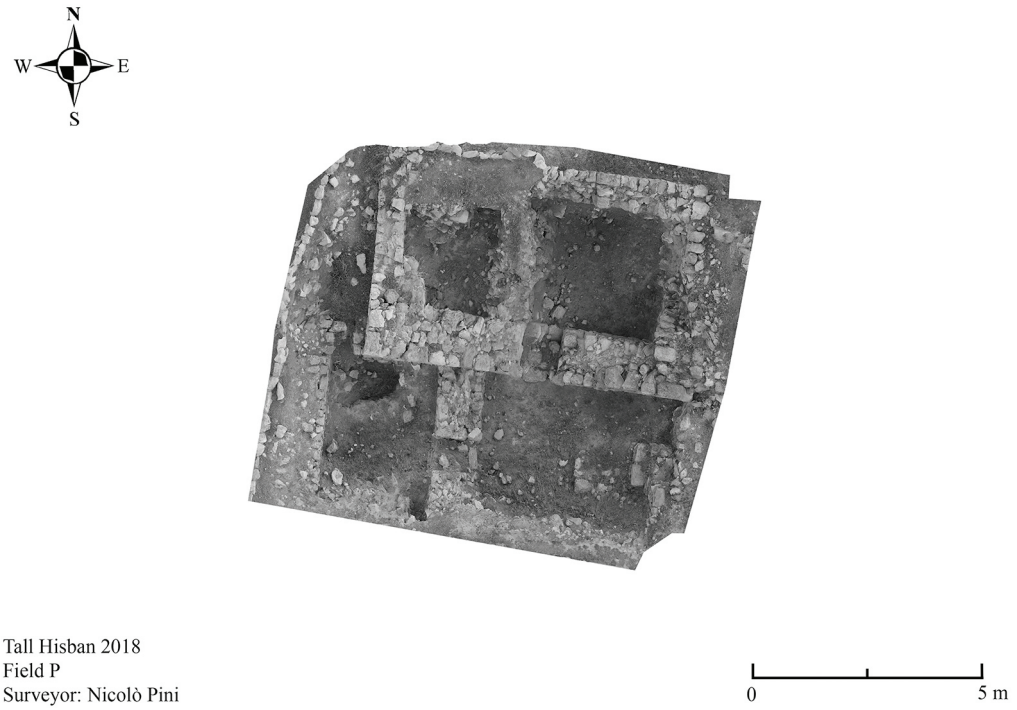
In more recent field seasons, and in particular from 2013, a new series of excavations focused on the area of the site



1. Plan of the site of Tall Ḥisbān (by the author and Quataiba; courtesy of Prof. B.J. Walker).

extending over the western slope of the hill (Fig. 1), where most of the Mamluk settlement has been documented so far (Walker 2013b; Walker *et al.* 2016; 2017c; 2018). This part of the slope was already noted as an area of interest during the first archaeological probes in the 1970s (Field C), which reported a series of terraces on top of which a scattered cluster of dwellings was set. One small, one-room structure is still visible at the site. However, apart from documenting the presence of such terraced spaces in the settlement, not much information was gathered on the exact evolution of the built environment at the time. One of the main goals of the recent excavations was to establish a more consistent chronology and description of the Islamic occupation of Tall Ḥisbān, especially in relationship to the previous phases of the settlement. Two fields have been the primary focus of the fieldwork: Field P and Field O, where excavation is still in progress.

Field P is an isolated farmhouse, built on a rather flat area in the southern part of the western slope of the tall (Fig. 2). Excavations reported that the Mamluk structure rested entirely on the foundations of a previous, completely demolished Byzantine dwelling, of which a series of architectural features—among which a consistent number of tesserae of a mosaic—have been recognized. In its original phase, the Mamluk dwelling consisted of a small, fenced courtyard, extending in front of the only entrance to the house. The type of this structure fits perfectly within Hirschfeld's "simple house" form of dwelling (Hirschfeld 1995: 24–44). In a later moment, possibly during the Late Mamluk period or even in the Early Ottoman, either the courtyard or the single room of the house



2. Field P, Tall Ḥisbān (by the author).



3. Plan of Field O, Tall Ḥisbān (by the author; courtesy of Prof. B.J. Walker).

were subdivided, while still maintaining the single entrance of the previous phase. A hypothesis proposed for the courtyard is that the subdivision of the space allowed the dwellers to keep different kind of animals. Excavations could not offer a more definitive explanation for the subdivision of the house in two rooms, which could have followed an increase in the number of dwellers or the appearance of new functional spaces. However, such developments are not rare in the site and do have several parallels in other settlement across the Middle East in different chronological phases (see discussion below).

Field O extends further north of Field P and consists of an extended cluster of farmhouses (Fig. 3). The distribution and the exact extension of the cluster is still yet to be determined, but so far, the presumed-to-be western aisle of the complex appears to be unearthed almost entirely and its exact evolution and chronology remains to be understood. Presumably, the northern limit had also been identified, but the east and southern boundaries are still unknown. Despite our limited knowledge of the organization of the cluster, few features can be recognized and are particularly relevant for the topic of the present paper. The remains described are predominantly from the Mamluk period, with limited evidence—but yet attested—of later Ottoman occupation of the complexes. However, recent excavations produced an increasingly consistent evidence of pre-Middle Islamic occupations, in particular dating to the Early Islamic period. Still, however, it was not possible to relate the finds from this period with certainty, especially a series of glass fragments dated to the Abbasid period, to standing structures (Walker *et al.* 2016; 2018). Similarly, in limited areas of

the field, even earlier materials have been excavated, suggesting a probable, and not surprising, presence of activity already in the Late Byzantine period. Only further investigations will clarify the chronology of the cluster, as well as point out eventual re-occupation patterns.

Nevertheless, a general, relative chronology of the unearthed structures has been determined. First of all, the western aisle, and the general evolution of the structures discovered until now, show a similar development through progressive addition of structures to previous standing buildings, either still in use or ruined. Based on the architectural remains, it was possible to identify two probable "original structures:" the southern room, which opens to a possible courtyard with underground cistern to the East and a quite massive wall—apparently a corner—in the northern end, which most likely belonged to a ruined or entirely demolished previous building (Fig. 4). To offer a dating to these two original structures is at present not possible, but when examining the building technique as well as their orientation, they hardly belong to a single complex or even to the same period. In particular, the northern structure presents quite large and well-cut blocks that might relate to a quite imposing previous building, similar to those found on the site in structures from the Roman or Byzantine periods. The southern room, on the other hand, presents features closer to the Mamluk structures and might be the first Middle Islamic building activity in field O attested so far, even though a previous building phase that is now absent cannot be excluded.

Afterwards, these two original structures were "connected" by the creation of two further barrel-vaulted rooms, progressively added proceeding from south to north. In the northern corner, the new walls—



4. The northern end of Field O in Tall Ḥisbān, looking west. Highlighted: the earlier well-laid wall (by the author).

consisting of rather small, roughly worked stones and limited evidence of clearly reemployed materials—literally englobed the older well-laid wall. In this phase, it is also possible to date another wall running eastwards and creating the northern edge of the "new" complex: this wall ultimately abuts against another rather massive, north-south running wall *ca.* 6 m long; its date is still impossible to establish, but might relate to an early phase of the complex (Fig. 4).

After being built, at least two of the rooms underwent spatial rearrangements: square 9—the northernmost room of the east aisle—was divided in two communicating areas, probably responding to a functional differentiation of the space; and square 12, whose relative chronology appears to be particularly challenging. The space created in this norther aisle is delimited on the southern end by a short wall, maybe forming some sort of platform. In this area, accessible through a short ramp of stairs, a consistent series of plastered and beaten-earth layers were found, and it is possible that this was a specialized area for processing agricultural products. The lowest levels dug here revealed an earlier structure, connected to or at least related to, the main channel cutting the room from north to south. The date and the function of this structure is yet to be determined. Similarly, another installation on the opposite end of the square, and exactly in a tiny space formed between the stairs mentioned above and the outer wall of the eastern aisle of Field O, has not been entirely understood (Fig. 5). This is also due to the fact that it surely underwent a radical functional change at a certain point of its use: a second re-plastering of the small basin, in fact, a channel going under the stairs and possibly connecting the basin to the north-south main channel, was cut off and consequently



5. Basin in square 12, Field O in Tall Ḥisbān (by the author).

filled. A hard but crumbly, reddish layer was found on top of the installation and is still under analysis: it might be informative on the second use of the installation.

Thus far it has only been possible to construct a relative chronology of the structures, with a limited chance to have precise dating: foundation levels have been reached only in small probes and the results are not conclusive. One of the goals for the next seasons is indeed to dig to foundation level of the already unearthed structures as well as determine the exact extension and spatial arrangement of the complex. However, the evidence gathered so far allows us to recognize at least two phenomena, which are understood as a recurring pattern not only in Field O, but in Field P as well, and also in other parts of the site, although not systematically recorded yet. The conjunctive development of the structures, *i.e.*, the progressive addition of new rooms to already standing buildings and the internal re-arrangement, spatial and functional, of already existing areas. Both developments necessarily rely on the exploitation of earlier buildings. Nevertheless, the modalities, as shown by the two fields in Tall Ḥisbān, may differ consistently. In certain cases, earlier structures are simply englobed or modified to fit the new arrangement or function. This is the case of the well-laid wall in Field O or the northern room with installations in the same area. In other circumstances, the construction of new buildings follows a complete demolition of whatever structure that might have preceded it: this is well documented in Field P and likely in the southern room off Field O.

On the basis of what is possible to document at Tall Ḥisbān, and possibly further supported by the evidence discussed in the comparative case studies below, something can be said about the possible actors involved in the above-mentioned process. All the data suggest that the process of the development of the domestic house, and to a certain extent the re-occupation patterns, are family driven. The diverse approach to pre-existing structures points to the hypothesis that, as argued elsewhere by the author (Pini 2020), the built environment in this area appears to follow a certain degree of flexibility that appears to characterize local communities that rely prevalently on pastoral—and more or less nomadic—socioeconomic strategies, as the population of Tall Ḥisbān appears to have never entirely abandoned (LaBianca 1990).[4] The process of the increase of habitable space might indicate that a major portion of a pastoral group needs to settle down in the settlement for longer periods of time. In addition, the creation of/conversion to new productive areas, especially when including installations, might suggest a more specialized economic strategy, yet still not at an industrial level.

Built Environment and "Change" in the Transregional Context

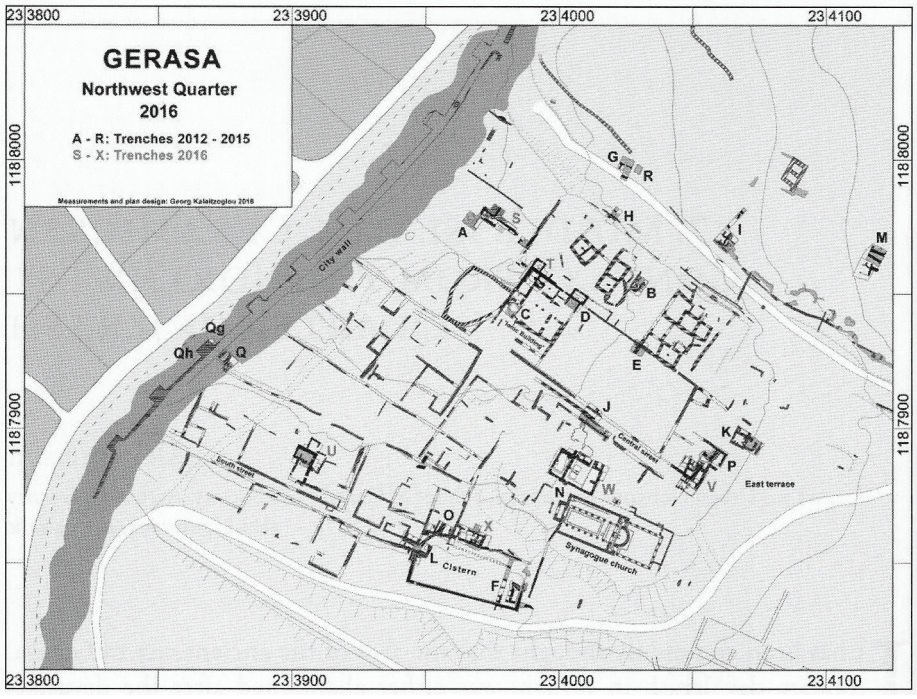
Similar ways of organizing the domestic space and of developing residential complexes, in particular as far as re-occupation patterns are concerned, can be documented in several places across the Middle East and in different chronological horizons. The so-called "conjunctive" house has been described, among others, by Wirth as a direct evolution of an Assyrian type of dwelling (Wirth 2000: 359ff). Such typology appears to be particularly frequent in rural settlements, or at least in settlements that do not entirely belong to the urban sphere. In the latter case, they appear to be predominant from the 5th century onwards, with examples attested also in proper cities, which underwent important transformations in this period (Kennedy 1985; Di Segni 1995; Shboul

[4] For a general discussion on adaptability and flexibility of pastoral communities, see for instance: Marx 1996; 2005.

and Walmsley 1998; Di Segni 1999; Avni 2014: 40–106). However, it is striking to recognize how a similar way of organizing the built environment was maintained over an extremely long period, with several examples from the Middle Islamic period that re-propose exact spatial patterns and architectural developments.

In this respect, Jarash represents a particularly useful term of comparison to Tall Ḥisbān for many reasons. Most interestingly, it shows how even in the case of a major classical *polis*, the status of the settlement can be continuously subjected to changes through time, following—or followed by—changes in the built environment. While it was one of the most important urban centers in modern Jordan at least from the Late Roman until the Abbasid period (*e.g.*, Lichtenberger and Raja 2018a; 2018b; Walmsley 2018), it was occupied as a small village during the Mamluk period. Furthermore, it is possible to recognize the same "conjunctive" way of organizing and developing the domestic space for different chronological horizons. Within the general remodulation of the ancient classical city of Gerasa, the appearance of new residential complexes which can be described as "conjunctive" has been documented already from the 5th century (Gawlikowski 1986).

However, for the purposes of the present paper, it is more relevant to refer to more recent investigations undertaken in Jarash, which unearthed the remains of the Middle Islamic settlement of Jarash. Architectural remains from the Mamluk occupation thus far have been identified in two areas: the Zeus Sanctuary and the Northwest quarter. In particular, the development of a new small hamlet in the Northwest quarter of the ancient *polis* follows the same processes



6. Plan of Northwest Quarter, Jarash (Lichtenberger and Raja 2018a: 146 fig. 10.3; Courtesy of the Danish-German Jarash Northwest Quarter Project, Universities of Aarhus and Münster).

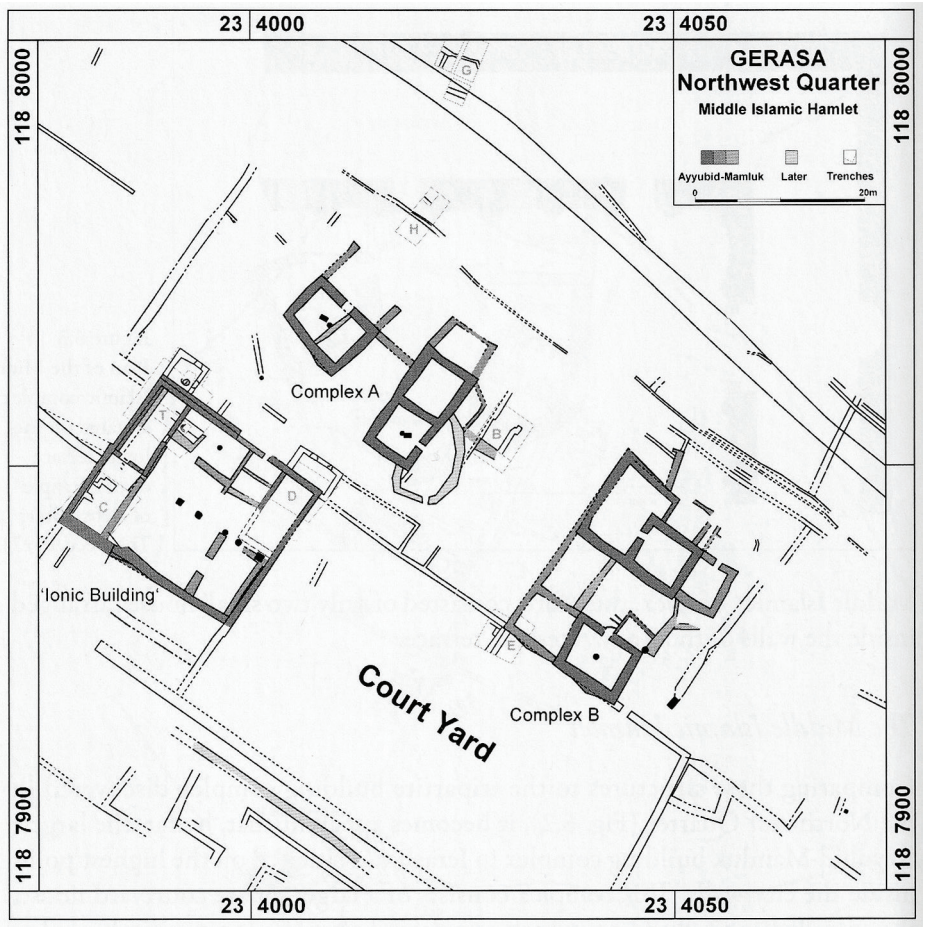
documented in Tall Ḥisbān (Fig. 6), offering a direct chronological and typological parallel. In general, the occurrence and the frequency of re-occupations of earlier structures is particularly striking as well as the progressive addition of structures that formed conjunctive houses and clusters of farmhouses (Kalaitzoglou 2018). The organization of the Middle Islamic village appears to be quite scattered, according to the available finds and surviving structures. Architectural remains from the Mamluk occupation thus far have been identified in two areas: the Zeus Sanctuary and the Northwest quarter.

The major urban sanctuary of the Roman city, also known as the Zeus Sanctuary, was later re-occupied by domestic structures, which reused the still standing walls of the lower terrace (Rasson-Seigne *et al.* 2018; Kalaitzoglou 2018: 99–101). It is clear that the presence of the earlier structures of the sanctuary deeply influenced the Mamluk occupation on a "quarter" level: no clear clustering of different households can be detected, but the Middle Islamic structures are sparsely intermingled with Roman remains. However, the dwellings—at least four different complexes with rooms and sheepfolds—closely resemble the "simple" houses and small conjunctive houses described at Tall Ḥisbān, in particular in Field P. In this particular case, it seems that the choice of re-settling this area of the site in this way was mainly influenced by the ability to take advantage of the large, standing structure still in place, which was also conveniently situated in a strategic and easily defendable position.

The Northwest quarter shows another more "standard" way of occupation with a cluster of different conjunctive houses (Kalaitzoglou 2018: 101–7). Additionally, in this circumstance, the re-employment of building materials and the re-occupation of a few surviving structures can be observed and is particularly evident in the so-called "Ionic building," a complex named after two Ionic capitals re-used in the courtyard. The most interesting aspect of this small hamlet is not only the domestic architecture that consists of houses that resulted from the progressive addition of rooms around a courtyard (Kalaitzoglou 2018: 104 fig. 6.5), but the organization of the quarter itself. In fact, in addition to small private courtyards belonging to the single houses, a larger common courtyard was created, directly connected to the "Ionic building" and "Complex B" (Fig. 7). This "shared" space has been explained by a possible functional differentiation of the buildings composing the quarter (Kalaitzoglou 2018: 106f), where the "Ionic building" would have served a more public and administrative role, as suggested by its direct connection to the large courtyard, the size of the house, the probable presence of benches inside the rooms, and lastly the more regular plan.

It was also noticed that while the other complexes of the quarter developed outwards, by contrast the development of "Ionic building" proceeded inwards. The addition of new rooms to the "Ionic building" always took place within the limits of the already existing building or by subdividing the space's existing structures. This development resulted in a more rectangular and regular plan in respect to the two other complexes, where each new room, which never communicate directly with the earlier rooms, is explained by the addition of a new nuclear family in the building (Kalaitzoglou 2018: 106).

This hamlet and in particular its development might offer important hints for understanding Field O in Tall Ḥisbān. It is possible that in an earlier phase there was a series of "isolated" complexes, later connected by new rooms to form a single unit organized around a shared courtyard. Given the evidence from Middle Islamic Jarash, it can be also considered the eventuality of an evolution in the built



7. Plan of Middle Islamic Hamlet in the Northwest Quarter, Jarash (Kalaitzoglou 2018: 102 fig. 6.4; Courtesy of the Danish-German Jarash Northwest Quarter Project, Universities of Aarhus and Münster).

environment dictated by some sort of functional differentiation.

Jarash and Tall Ḥisbān present features that are also regularly encountered in other regions in modern Jordan and Syria. For the purposes of the present paper, it is worth discussing one final site, Umm al-Jimāl, which will allow to highlight the geographical and chronological diffusion of the phenomena described earlier. Umm al-Jimāl is one of the most famous examples of the Hauranian architecture, characterized by the almost exclusive use of basalt as building material. While there are other sites in Jordan and Syria that could have also served as worthy comparisons to Tall Ḥisbān and Jarash for their similarities in the spatial organization in the domestic architecture,[5] Umm al-Jimāl was chosen as it allows for the examination of a multiplicity of topics that are crucial for the argument presented here. In my opinion, the site represents the perfect example of a semi-urban or semi-rural settlement, a type

[5] Such as the Syrian sites Mseikeh (Guérin 2008) and Sharah (Clauss-Balty 2010).

of settlement also described by Avni as a sort of urban hub in the countryside (Avni 2014: 194–6).

The appearance of this kind of settlement seems to particularly characterize the later Roman period and mostly Late Antiquity—especially the 5th century—in the ancient provinces of *Siria, Arabia*, and *Palaestina* (Pini 2019b): Umm al-Jimāl is indeed one of those cases. However, as the Middle Islamic settlement of Tall Ḥisbān shows, the appearance is not limited to that period. This "intermediate" role of the settlement has a deep impact on its built environment, especially in term of functions that are required: rural features (*i.e.*, elements that might relate more clearly with the process of agricultural products and/or orientated to a more subsistence economy) are side by side a clear mark of "urbanity" (administrative buildings, signs of socioeconomic stratification as well as traces of market-oriented production). Umm al-Jimāl's apex seems to take place in the later phases of the Byzantine period: the development of the site erased the previous settlement almost completely, whose remains are rare and scattered, but yet enough to certify the existence of a Roman—if not earlier—Umm al-Jimāl (for a comprehensive analysis of the site: DeVries 1998). For the most part, this first Byzantine development recalls closely what was documented at Tall Ḥisbān in Field P, where the Mamluk dwelling determined the complete destruction of an earlier Byzantine structure, or in Field O with the survived well-laid wall in the northern end of the complex. At the same time, Umm al-Jimāl exemplifies the coexistence of this way of re-occupying earlier site/structures, with a less destructive approach, where single buildings or rooms are functionally or spatially modified without a complete demolition of earlier structures—see for instance the so-called "Praetorium." In this process, as well as in the following Byzantine developments, a particularly important role is played by the "conjunctive" way of organizing and modifying the built environment. The same seems to be described for later phases of Umm al-Jimāl, for which recent studies are gathering an increasing set of data (Osinga 2017: 105–41). In general, and this is not limited to Umm al-Jimāl, under a strictly architectural and spatial point of view, it is hard to distinguish clearly a Middle Islamic "conjunctive" house or cluster of farmhouses from a Byzantine one, not only in terms of morphology, but also in terms of the kind of possible developments the built environment might have undergone during the occupation of the building.

As mentioned earlier, Jarash and Umm al-Jimāl are just two case studies that show how some features and developments that are also documented in Tall Ḥisbān are extremely widespread geographically and chronologically. In particular, the frequency of the "conjunctive" development of the built environment and the (to a certain extent) connected phenomenon of re-occupation of earlier structures. The evidence offered here is extremely limited, and more instances of re-occupation could be found, even within the sites presented, but it gives a first look at these phenomena. Like in Tall Ḥisbān, the built environment in Jarash and Umm al-Jimāl appears to undergo an extremely diversified fate over their long periods of occupation. In particular, it is interesting to document in both sites the co-existence in the same chronological horizon of the two general re-occupation patterns described earlier. One attesting the complete destruction of earlier structures, as in the case of the majority of the structures in the North-western quarter in Jarash or for the most part of the Byzantine development of Umm al-Jimāl. The other showing evidence for earlier structures that were re-employed and englobed in the new structures, such as in the Middle Islamic occupation of the Zeus sanctuary in Jarash or the "Praetorium" in

Umm al-Jimāl. It is also interesting to note the frequent connection between these patterns and the occurrence of the "conjunctive" houses (*i.e.*, the progressive addition of new rooms or buildings to already existing and still inhabited complexes). This typology appears to be particularly frequent—even if not exclusive—in settlements inscribable in the "intermediate" semi-urban or semi-rural level. It is not entirely surprising, for instance, that even in the case of a clearly urban center like Jarash, this typology is documented for the first time in Late Antiquity, when the classical organization of the city was undergoing radical changes in morphology and function, suggesting to some scholars the idea of a "ruralization" of the *polis* (for a general discussion: Pini 2019a: 207–13). The issue of the type of settlement, or to be more precise, of its rank in a hierarchy, might appear abstract and too theoretical, but it has indeed important consequences on our interpretations, especially in our understanding of the actors at play in the development of the built environment.

Currently, the challenge is to offer a plausible explanation for the patterns just described. In my opinion, an important role played by social structure, most notably family groups, seems to be likely: considering a society and in particular to family-groups as the main actor(s) in the development of the built environment in sites of this region, especially in the rural or not entirely urban context, can indeed offer some potential answers to the questions not only surrounding resilience in a settlement during a certain period, but also on the maintenance over long periods of similar ways of organizing and modifying the built environment. Secondly, it might offer some hints as well to understand re-occupation patterns.

In this respect, the challenge is now to understand the reasons behind these different re-occupation patterns, which seem to change not only within the same site in the same period, but even within the same complex. The data are thus preliminary and the present paper aims ultimately to problematize a topic that has been considered almost entirely on the regional and macro-levels or, on a more detailed level, in terms of the re-employment of building materials, which is in my opinion only one possible appearance of the re-occupation phenomenon. For now, it is only possible to bring forward a few working hypotheses, which may be confirmed by the archaeological record with additional data from further excavations. Convenience is most likely a guiding idea for several architectural strategies in antiquity, especially in a rural context like Tall Ḥisbān; know-how is one further possible way of approaching the issue, even though gathering data might be a particularly challenging. Finally, possible ideological and cultural meanings need to be taken into account. Re-occupying already standing buildings surely represents an advantageous solution under an economic perspective, cutting costs in terms of time, labor, and building materials. However, building anew with reused materials architecturally and simply restoring a still standing structure, which requires limited interventions, are two radically different approaches, suggesting different knowledge and possibly different social and political networks connected to patronage systems. At the same time, reoccupation can be also culturally and ideologically loaded: perhaps a way of expressing and imposing cultural supremacy over the earlier owner or dwellers of the site or, on the contrary, the result of a resilience strategy adopted by local communities to face changes (political, socioeconomic, or even environmental) taking place on a broader scale than the single site. Pragmatism, different knowledge, and cultural resilience do not necessarily exclude each other, but the different relative

relevance of each one of them in this "triadic system" determines the differences in reoccupation. This "triadic system" is also tightly connected to changes in the role and function of the site within the regional and transregional contexts. Future investigations at the site will better define the issue, theoretically and methodologically, and attempt to offer more concrete answers to this extremely complex topic.

Conclusions

Were the built environments of rural settlements in the Transjordan then "a changin'" or "a-changin'?" The enigma formulated by Bob Dylan fits well into the main question raised by the analysis of the built environment in Tall Ḥisbān and the other case studies. How can we explain the recurrence or maintenance of similar spatial patterns and ways of developing the built environment over a long period, in some case also after episodes of temporary abandonment? As mentioned earlier, the idea of continuity in forms of spatial organization, on different levels—from the single dwelling until the settlement in its entirety—is not in contrast with the idea of changes taking place in the built environment. Architecture and urban space have in their dynamicity one of the primary forms of resilience in order to meet the developing needs expressed by the inhabitants as well as in response of events taking place on a larger scale (*e.g.*, political and administrative shifts). Change is therefore a constant feature in any living settlement. However, the continuity in some sites also determines the recurrence of similar forms of organization, pieces of "a-changing" evidence that are sometimes hard to explain.

The present paper presented a specific case-study with the intent of problematizing the issue of reoccupation of sites, which is a discussion that has been often dealt with on a limited scale, meaning single buildings, and with an almost exclusive focus on the reuse of building materials form earlier complexes. It was shown how the reuse of building materials is only one aspect of the phenomenon of reoccupation, which in turn requires an extensive and systematic analysis, on a local, regional, and ultimately transregional scale.

Tall Ḥisbān was an ideal case study to start designing a method to approach this complex topic, by first identifying the main actors at play in determining different forms of organization of the built environment and in decision-making in relation to the reoccupation patterns. The evidence is necessarily limited to only one small portion of the site and requires further investigation, as well as the identification of further comparisons and a wider coverage of sites in the hinterland of Tall Ḥisbān; this is one of the goals that is intended to be pursued over the next field seasons.

The first results of this study strongly suggest an important role of society and social identities in the process of determining the forms of the built environment. The maintenance or the recurrence of similar family structures—yet, not necessarily the presence of the same families—in particular those described as "segmented," might have determined the survival of very similar forms of spatial organization over long periods, also after episodes of more or less prolonged abandonment of the site. In addition, other factors need to be taken into account and might have played an important role as well; economic conditions appear to be the most influential also on a family level. Adaptation to different economic strategies—one of the most characterizing traits demonstrated by so-called "pastoral" groups—as well as the improvement or shrinking of prosperity are likely to leave clear marks on the built environment, not unlike from other sorts of material evidence collected archaeologically. The flexibility that characterizes such "segmented" social

groups and "pastoral" economic strategies is clearly reflected in the architectural remains and might be explained as well as a form of resilience by local communities to face temporary crises.

It is not entirely surprising that the persistence of similar spatial forms or of similar ways of developing the built environment especially affect the domestic architecture, where the impact of more circumscribed family groups is almost exclusive: the chronological and geographical diffusion of the so-called "conjunctive" house is a clear hint to this respect. This type of dwellings is indeed the most easily modifiable, well-fitting the flexibility shown by segmentary and/or pastoral groups. Following this idea, it might well be suggested that the complete abandonment of a site or a complete disruption of the former built environment—not only physical but more importantly conceptually—intervenes exclusively when the resilience of the local societies is overwhelmed and brought beyond the survival limits. Circumstance for such disruptions can be different for time and modalities, ranging from a single, temporally limited but extremely intense event (*e.g.*, the complete reconstruction of a settlement following an administrative change, military invasion followed by a radical replacement of people, or incredibly destructive earthquakes) or, and that is in my opinion the more frequent case, by a rapid succession of small "crises." In conclusion, this paper represents a first attempt to problematize a series of topics—in particular related to re-occupation patterns—which have not been considered systematically so far on rural settlements. It has shown how "a-changin'" and "a changin'" are ultimately two faces of the same coin. Within continuity in the built environment, manifesting itself for instance in the uninterrupted occupation of a site, there are elements of discontinuity, such as functional morphological changes. At the same time, even within the morphological and functional changes, and in different period, the way the built environment is modified presents recurring features and patterns, as demonstrated by the persistence of the "conjunctive" type of houses and the frequency of the same re-occupation modalities.

Postscript

At the time that the article was written, the author was at the University of Bonn. At time of publication, he was conducting postdoctoral research at the Centre de Recherches en Archéologie et Patrimoine (CReA-Patrimoine) of the Université libre de Bruxelles (Belgium). The research project, "The different fates of architecture: reoccupation patterns in the Madaba Plains (Jordan)–ReMaPla," was performed under the supervision of Prof. Agnes Vokaer and funded by the IF@ULB Marie Skłodowska Curie COFUND action, September 2020–August 2022.

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Data and Metadata Standardisation and Sharing and People-Powered Research: Synergies Across Disciplines

Abstract

Astronomy and archaeology are two seemingly disparate disciplines that share a common goal: the search for our origins. Other than the shared philosophical implications, this common quest also leads to a plethora of conceptual and methodological commonalities. Beyond data acquisition, data standardisation, sharing and interoperability efforts to bring together and curate data sets and other research resource, preservation of their provenance, searchability of metadata, and seamless accessibility of all those resources are only some of the challenges the two disciplines are facing in common. At the same time, with the advent of technology, both fields of study start benefiting strongly from the contribution of the general public in the form of crowdsourcing or citizen science.

Introduction

Since the 17th century, and in particular since Isaac Newton's *Principia,* all scholars know that all scientific methodologies share certain characteristics, namely systematic observations, measurements and experiments, accompanied by formulation, evaluation, and subsequent adjustment of hypotheses or theories. Nevertheless, it was not until I joined the Madaba Plain Projects ʻUmayrī excavations in the summer of 2010 that I realised how much astronomy (my field of expertise) and archaeology shared in common. The one obvious similarity, the search for our origins, is of course the main driver for both pursued via attempts to reconstruct history (of our civilisation or that of the Universe; Fig. 1). But there is much more to it than that. Simple things in common include having to work at hours outside the usual nine-to-five, as both astronomers and archaeologist tend to (Fig. 2). Data acquisition is almost exclusively based on observations supported by models, while experiments are largely beyond reach. But deeper and

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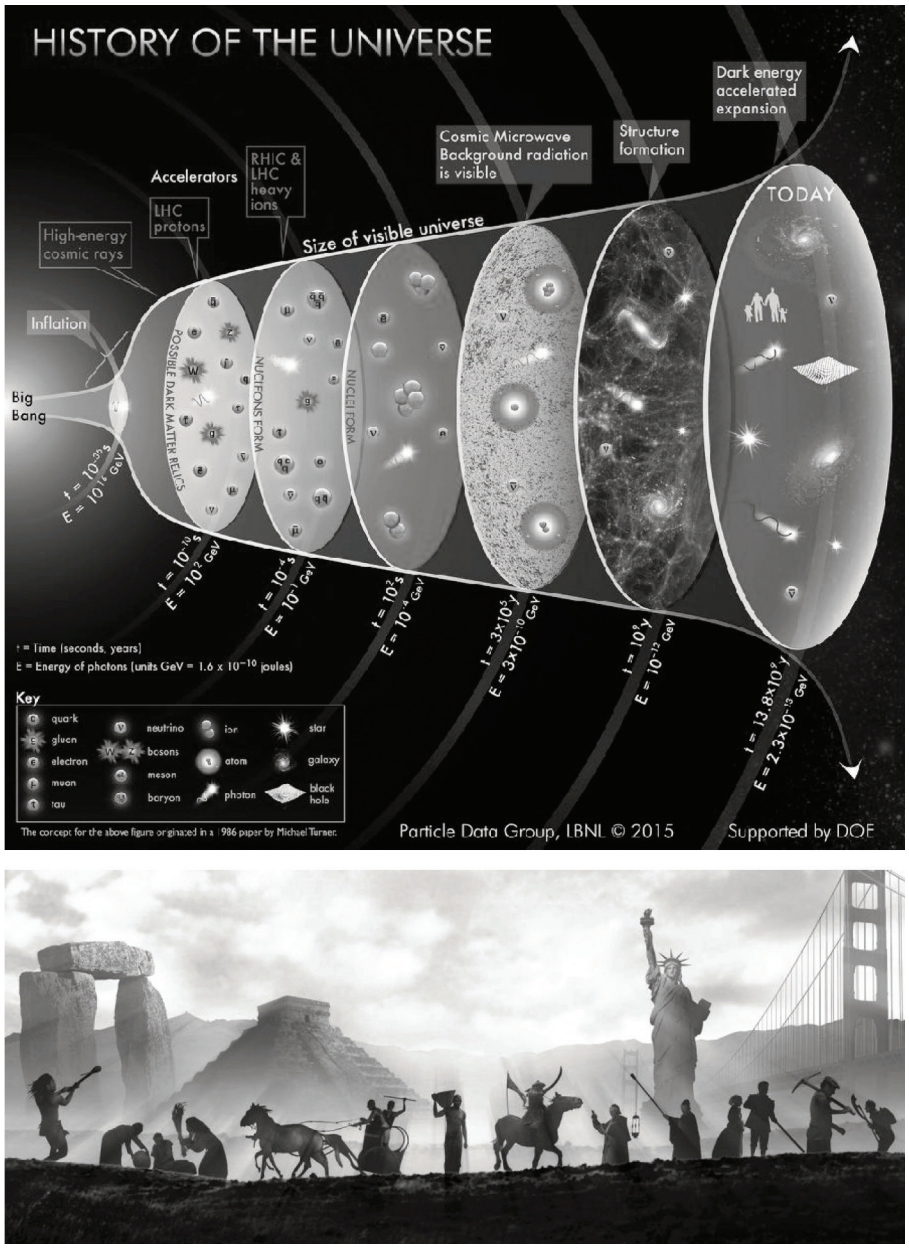


1. Top panel: A brief history of the Universe since the Big Bang (Image credits: Particle Data Group, Lawrence Berkeley National Laboratory); bottom panel: A brief history of human history (Image credits: history.co.uk).

more complex commonalities can be found in the scientific methodologies employed and their underlying implications. Parallels can be drawn, for instance, between digging and observing (*i.e.*, data acquisition; Fig. 3); cleaning object and reducing data (*i.e.*, the 'cleaning' of the raw data as taken at the telescope to produce *e.g.*, science-quality images); storage of artefacts in museums and astronomical data archives, just to



2. Top panel: Sunrise at the Roque de los Muchachos observatory La Palma, Spain (taken in June 2005); bottom panel: Sunrise at Tall al-ʻUmayrī (July 2010).

name a few. At the same time, while time is the most important factor for both, albeit at very different scales, the two disciplines also face similar challenges, namely weather and human interference. As time goes by, precipitations can destroy any man-made construction while the same phenomena will prevent observations carried out by any optical telescope. And humans are adding to the disturbance by *e.g.*, looting or



3. Top panel: Control room at the Atacama Large Millimetre/Sub-millimetre Array (ALMA) Operations Support Facility at 3000 m in the Atacama Desert, Chile, where astronomical observations with ALMA are run (August 2018); bottom panel: Digging at Tall al-ʿUmayrī (July 2010).

encroachment on one side and light pollution or unregulated commercialisation of space (*e.g.*, commercial satellite launching) on the other.

Perhaps more importantly, methodological similarities include the 'big data challenge' as well as all the issues inherent to data and metadata standardisation, data availability, accessibility, and sharing. Given their almost universal nature across disciplines, these issues are discussed in what follows from the prism of a perhaps naïve astronomer that, having invested a number of years in addressing them in her

own field, sees a huge potential for cross-disciplinary development of methodologies and subsequent applicability.

Big Data

The 'big data challenge' can be described in terms of data volumes, data rates, and the need for almost instantaneous data availability and accessibility to scientists across the globe. The challenge is not unique to a specific set of disciplines. It has spread across fields from biology (the pioneer in the domain) to genetics and medicine, to physics and astronomy, but also outside science, in business and industry (*e.g.*, transportation, logistics, automotive, manufacturing, etc).

The challenge of big data presents the different scientific fields with common issues. They include (but are not limited to) data and metadata standardisation, digital data storage, maintenance, handling and accessibility, data download tracking, proprietary versus public data, data curation, ownership, and referencing. The answers to some other related questions, however, are discipline-specific. Data combination for instance means different things to different people and while in astronomy it most commonly signifies putting together data taken by different telescopes and/or different wavelengths on the same object or region of the sky, in archaeology it could imply folding in data from other fields, such as climatology. Data storage to posterity is also a notion with different meanings, given that in astronomy we are interested in the maintenance of data already digitized at the stage of acquisition while in archaeology a lot of the data are buildings or objects that need physical space to be stored and maintained, with digitisation and subsequent storage in digital archives being a separate step that comes with its own complications.

As archaeology is going digital it is inevitably finding itself in the big data quandary. In order to avoid the proverbial reinvention of the wheel, methodologies can be borrowed from other disciplines and adapted to the needs of the field. Examples of some related efforts made within the field of astronomy and beyond, with possible relevance and applicability to archaeology are given below.

The Need for Standardisation

Astronomical data are taken by ground-based or space-borne telescopes (mainly images, spectra, and time-series) or produced by simulations. Data from different telescopes could come in different formats (especially in the early days of digital astronomy), with datasets containing enormous amount of information organised in ways that could be fully structured to fully unstructured and anything in between. Information is usually extracted from those data and stored fairly often in tabular format, but the shear amount of information creates a complex, multi-dimensional problem in terms of data storage, preservation, management, accessibility or visualiation, and documentation.

In a loosely drawn parallel, archaeological data are of two distinct categories: material data such as architectural items or objects (including artefacts) and intangible data, *i.e.*, measurements (*e.g.*, mass, material, colour, texture), direction, and/or orientation and associations (*i.e.*, positioning the material data in relation to their surroundings). The amount and diversity of the data and documentation, inherent even to the initial steps of the archaeological research, such as data acquisition, leads to similarly complex data handling issues.

Standardisation is the pillar for data preservation and seamless data sharing regardless of the discipline, as described by Whitcher Kansa, Kansa, and Schultz (2007): 'Among the primary technical and conceptual issues in sharing field data is the question of how to codify our documentation. Archaeologists generally lack consensus on standards of recording

and tend to make their own customized databases to suit the needs of their individual research agendas [...].' And even though this refers explicitly to archaeological data, the problem is anything but unique to archaeology.

Data standardisation **is** vital if we want to bring data into a common framework that allows for collaborative research, the sharing of tools and methodologies, or large-scale data mining and analytics. In astronomy this effort started in 1981 with the development of a format in which all astronomical data are stored in a structured way. The Flexible Image Transport System (FITS) is an open standard that defines a format used for data storage (Wells *et al.* 1981). One important feature is the storage of metadata in ASCII (plain text) format in the header of any FITS file, that can easily be extracted and that provides all the necessary information regarding the provenance and characterisation of the data.

Description and characterisation of metadata is equally important as standardisation of data formatting and storage. Similarly, long-term storage and accessibility as well as access to published results via dedicated platforms are essential to ensure future exploitation, repeatability of results and usage of the data beyond the original scope, by the expert communities and the public.

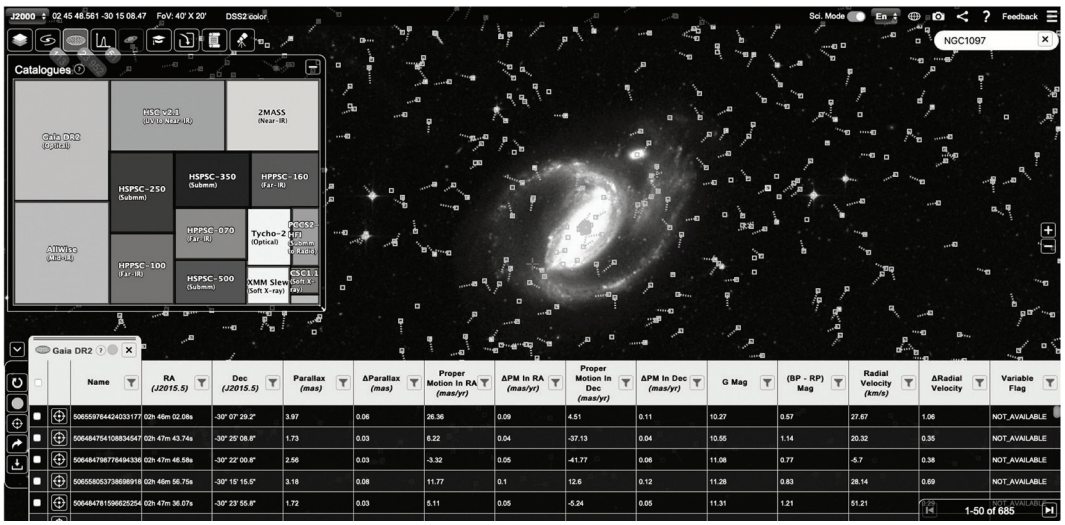
The astronomical Virtual Observatory (VO; Szalay and Gary 2001) is an international community-based initiative, an aggregation of interoperable data archives and software tools that form an environment in which original astronomical research can be conducted via the internet. The VO allows transparent and distributed access to data by developing and promoting common standards and by ensuring interoperability between the various data collections, tools, and services. It is driven by the vision that astronomical datasets and other resources should work as a seamless whole, to open up new ways of exploiting the huge amount of data continuously collected by astronomical facilities and computer simulations (Hatziminaoglou 2010).

To this aim, the International Virtual Observatory Alliance (IVOA; ivoa.net) was formed in 2002. It is an organisation that agrees on the technical standards and protocols needed to make the VO possible, acts as a framework for developing VO ideas and technology and for promoting them to the wider astronomical community and liaises with other disciplines facing similar data and metadata standardisation issues. These standards are there to *e.g.*, ensure uniformity in the data and metadata description for storage and accessibility; provide information about the production of datasets that can be used to assess their quality and reliability; enable tracing back the origin of datasets or documents (*e.g.* scientific articles, technical notes, etc.).

Data standardisation initiatives are certainly not unique to astronomy or natural sciences. Similar efforts are carried out in archaeology. The CIDOC Conceptual Reference Model (CRM; cidoc-crm.org), for instance, provides definitions and a formal structure for the description of concepts used in cultural heritage documentation and querying and exploitation of related dataset, with museums and museum collections as its main focus but with extensions towards field archaeology (Binding *et al.* 2008). Furthermore, data sharing, enabled by the development of standards and protocols is gaining momentum, as described below, with concepts such as interoperability infiltrating the field.

Data Sharing

Astronomy has been a pioneer in data sharing, with efforts like the database of the International Ultraviolet Explorer, a space-borne observatory that observed the Universe in the Ultraviolet (UV) part of the spectrum between 1978 and



4. ESASky (sky.esa.int) is an application that allows to visualise and download public astronomical data in science and explorer mode. View of the region around the nearby galaxy named NGC097. Access to images, catalogue and spectroscopic data are provided in visual form (*e.g.*, top left inset allows the selection of any catalogue data, listed in tabular form at the bottom of the panel). Clicking on any of the small squares (i.e., sources) on the image will trigger a popup with more information on the source. Data can be sent to other applications without local download, explored on-the-fly or exported on the local disk.

1996, emerging at the same time as the World Wide Web (Wamsteker *et al.* 1989). Nowadays, data sharing is a routine practice among astronomers and most datasets obtained by large astronomical facilities have a proprietary time of 12 months, after which they become publicly available via dedicated archives (Fig. 4). Astronomy, however, is only one among the many disciplines that are experiencing a strong push for data sharing and open access, by both their scientific communities and their funding agencies. Researchers in an increasing number of scientific fields are working together towards setting up interoperable data services and initiatives like the IVOA, such as the Research Data Alliance (RDA; Genova 2019; rd-alliance.org), are expanding across disciplines.

Archaeology has also been in the forefront of applying new and innovative techniques, still requests for data by e-mail are common practice, discipline-wide sharing is sporadic and only a small fraction of data is stored in structured formats that enable easy access (Marwick and Pilaar Birch 2018). Nevertheless, data sharing initiatives, often interweaved with standardisation works, are emerging with some notable examples including: EU-funded Advanced Research Infrastructure for Archaeological Dataset Networking (ARIADNE and its successor ARIADNEplus; ariadne-infrastructure.eu/portal/) that brings together existing archaeological data infrastructures to enable the incorporation of distributed datasets and new technologies into archaeological research methodologies, in a framework that has a lot in common with the VO; Open Context (opencontext.dainst.org), a system for sharing data in archaeology via the web for public use with a link to ORCID (orcid.org) for the identification of researchers;

the Digital Archaeological Record (tDAR; tdar.org), an international digital repository for long-term preservation; the Archaeology Data Service (ADS; archaeologydataservice.ac.uk), a digital repository for heritage data; or OpenDig (opendig.org), a site for direct online publishing of digital data for permanent storage hosting the Tall al-ʻUmayrī dig database, just to name a few.

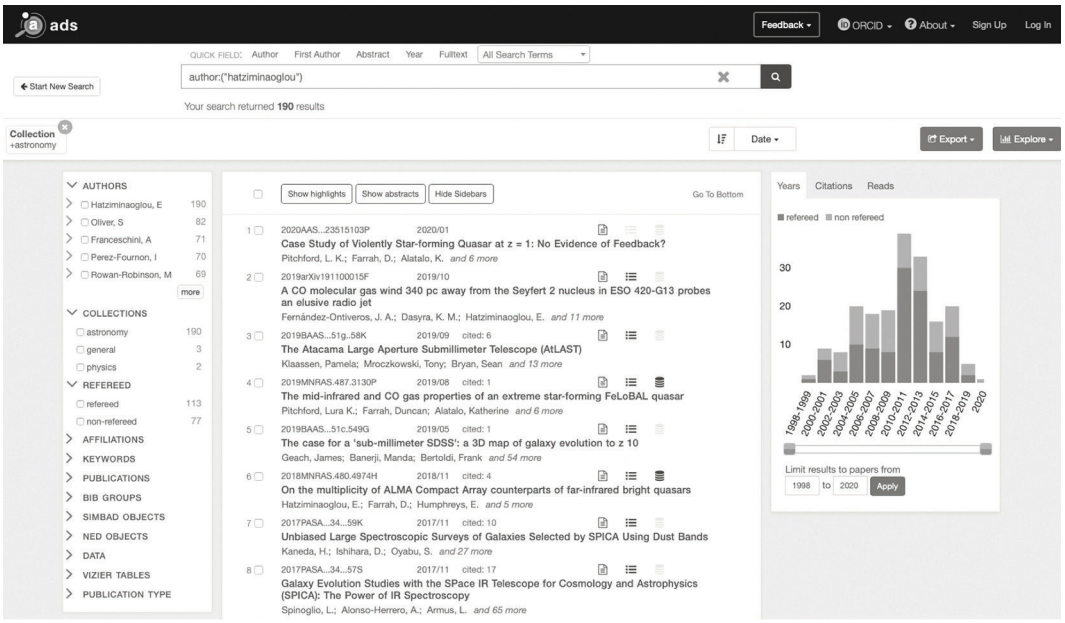
Data sharing is not a panacea for all data related issues. It is a practice that introduces concerns about quality assurance, metadata interpretation, data download tracking, provenance, referencing or acknowledgements, many of which are at the heart of the standardisation efforts mentioned above. Nevertheless, it comes with enormous benefits. Other than ensuring repeatability of the results and maximising the output of any scientific and research investments by enabling reusability of data for purposes beyond what was originally foreseen, data sharing also addresses many of the issues inherent to the handling of big data, regardless of discipline or scientific topic. It improves transparency and reduces duplication of efforts; it allows for new discoveries and facilitates science by less privileged countries/communities or scientist that do not have direct access to scientific facilities (*e.g.*, telescopes or archaeological sites in the vicinity). It also enables public participation and multidisciplinary work.

Open Access

Open access is gaining momentum under various models and configurations. The aim of this work is not to discuss such models nor the associated benefits or controversies, but rather to highlight ways preprints can be made publicly available, using once again the field of astronomy as an example.

If this were an astrophysics paper, I would have uploaded it, right after its acceptance and prior to its publication to a refereed journal, to arXiv (arxiv.org) (dubbed 'the archives'), an open-access platform for electronic prints. This effort started back in 1991 as an archive for preprints in physics but quickly expanded to astronomy, mathematics, computer science, quantitative biology, and, most recently, statistics, and it is currently maintained and operated by Cornell University. Submissions (made by registered users) are not peer-reviewed by arXiv itself, but the site is moderated to make sure that the submitted material have an academic content and are relevant to the category they have been submitted to. Preprints can be accessed by all internet users directly from the arXiv.org website or one from the many mirrors, without registration. Similar initiatives followed in other disciplines such as bioRxiv (biorxiv.org) for biological sciences operating since 2013 or PsyArXiv (psyarxiv.com) for psychological sciences operating since 2016.

A step further to such archiving efforts is provided by the Astrophysics Data System (ADS; ui.adsabs.harvard.edu/classic-form), a digital library portal for astronomy and physics, operated by the Smithsonian Astrophysical Observatory under a NASA grant. It provides access, via search forms, to bibliography databases (with a total content exceeding 13 million records) with publications in astronomy, astrophysics, and physics, including the arXiv. Other than direct links to the publications on the publishers' pages (access subject to fees), it provides free direct access to publications on arXiv, to abstracts, to bibliography statistics, citation counts, access to data linked from the publications (often via direct links to VO services), and other valuable resources (Fig. 5). The contents of the ADS are accessible to all internet users without registration. Finally, initiatives like ResearchGate (reseachgate.net), a social network primarily for sharing papers among researchers and scientists, provides open



5. Screenshot of the outcome of an ADS query for author "Hatziminaoglou" listing all publications of the author in reverse chronological order, providing a wealth of information on, *e.g.*, co-authors, journals, links to data, in the form of retractable menus (left), links to the abstracts and full papers (middle) and brief publication statistics (right), all clickable and interactive.

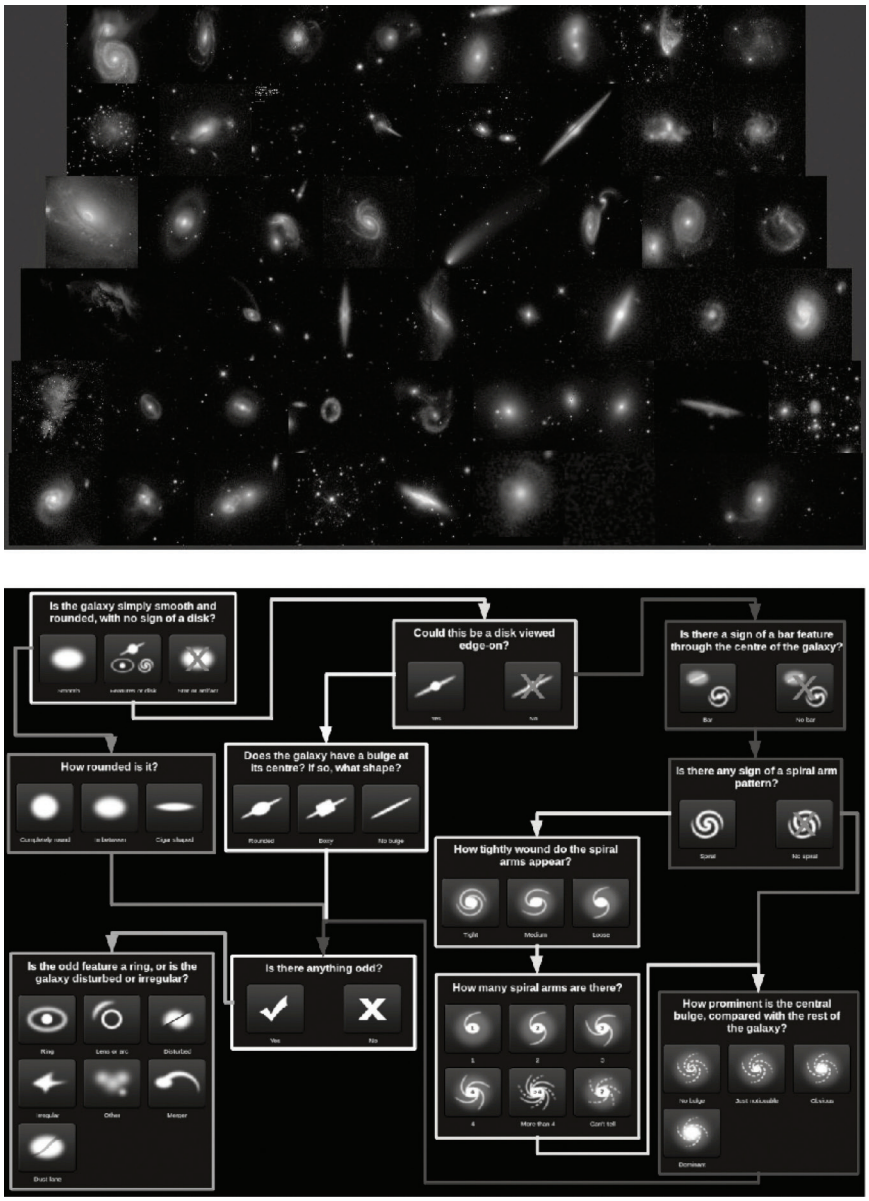
access to scientific papers from a wide variety of fields from one single platform, as well as opportunities for new collaborations via its multiple features.

People-Powered Research

One of the major breakthroughs of data sharing, and to an extent of open access, is that it opened the gates to people-powered research, allowing practically anyone with access to the internet to contribute to cutting-edge science and new discoveries.

Zooniverse (zooniverse.org) is the world's largest platform for people-powered research. It started off as a single project, Galaxy Zoo (initiated in 2007), whose task was the morphological classification of about 900,000 galaxies by eye, observed by the Sloan Digital Sky Survey (sdss.org) (SDSS; Fig. 6). More than 40,000,000 classifications were carried out by more than 100,000 volunteers in 175 days, that provided about 40 classification per galaxy in the 900,000 sample. Since then, Zooniverse has expanded to include more than 230 projects (about half of them currently active) in arts, biology, climate, history, language, literature, medicine, nature, physics, social science, and space. The creation of new projects can be done directly on the Zooniverse interface. The more than 1,000,000 volunteers from all over the world contributing to new discoveries that have been published in a stunning 238 peer-reviewed articles to date.

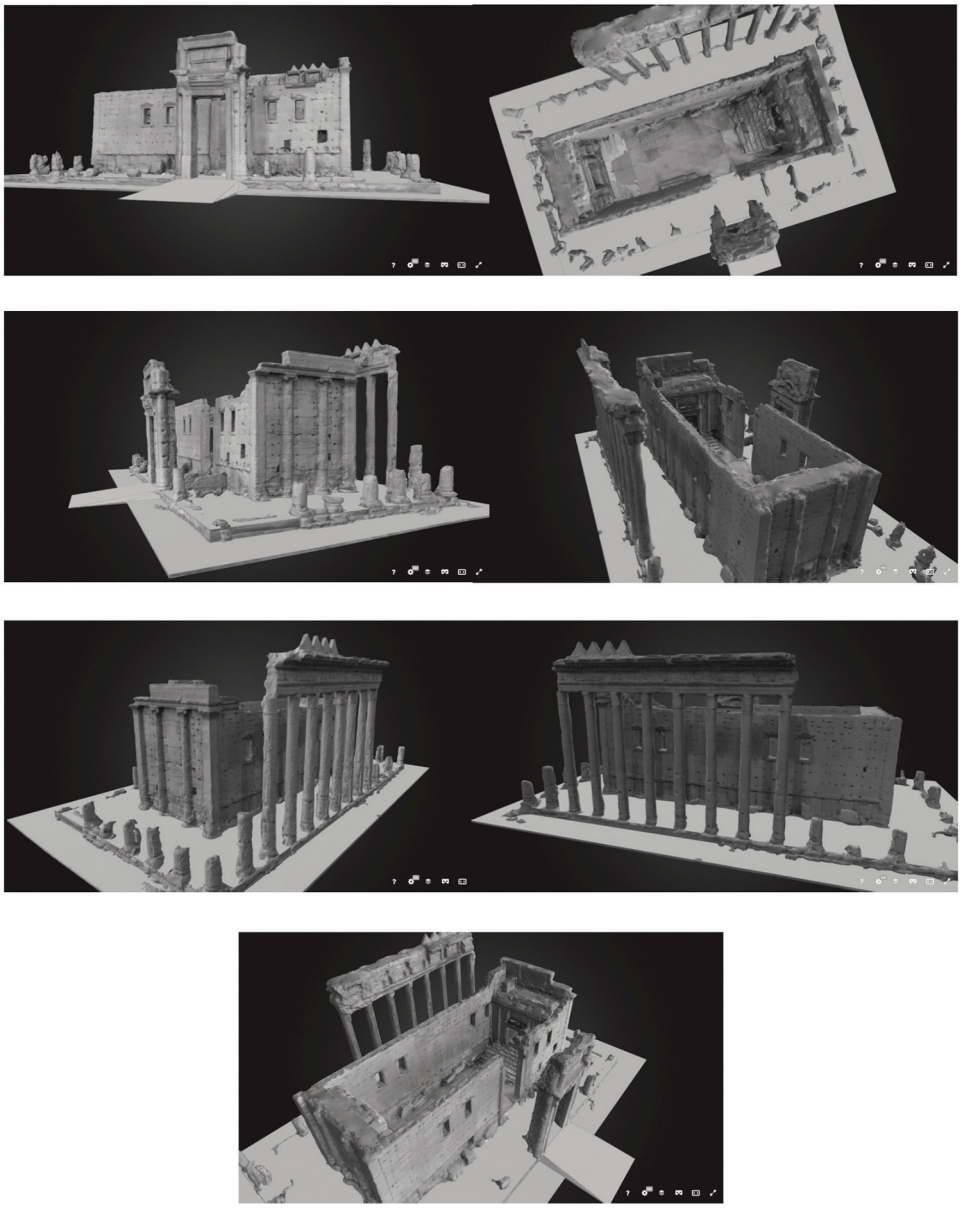
Earlier such initiatives include Clickworkers, a now defunct NASA project aiming at the identification of craters on Mars or Stardust@home that asks volunteers to look for the impact of interstellar dust particles on images of aerogel blocks exposed by the Stardust spacecraft after its launch in 1999.



6. Top panel: Variety in the morphology of galaxies observed by the Sloan Digital Sky Survey; bottom panel: Simple decision tree to be followed for the visual classification of each galaxy, by clicking on the interactive interface (Image credits: SDSS, Galaxy Zoo).

In astronomy, citizen science, a term whose definition largely depends on who you ask, comes in a variety of flavours other than crowdsourcing. Amateur astronomers, for instance, often act as comet or supernovae hunters, with many new discoveries made by their community every year.

Crowdsourcing efforts are becoming popular in archaeology, too. Currently paused GlobalXplorer (globalxplorer.org), is an example of a project that uses volunteers to analyse satellite images and look for



7. Different viewing angles of the model of Bel Temple in Palmyra (Syria), digitally reconstructed as part of Project Mosul.

new discoveries, but also signs of looting and encroachment in Peru and is based on a simple classification tree reminiscent of the one used by Galaxy Zoo. Furthermore, as datasets are often the only record of excavated or even destroyed sites, multiple efforts for digital reconstructions are taking place across the globe. Rekrei (projectmosul.org), for instance, formerly known as Project Mosul, launched in the aftermath of the destruction of the Mosul Museum by Daesh, is an

ingenious effort to digitally reconstruct lost heritage in the Middle East and elsewhere, by combining archaeology, photogrammetry, web development, and digital data (*i.e.*, photographs) taken by individuals (many of them tourists) over the years (Fig. 7). Similarly, the Zamani Project (zamaniproject.org) creates digital representations of historical sites in Africa that can be used for research, education, and restoration but also preservation for future generations.

Conclusions

The Square Kilometre Array (SKA; skatelescope.org) is the father of big data projects. The SKA is a global project that, towards the end of the decade, will be operating hundreds of dishes and several hundred thousands of low-frequency radio-antennas, all connected via the highest-speed network ever conceived for astronomical research. In early operations it is expected to produce an archive of science data products with a projected growth rate of a couple hundred petabytes per year (that is a couple times 1,000,000,000,000,000 bytes per year!). The needs of this project for data transfer, analysis, storage, and access demand continues change not only in the technologies used but also in the ways we think of and do science.

At the same time, new digital techniques are entering every step of the archaeological workflow causing an exponential increase in the data volume, opening endless possibilities for cross-disciplinary collaborations, perhaps even altering the profiles of professional archaeologists.

Although new efforts will build on the infrastructure already provided by earlier initiatives, they will require adaptation and technological leaps in order to accommodate the astronomical (pun intended!) data volumes involved. This is to say that the big data challenge is only starting. Data standardisation, sharing and interoperability efforts to bring together and curate data sets and other research resources across disciplines, to preserve their provenance, to render metadata searchable, and to make all those resources accessible as a whole, are taking up leading to a paradigm shift, allowing at the same time for new and unprecedented discoveries. This is the moment for disciplines to join forces towards developing common infrastructures and sharing knowledge, methodologies, and technologies.

This paper briefly discusses personal views of a professional astronomer with a profound interest in archaeology on how academic research is expanding not only beyond the traditional borders between individual disciplines but also beyond the strict limits of academia itself, how the combined power of the internet and the people around the world is employed resulting in new and exciting discoveries, how people with very different professional backgrounds and interests can contribute to original scientific research on topics distant from their fields of expertise, how technology can subscribe to the preservation and expansion of knowledge, and on how all of the above contribute to the globalisation of science.

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Jordan at the Turn of the 18th–19th Centuries: Napoleon and the Wahhabis

This article will focus on the impact that Napoleon's military campaign in Palestine in 1799 had on Jordan, and then on the First Sa'udi State's presence in southern Jordan between 1802 and 1811–1812.

Napoleon's Campaign in 1799

Napoleon, with a French army numbering 30,000 troops, invaded Egypt in 1798 and ruled the country for three years up to their defeat by the British in 1801. The French troops landed in Alexandria on 1 July 1798, Napoleon left to return to France on 23 August 1799, and the remaining French troops surrendered to the British on 2 September 1801. The British, for their part, did not attempt to establish permanent rule in Egypt; rather they evacuated Egypt in March 1803, leaving anarchy in Egypt until Muhammad 'Ali Pasha consolidated his power in mid-1805.

Part of the French campaign in Egypt involved an unsuccessful invasion of Palestine in the first half of 1799. Napoleon invaded with an army of some 13,000 troops on a campaign that lasted four months. Napoleon left Cairo on 10 February 1799 (Berthier 1799: 29), when the initial fighting of the campaign at el-Arish was already underway, and started the siege of Acre on 20 March. Napoleon abandoned the siege of Acre on 21 May and arrived back in Cairo on 14 June. During that campaign no French troops reached the territory of modern-day Jordan. The closest that any French troops seem to have got was around the south end of the Sea of Galilee in the aftermath of the Battle of Esdraelon/Mount Tabor on 16 April 1799 (Berthier 1799: 57).

No fighting took place in Jordan, and the four-month duration of the campaign was not long enough for most people in Jordan to be forced to take sides. However, the Beni Sakhr were among those who fought against the French at the Battle of Esdraelon/Mount Tabor on 16 April 1799 (Peake 1958: 88).

Tribes in Palestine, however, were more directly involved. Seetzen recorded one

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manifestation of that tribal involvement that had an impact on Jordan (1854: II 322; note that all translations of Seetzen are mine):

> *At the time of the French invasion of Syria, the Bedouins on the west side of the Dead Sea and the Jordan had gone into the field against the French and had left their families behind without protection. So the Ḥajāya and a number of other Bedouins on the east side used this good opportunity to satisfy their desire for raiding and made an incursion into Palestine, plundered the Greek monastery of Mar Saba in the desert and prowled up to Jerusalem and Bethlehem. The Htém, who were responsible for protecting that monastery, took this every ill and plotted revenge. They made a foray into the territory of the Ḥajāya, attacked a number of encampments, and the cruel Negros spared neither woman nor child. Thus it was easy to understand that the Ḥajāya so treated thought of blood revenge.*

While those Bedouin opposed the French invasion, a tribe in the Sinai took the side of the French, as noted by Seetzen (1854: III 49).

When Seetzen (1854: I 423) was in al-Karak at the end of March 1806, he remarked that "many occasional poems and songs were circulating about Bonaparte, but very little written." Why those poems and songs were not written down can be accounted for by another quote of Seetzen (1854: I 404) from when he was in as-Ṣalṭ in mid-March 1806:

> *The present Schemmâs (his name on the poem) is an Arab bard. I got from him a poem that he had made about Bonaparte's invasion in Egypt and Syria. He sang another poem that was by him and contained a call to the Christians of this region to quickly place themselves at the service of Bonaparte. But it was written very flowery, so that the Muslims or al-Muahadin could not understand the sense.*

Not wanting the Muslims to understand the content can be seen as prudence on the part of the poet. Any call by Christians in Jordan to support the French invaders would have been an act of rebellion against the Ottomans and their regional rulers like Ahmad al-Jazzar. So, if the French invasion were to fail, as indeed happened, the Christians could expect to face the consequences of their disloyalty. But by not writing the poems down, or writing them in a flowery style that the Muslims could not understand, the Christians were careful not to provide the Ottoman authorities with written evidence of their disloyalty.

That the Christians in Jordan could be seen as potential allies of the French is evident from an observation of Irby and Mangles, who spent a week in al-Karak in 1818 (1823: 368). "It was said that at the time of the French invasion in 1799, there was a project for disarming the Christians and driving them out, which the present *sheikh* prevented." They also noted that "There are about as many Christian inhabitants in Kerek as Turks" (1823: 368).

One case of local Christians assisting Napoleon is known: "Buonoparte was informed by the Christians of Damas, that a considerable force" was on its way to attack the French forces (Berthier 1799: 49). That was the force that Napoleon defeated at the Battle of Mount Tabor on 16 April 1799.

The French invasion of Egypt in 1798 had prompted rioting in Damascus, until Ahmad al-Jazzar, the governor of Sidon and former governor of Damascus, was reappointed governor of Damascus at the end of 1798 and suppressed the rioting. Shortly after the French retreat from Acre in

May 1799, Ahmad al-Jazzar was replaced as governor of Damascus by ʿAbd Allah Pasha, but Ahmad al-Jazzar remained governor of Sidon and was reappointed governor of Damascus in late 1803 after the pilgrimage led by ʿAbd Allah Pasha in March-April.

At the time, there was no effective Ottoman administration in Jordan. The presence of the Ottoman government was restricted to ensuring that the *Hajj* pilgrimage caravan from Damascus could safely proceed south through Jordan to the Hijaz and that the *Hajj* caravan from Egypt could safely cross the Sinai Peninsula to ʿAqaba and then south to the Hijaz.

I have found no report about the impact that Napoleon's campaign in Palestine had on the *Hajj* pilgrimage caravan from Damascus, but I assume that it was cancelled. The 10th of Dhu *al-Hijjah* 1213 was 15 May 1799, in the last week of the siege of Acre, and the pilgrimage caravan would have needed to set out from Damascus a few days before the Battle of Mount Tabor on 16 April and would have still been in northern Jordan at the time of the battle. I also assume that there were no other pilgrims from Palestine who would have gone in the usual pilgrim caravan from Jerusalem and Hebron to al-Karak and then south to the Hijaz, while the Egyptian pilgrim caravan across the Sinai Peninsula to ʿAqaba and then south surely was cancelled that year as well. The disruption of the pilgrimage from Syria-Palestine would have impacted the population along the pilgrimage route who sold supplies to the pilgrims, especially in Maʿān, as noted below for the Wahhabi disruption of the Syrian pilgrimage caravan.

The disruption that Napoleon's campaign in Palestine had, however, was short-term. Ahmad al-Jazzar, the Ottoman governor of Sidon and Damascus, based in Acre, remained in power until his death in May 1804, when he was succeeded by Sulayman Pasha. The situation in Egypt, however, did not begin to stabilize until May 1805 when Muhammad ʿAli consolidated his rule.

The Wahhabis and the First Saʿudi State

In the meantime, in the early 19th century, the Wahhabis in Arabia played a major role in southern Jordan. The puritanical religious leader Muhammad ibn ʿAbd al-Wahhab (1703–1792) formed an alliance with Muhammad ibn Saʿud in 1744, establishing the First Saudi State—the Emirate of Diriyah—that lasted until 1818. Muhammad ibn Saʿud died in 1765, and his son ʿAbd al-ʿAziz ibn Muhammad ibn Saʿud succeeded him. ʿAbd al-ʿAziz ruled until he died in November 1803. His successor Saʿud ibn ʿAbd al-ʿAziz ibn Muhammad ibn Saʿud then ruled from 1803 to 1814, and his successor ʿAbd Allah ibn Saʿud ruled from 1814 to 1818. Muhammad ʿAli, the ruler of Egypt, invaded the Hijaz in 1811–1812 to defeat the Saʿudis and his son, Ibrahim Pasha, took over the campaign in 1817 and captured Diriyah in 1818, ending the first Saudi state.

ʿAbd al-ʿAziz ruled starting in 1765 but only at the end of his reign in the early 19th century did the Wahhabis begin raiding aggressively outside of the Arabian Peninsula, starting with the sack in 1801 and 1802 of the Shiʿite centers in Iraq of Karbala, where Husayn the grandson of the Prophet Muhammad had been martyred in 680, and Najaf, where ʿAli ibn Abi Talib had been buried in 661.

The Hijaz and other parts of Arabia had been ruled as part of the larger Ayyubid and Mamluk states centered in Egypt for centuries, continued by the Ottomans. So, it can hardly be a coincidence that the Wahhabis began their long-range raiding in 1801–1802, at a time when anarchy in Egypt was at its worst, and that after the Egyptians reestablished a stable government in 1805, they were able to reassert their rule over the Hijaz, by invading the Hijaz in 1811–1812 and putting an end to the First Saʿudi State

in 1818. So only in that ten-year period from 1802 to 1811–1812 were the Wahhabis in a position to rule the Hijaz and undertake raids outside Arabia free from Egyptian control.

Disruption of the *Hajj* Pilgrimage Caravan from Damascus

The Syrian *Hajj* caravan, with tens of thousands of pilgrims, was always subject to attack by Bedouin along their way from Damascus south to the Hijaz, so the safety of the caravan was a primary concern of the Ottoman authorities, who needed to organize a military escort for the pilgrim caravan (Barbir 1980: 167–77, 200–1; Peters 1994b: 145–62). The Bedouin attack on the Syrian caravan in 1757, for example, was catastrophic (Peters 1994b: 161–2). The Wahhabis were also prone to attack the *Hajj* caravan; in 1786 Ahmad al-Jazzar was successful in organizing effective protection against the Wahhabi attacks (Cohen 1973: 71). Burckhardt, however, remarked that prior to the Wahhabi takeover of the Hijaz the pilgrim-caravans passed from Damascus, Baghdad, and Egypt without any molestation through Wahhabi territory (1831: II 181, 191).

But the Wahhabi takeover of the Hijaz changed the political balance between them, the Ottomans, and the Hashemite Sharif of Mecca. The Wahhabis captured Mecca in 1803 and Medina in 1804; however, they failed to capture Jeddah in 1803, which remained under the control of an Ottoman governor. The Wahhabi takeover soon led to awkward confrontations with the annual Syrian pilgrimage caravan, as the Wahhabis attempted to block the pilgrimage caravan from coming due to ideological reasons (Corancez 1810: ch. 9 66–82, ch. 11 92–104).

In 1803 ʿAbd Allah Pasha was the leader (*amir al-hajj*) of the pilgrimage caravan from Damascus, and when the pilgrims arrived in the Hijaz, the Wahhabis leveled onerous taxes, and an armed confrontation ensued in which 150 Wahhabis were killed. But the Wahhabis did allow the pilgrims to perform the *Hajj* rituals (Coranzes 1810: 32–33; Peters 1994a: 302; 1994b: 200–1).

Although Burckhardt (1831: II 192, see 102) wrote that "The Syrian caravan performed its pilgrimage for the last time in 1802," Syrian pilgrims were still able to come for a few more years (Table 1). In 1804 the Ottoman had to pay heavy tolls to the Wahhabis, but the pilgrims in the caravan were allowed to perform the *Hajj* rituals (Coranzes 1810: 74–7). In 1805 the Syrian caravan was allowed to come, but only after paying high tolls, with Ottomans paying more than Arabs (Corancez 1810: 74, 92–3; Peters 1994a: 302 emends the date to 1803). The Wahhabis informed the Ottoman commander of the caravan that the caravan would not be allowed to come the next year. As Ali Bey al-Abbassi put it (1816: II 135–6; Peters 1994a: 303):

> *The great caravan from Damascus in 1805 could not obtain a passage but by heavy sacrifices, and Sa'ud signified to the Pasha of Damascus, the Amir al-Hajj or Prince of the Pilgrims, that this caravan should no longer come under the protection of the Turks, or bring the rich carpet that the Grand Seignior sends every year to cover the sepulcher of the Prophet, a thing looked upon as a great sin by the Wahhabis. In short, he required that the whole caravan should be composed absolutely of pilgrims alone, without troops, arms, flags, or any trophies or ornaments, and without music or women.*

In 1806 the Syrian caravan came as usual, anyway, but the Wahhabis blocked the *Hajj* caravan outside of Medina from proceeding any further, so that the pilgrims were not able to perform the *Hajj* rituals. As Ali Bey al-Abbassi described it (1816: II 135–6; Peters 1994a: 303):

Table 1. The Date of the Pilgrimage to Mecca (10 Dhu al-Hijjah) 1213/1799–1233/1818.

1213	15 May 1799
1214	5 May 1800
1215	24 April 1801
1216	13 April 1802
1217	3 April 1803
1218	22 March 1804
1219	12 March 1805
1220	1 March 1806
1221	18 February 1807
1222	8 February 1808
1223	27 January 1809
1224	16 January 1810
1225	6 January 1811
1226	26 December 1811
1227	15 December 1812
1228	4 December 1813
1229	23 November 1814
1230	13 November 1815
1231	1 November 1815
1232	21 October 1817
1233	11 October 1818

> *Notwithstanding this declaration of Sa'ud, the caravan of Damascus wished to make the pilgrimage in the following year, 1806, without strictly conforming to the ordinances of the conqueror; but it had hardly arrived at the gates of Medina when it was obliged to retire in disorder, persecuted and annoyed by the Wahhabis, who occupied the city and its neighborhood.*

In 1807 the requirement that the pilgrims accept the Wahhabi standards of behavior discouraged many prospective pilgrims from coming (Corancez 1810: 132; Peters 1994a: 305). But the Damascus pilgrimage caravan again came as usual, only to be stopped before reaching Medina, so that the pilgrims were unable to perform the *Hajj* rituals. As Seetzen mentioned in March 1807, when he was in Beersheba (1854: III 33–4):

> *In the afternoon a Greek Christian came back with a small caravan from Maân, which had brought food and other needs and trade goods for the returning pilgrim caravan. He told us that the inhabitants of Maân and the entire region trembled due to the Wuhabis, who he called Muhábys, and confirmed the news that Abdallah Pasha of Damascus had to withdraw again from the vicinity of Medina, leaving things unperformed.*

For the pilgrimage in 1808, the pilgrimage caravan was on a much-reduced level as it left Damascus on 30 December 1807. Corancez (1810: 132) give the figure of 350 pilgrims. The coverage by Corancez stops in 1808, so for the pilgrimages of 1809, 1810, and twice in 1811, I have not found any explicit statement about whether the Syrian caravan came or was cancelled, beyond Burkhardt's report about the Barbary pilgrims who were permitted by the Wahabi chief to perform their pilgrimage in 1810 and 1811 and return via Ma'ān and ash-Shawbak to Hebron, Jerusalem, and Yaffa (1822: 437, see below). Seemingly other pilgrims were not able to do the same, an indication that none tried to come via the Syrian pilgrimage route.

But the Wahhabis were not the only obstacle to the pilgrimage caravans. Another threat was the Omran tribe on the Red Sea coast. As Burckhardt wrote (1831: II 9):

> *They inhabit the mountains between Akaba and Moeyleh, on the eastern coast of the Red Sea. The Omran are a strong tribe of very independent spirit. Their frequent depredations*

> *render them objects of terror to the pilgrims proceeding to Mekka, who are under the necessity of passing through their territory. At the time when Mohammad Aly, Pasha of Egypt, had reduced all other Bedouins on the Egyptian* Hadj *road to complete subjection, the Omran still proved obstinate. In the year 1814 they attacked and plundered a detachment of Turkish cavalry near Akaba; and in 1815 they pillaged the whole advanced corps of the Syrian pilgrimage caravan, on their return from Medinah to Damascus.*

Elsewhere, Burckhardt identified all the tribes southward of Akaba al-Shámy (Fassuʿa), along the Syrian *Hajj* route that went east of the port of ʿAqaba, to Medinah as Wahhabis, "continuing to profess themselves such even after the campaign of Mohammad Aly Pasha against these sectarians" (1831: II 25).

Another non-Wahhabi threat was the *El ʿOwf*, enterprising robbers between Mecca and Medina who were never completely subjugated by the Wahhabis and who in parties of 300 or 400 men would carry off by night valuable loads out of the midst of the encampments of the *Hajj* and cut off stragglers (Burckhardt 1831: II 35–6).

The blockage of the Ottoman *Hajj* caravan from Damascus did not mean a larger disruption in the *Hajj* pilgrimage, since pilgrims could come by sea via the port of Jeddah, or overland by other routes, as during the pilgrimage of January–February 1807, although the ongoing Napoleonic Wars in Europe that paralyzed the commerce of the East and the revolutions in Egypt after Napoleon adversely impacted the wellbeing of the population of Jeddah (Ali Bey al-Abbassi 1816: II 52).

The blockage of the *Hajj* caravan from Damascus, however, had an direct impact on the livelihoods of the populations along the route, as in Maʿān, who depended on trade with the pilgrims. When Wallin passed through in 1845, he emphasized the importance of trading during the four days a year that the Syrian *Hajj* caravan was in Maʿān for the wellbeing of the population of some 200 families for the rest of the year (1854: 121–4). Burckhardt, who passed through Maʿān in 1812 also wrote about the impact that the blockage of the Syrian pilgrimage caravan had on Maʿān (1822: 437):

> *Maan is situated in the midst of a rocky country, not capable of cultivation; the inhabitants therefore depend upon their neighbours of Djebal and Shera for their provision of wheat and barley. At present, owing to the discontinuance of the Syrian Hadj, they are scarcely able to obtain money to purchase it. Many of them have commenced pedlers among the Bedouins, and fabricators of different articles for their use, especially sheepskin furs, while others have emigrated to Tafyle and Kerek. The Barbary pilgrims who were permitted by the Wahabi chief to perform their pilgrimage in 1810, and 1811, returned from Medina by way of Maan and Shobak to Hebron, Jerusalem, and Yaffa, where they embarked for their own country, having taken this circuitous route on account of the hostile demonstrations of Mohammad Ali Pasha on the Egyptian road. Several thousands of them died of fatigue before they reached Maan. The people of this town derived large profits from the survivors, and for the transport of their effects; but it is probable that if the Syrian* Hadj *is not soon reestablished, the place will in a few years be abandoned.*

Elsewhere (1822: 404–5) Burckhardt

mentioned that the inhabitants of Ṭafīla "supply the Syrian *Hadj* with a great quantity of provisions, which they sell to the caravan at the castle El Ahsa," but that "It is much to be doubted whether the peasants of Djebal and Shera will be able to continue their field-labour, if the Syrian pilgrim caravan be not soon re-established."

The Wahhabis blocking the Syrian pilgrimage caravan led to the Ottomans supporting Muhammad ʿAli, the ruler of Egypt, in invading the Hijaz in 1811–1812. The Egyptians took Medina in October 1812 and Mecca in January 1813. Ibrahim Pasha took over the campaign in 1817 and captured Diriyah in 1818, resulting in the end of the first Saudi state.

Saʿud ibn ʿAbd al-ʿAziz, the ruler from 1803 to 1814, had tried unsuccessfully to stop his followers from trading with Syria and Iraq. As Burkhardt put it (1831: II 141),

> *. . . Saoud found it necessary to relax his severity on that subject. He even tacitly connived, in the last period of the Syrian* hadj*, at his Arabs transporting provisions for the caravans, and took himself one dollar for every camel, belonging to his people, so employed; but except in this carrying business of the* hadj*, he never would allow any of his Arabs to trade with Syria or Baghdad until after 1810, when the Egyptian expedition began.*

Wahhabi Control of Southern Jordan

In addition to disrupting the *Hajj* caravan from Damascus, between 1802 and the Egyptian invasion in 1811–1812, the Wahhabis expanded their political control into southern Jordan and beyond. Details are scare and come mostly from the observations of Western travelers, notably Jasper Ulrich Seetzen, John Lewis Burckhardt, and Charles Irby and James Mangles.

The Wahhabis raided far afield into Iraq and Syria, including a raid in 1810 to Damascus and the Hauran with about 6,000 men that led to the sack of 35 villages (Burchkhardt 1831: II 164, 170, 209–10). But their longer-distance raids were for the sake of plunder rather than to extend their dominions, as Burckhardt stated (1831: II 166). The Wahhabis may have found some supporters in Damascus and the region (El-Abbassi 1816: II 322–3), but the Ottoman governors ruling as far south as Hebron, were in a position to keep the Wahhabis from doing anything beyond raiding.

But in southern Jordan the Wahhabi presence was more substantial. The clearest evidence for the Wahhabi presence is their collection of tribute from the Bedouin tribes. As Seetzen, who in January 1807 spent the night in a Beni Sakhr encampment in the area below Ḥisbān, remarked (1854: II 323):

> *The conversation among other things turned to the new sect of the Wuháby: the numerous tribe of the Beni Szácher and the far more numerous one of the Ánäséh are already for some years tributary to the current caliphs of the founder of the religion. However, this year the collector of this tribute (el Síka) had not arrived, for which no one could give a reason. From the utterances of our hosts, I concluded that they were very opposed to this new, previously unknown imposition.*

Seetzen also remarked in March 1807 (1854 III 9–10) that the *Ḥuweiṭat* a year and a half ago (so Fall 1805) were compelled to pay the ruler in Najd the Suqea tax. They joined the other tribes in Jabal (the region around Ṭafīla) and Jabal al-Sharah (the region around Wādī Mūsā) in military action against them, but Seetzen thought that would be in vain—that all tribes from Hedjaz to Damascus will pay tribute to Wahhabis. The center of the *Ḥuweiṭat* is

around Maʿān, but up to al-Karak and south of Hebron.

But how effectively the Wahhabis were able to collect that tribute is questionable. Charles Irby and James Mangles, who spent a week in al-Karak in 1818 reported about the Wahhabis (1832: 366):

> *It appears that the Wahabees made an attempt on Kerek, and were encamped for several days on the heights south of the town; one of them was sent in to parley, and the inhabitants boast of having killed about forty of them, from the loop holes of the castle, with their muskets.*

Another quote from Irby and Mangles (1832: 369), however, gives another picture: "Here [just west of al-Karak] we were joined by an Arab from Djebal who had been forced away by the Wahabees, and had lived and served with them; almost all his fellow-townsmen had been put to death."

In 1808 al-Karak came under the nominal control of the Wahhabis, as Burckhardt noted (1822: 387–8), but the Wahhabis never exercised direct control in the area and did not collect taxes (Gubser 1985: 16).

The Wahhabis may have claimed the nominal allegiance of the population, but much of the local population may not have approved of Wahhabi ideology, as suggested by such quotes as that of Seetzen, when he was in Beersheva in March 1807 (1854: III 33–4):

> *The Wuhabisten are said to maintain very strongly the prohibition against smoking tobacco, and a while ago their leader had a tobacco dealer seized and burned next to his tobacco. Although smoking tobacco certainly belongs to the most ridiculous customs that were ever conceived by the human race, one should have to admit that such a punishment was too hard and cruel. Ignoring the threatening danger, many are so very used to it, that they are not able to completely give it up. Meanwhile they smoke in secret and use for that only the pipe heads, as I noticed among the Huethât. Some affirm that the short confession of belief of the Wuhabis consists of the following: "I believe in the one God and in Mohammed, the servant of the one sent of God, who was born and died." Often the conversation of the local Bedouins turned to this topic, and Wuhâb's reformation of Islam sometimes found its secret defenders. Basically, it can be indifferent to the Bedouin, whether they confess to this or that sect, because they care little or nothing for religion, and only bear the name of Mohammedans.*

The Wahhabi presence in southern Jordan may also have affected the remnant Christian population. When Burckhardt passed through Petra in 1812, he remarked about the now abandoned village of Badabde near Wādī Mūsā that "It was inhabited till within a few years by about twenty families of Greek Christians who subsequently retired to Kerek" (1822: 420). That abandoned village can be identified as Dibdibah (MEGA Jordan site 12446), some six km north of Wādī Mūsā and two and a half km east of Bayḍā. Reading between the lines, one can plausibly attribute the decision of the Christians of Badabde to leave for the safety of al-Karak, where Christians were concentrated, to the Wahhabi presence.

Musil, who visited Petra between 1896 and 1902, also recorded a story about a Christian clan living in Wuʿeira who left at some unspecified time due to Arab pressure (Musil 1908: 58). That decision to leave could conceivably also have been due to the Wahhabis taking over the region nearly a century before Musil's time.

The Aftermath of the Wahhabis

A Wahhabi presence in southern Jordan would have collapsed as a result of the Egyptian invasion of the Hijaz starting in 1811–1812 led by Muhammad ʿAli and his son Ibrahim Pasha. The Ottoman governors of Damascus would have been able to reestablish their authority, which largely consisted in establishing relations with the Bedouin tribes to insuring the safe passage of the *Hajj* caravans from Egypt and Syria. Only with the Egyptian takeover by Muhammad ʿAli and Ibrahim Pasha between 1830 and 1840, followed by the Ottoman recovery in the *Tanzimat* period, would a new phase of stronger government authority in Jordan begin.

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Early Photographs and Archaeology: The Case Study of K.A.C. Creswell's Photographs of the Amman Citadel

Historical archives are increasingly becoming an important research tool for the archaeological disciplines, especially those related to the Near East. This is of course a positive trend: any effort to make "forgotten" data available to the scientific community is to be welcomed. Archive studies, however, require a specific approach: consistent and shared procedures for cataloguing and publishing the data gathered from archives still need to be fine-tuned by the archaeological community. Archive data is often collected and used by the archaeologist simply to answer doubts and problems already defined in the research in progress. Much potential information is thus neither recorded nor reported, making it difficult to compare data from different archives.

This contribution deals with a specific archive source of information: the early photo archives concerning Amman. By "early photos," I mean those taken between the very beginning of the use of the camera in archaeological contexts, around mid-19th century, and World War II. The photographic method was presented by Louis Daguerre, in Paris in 1839, and the first attempts to use a camera on an archaeological excavation were made just a few years later, in 1842, when the German Egyptologist Richard Lepsius decided to include a camera in the equipment of his archaeological expedition in Egypt (Bohrer 2011: 35). The camera was introduced in Jordan very early, most likely in 1842, when the Scottish physician George Skene Keith took some daguerrotypes at Jearash (see Perez 1988; Abujaber and Cobbing 2005; Anastasio forthcoming for an overview of this issue). From this moment onwards, as a rule, photographers were part of the staff of the main archaeological expeditions. World War II marks a radical change in the history of photography. Kodak started the production of Kodachrome, the first commercially successful color film, in

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1935, while the Super Kodak SIX-20, the first camera with automatic exposure, was released in 1938; more generally, many new tools were produced, with an increasingly affordable price, for shooting, printing, and reproducing photographs and slides. From this moment onwards, photography became a practice accessible to all, whether professionals or not, leading to a large increase in photographic archives.

The main types of information that can be gained from early photo archives are: 1) how the landscape where the monuments are located has changed; 2) the state of a monument prior to any recent damage or destruction; 3) the reconstruction of the provenance of archaeological items; 4) the history of remakes and conservation works on a monument, if any—just to list the main ones.

The following examples will give special emphasis to the last issue, presenting a group of early photos that I had the opportunity to analyze first-hand: the photos of Amman taken by Keppel Archibald Cameron Creswell in the 1920s.

K.A.C. Creswell (London 1879–London 1974) is known as one of the first and most important scholars of Islamic architecture. He devoted himself to this subject from the time of his military posting in Egypt, in 1916. He spent most of his life living in Cairo and traveling all over the Islamic world, taking thousands of photos, which were published in his works only to a small extent (see Hamilton 1991 for a biographical sketch of Creswell). They are currently included in several archives: the Ashmolean Museum (that holds most of the negatives), the American University in Cairo, the Victoria & Albert Museum, the Fine Arts Library in Harvard, and the Biblioteca Berenson at Villa "I Tatti" in Florence, the latter being the institute where I had first-hand access to his photos. In Florence, there are 27 gelatin silver prints dedicated to Amman, out of a total of about 3,000 donated by Creswell to the art historian Bernard Berenson.

A total amount of roughly 40,000 photos are spread across the different archives. In most cases the archives have replicas of the same images, but without completely overlapping. Creswell's photos of Jordan are a very small part of the entire collection; specifically, the images of Amman amount to 39 shots, replicated in prints with a few differences in the other archives, for a total amount of 160 items.

It is important to recall that an international project for reuniting all the archives in a single online platform, aimed at making the whole collection accessible, has recently been launched: "The Creswell Online Network" project (Koulouris 2018; a preliminary outline of Creswell's photos of Amman is given in Anastasio forthcoming).

The most likely date of these photographs falls between 1916 and 1928. Creswell's first known visit to Egypt was in 1916, and some photos credited to Creswell illustrate a travel guide published in 1917 (Devonshire 1917). A comparison between his photographs and those taken by the Italian expedition to Amman, directed by Renato Bartoccini in 1928, makes it possible to state that all of Creswell's photos of Amman were taken prior to the works carried out by Bartoccini (his private archive has recently been published in Anastasio and Botarelli 2015). Furthermore, it is worth mentioning that Creswell definitely visited Amman between 1919 and 1920, as inspector of monuments for the Allenby Military Administration (Hamilton 1991: 130). Due to this, we can assume that Creswell's photos of Amman were taken in 1919/1920.

Creswell took interesting photos both in the plain area at the foot of the Citadel mound, and on the Citadel itself. The former include photos of the Umayyad Congregational Mosque, details of the Roman Theatre, as well as the Nuweijs mausoleum, which intrigued Creswell especially for its dome,



1. Amman. The Nymphaeum in photo ID 133300 of the Biblioteca Berenson collection, Florence (©Ashmolean Museum, University of Oxford, neg. 5408).

supported by pendentives.

A very interesting case is the Roman Nympaheum (Fig. 1). Even though the monument is portrayed in only one of the photos of Creswell's collection, it is very meaningful. The main preserved wall is viewed from the north-east, which is an unusual viewpoint, compared to most of the other known early photos of the monuments where the perspective is normally the opposite compared to Creswell's photo: for example, the photo taken by Bartoccini in (Fig. 2); other photos of the monument can be found especially in the photo archives of Bonfils and Phillips in the 1860s (Warren 1870; Renié 2008), Kondakov and Butler expeditions in the early 1900s (Kondakov 1904; Kenfield 2010), and Bartoccini in 1928–1938 (Anastasio and Botarelli 2015).

Despite this difference in perspective, all these photos are linked by visible masonry details. It is interesting to notice



2. Amman. The Reception Hall, from west, in photo ID 133304 of the Biblioteca Berenson collection, Florence (©Ashmolean Museum, University of Oxford, neg. 5434).

that Creswell's photo shows an intermediate state of preservation of the structure, between the earlier period, until Butler's time, and the later period, around a decade

after Creswell's visit, when the upper part of the main wall was collapsed, as well visible in the photo taken by Bartoccini: the higher part of the wall is still preserved in Butler's time, and completely lost at the time of Bartoccini's excavation, in 1928. The photo taken by Creswell, probably eight years before Bartoccini's photo, demonstrates that the wall had already collapsed in part, but not to the extent shown in Bartoccini's photo. In any case, what is interesting is that if we compare all these early photos in chronological order, a large amount of data can be acquired on the modern history of the building.

Creswell took photos on the Citadel of the so-called Audience (or Reception) Hall, photographing the monument both from the outside (Fig. 2) and the inside (Fig. 3). He recorded several details of the decorations in the row of niches that are inside the building. These latter photographs are particularly worth mentioning because they are among the first to document these architectural elements. Most previous travelers who had visited Amman had focused their attention on the main monuments at the foot of the Citadel, because its top was a mass of collapsed ruins, with very few standing and accessible buildings.

Prior to Creswell's visit, the photos published in 1904 by Nikodim Kondakov show some of the decorated niches in good detail. Unfortunately, these photos were significantly retouched and adjusted for publication—a common practice at that time—and the original architectural features are not clearly readable (Kondakov 1904: figs.



3. Amman. The interior south-western corner of the Audience Hall, (left) in a photo taken by Creswell and (right) in its current state (left: Berenson ID 133307, ©Ashmolean Museum, University of Oxford, neg. 5436; right: Stefano Anastasio, photo taken in 2014).

18–25 pls. XXVIII–XXXII). These decorations were photographed and drawn in greater detail only later, during the Italian excavations in the 1930s (Anastasio and Botarelli 2015: figs. 167–184).

The photos of the interior of the structure are very useful because of the significant work of restoration, and in some cases, reconstruction, carried out in the building in recent years, as well as at the time of Bartoccini's expedition. In the 1930s, conservation work consisted mainly in shoring up some instable walls and repairing the masonry in at least "12 endangered parts" as mentioned in the excavation journal, but unfortunately not mapped ("12 punti pericolanti," see Anastasio and Botarelli 2015: 112). Creswell's photos allow some details to be thoroughly compared, as in the case of the corner restored by Bartoccini, displayed in Fig. 3.

Early photo archives are a significant tool for protecting and enhancing archaeological heritage. They may be particularly effective for planning appropriate conservation works on damaged monuments, making their proper use by scholars of key importance.

Of course, professional skills in the study of early photographic materials and techniques require extensive training and experience, which cannot be expected from ordinary archive users. However, both professionals and amateurs may use several tools and tutorials to achieve at least a basic knowledge in the field, especially as regards the materials and the techniques of the photos.

Being able to recognize the material and the technique of a printed photo, generally means being able to date it, at least approximately. Many techniques were used for printing photos especially between the late 19th–early 20th century: salted paper, platinum, cyanotype, albumen, collodion, gelatine silver, etc., and in many cases they were used just for a limited time. Becoming familiar with at least the main types could surely help archaeologists in dating uncertain photos.

For this reason, it is important to give information about the material, dimensions, and techniques of the archive photos when they are reproduced in archaeological publications. This does not happen very often, unfortunately.

Besides printed handbooks (for instance, Reilly 1986), some useful and practical tools for approaching this subject can be found online: for instance, in the Graphic Atlas Project of the Image Permanence Institute (graphicsatlas.org), which introduces the identification of photographs, as well as the Atlas of Analytical Signatures of Photographic Processes of the Getty Institute (getty.edu/conservation/publications_resources/pdf_publications/atlas.html).

These and other similar tools may allow the archaeologist to gain a basic knowledge in the field, improving the way archive documents are studied for archaeological research, and making their publication consistent and effective.

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Archaeological Work at Gerasa/Jerash: New Perspectives on the City on the Gold River. The Danish-German Jerash Northwest Quarter Project 2011–2017

The Danish-German Jerash Northwest Quarter Project's Archaeological Work 2011–2017

The Danish-German Jerash Northwest Quarter Project was a joint project between the universities of Aarhus and Bochum, later Münster. It dealt with a hitherto unexplored part of the Decapolis city Gerasa in Northern Jordan. The aim was to investigate and document the settlement history of the Northwest Quarter and understand the area in a diachronic and comparative perspective, drawing on already published data from the city and the region in general in order to contextualise the findings as firmly as possible within the city's and region's archaeological and historical context (Fig. 1).[1] The Northwest Quarter is the highest area within the walled city and covers an approximately 4-ha large area (Fig. 2).[2] A survey campaign was undertaken in the summer of 2011 (Kalaitzoglou *et al.* 2012; Lichtenberger and Raja 2019c) followed by five excavation campaigns, each of about six weeks duration (2012–2016, trenches A–X) and one shorter study campaign of two weeks in 2017.[3] The areas of excavation (trenches A–X) were chosen on the basis of research questions pertaining to the general development of the site, the urban layout, the chronology of the buildings and structures, the earliest use of the Northwest Quarter, water-management strategies over time, the impact of the earthquake of AD 749,

[1] This contribution is based on our elaborate introduction to our final publications in volume 1 (Lichtenberger and Raja 2020a).

[2] See website for more information: https://projects.au.dk/internationaljerashexcavation.

[3] 2011 campaign: Lichtenberger and Raja 2012. 2012 campaign: Kalaitzoglou *et al.* 2013; Lichtenberger *et al.* 2013. 2013 campaign: Kalaitzoglou *et al.* 2014; Lichtenberger *et al.* 2014. 2014 campaign: Kalaitzoglou *et al.* 2015; Lichtenberger *et al.* 2015. 2015 campaign: Kalaitzoglou *et al.* 2022a. 2016 campaign: Kalaitzoglou *et al.* 2022b.

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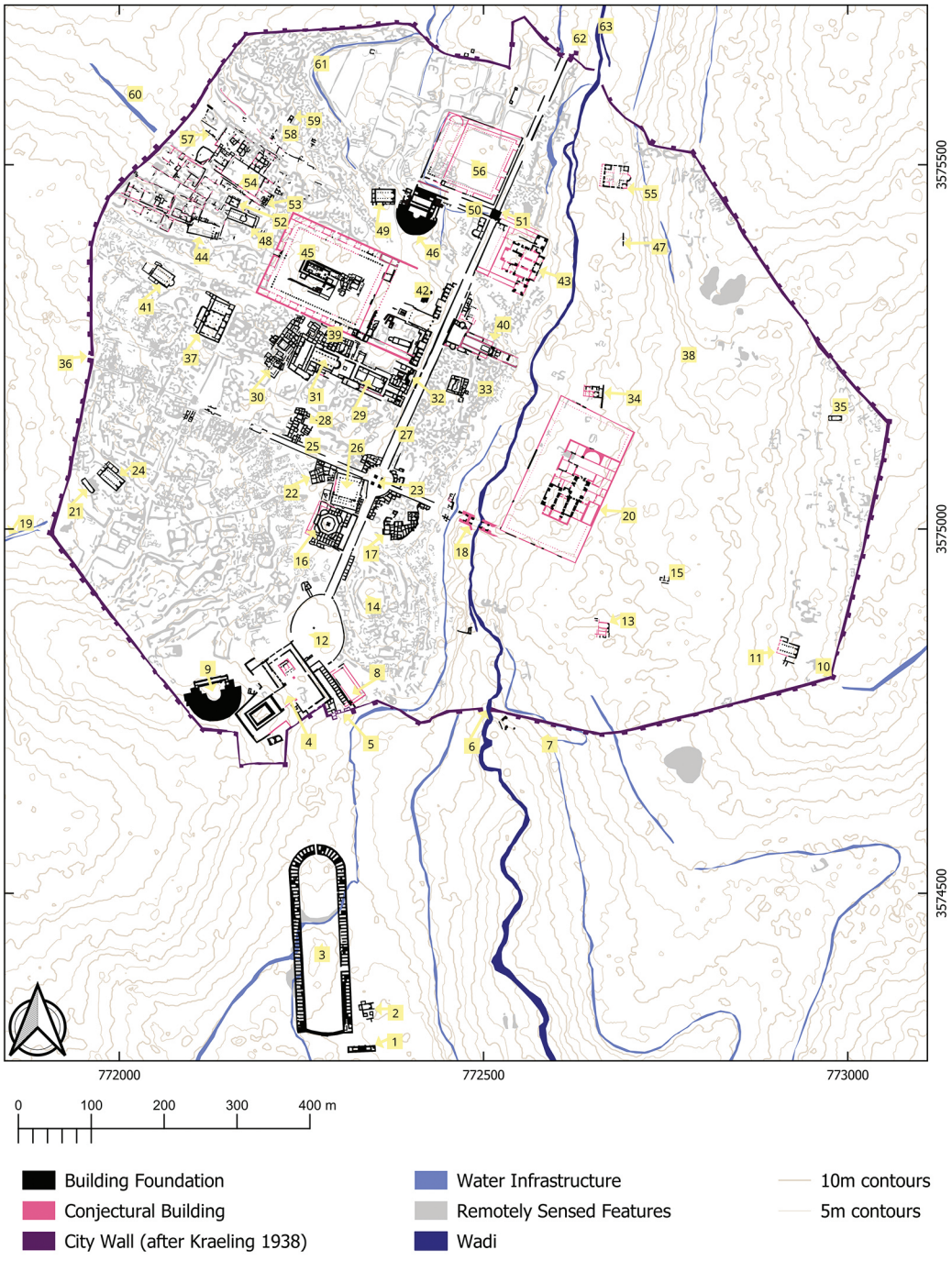
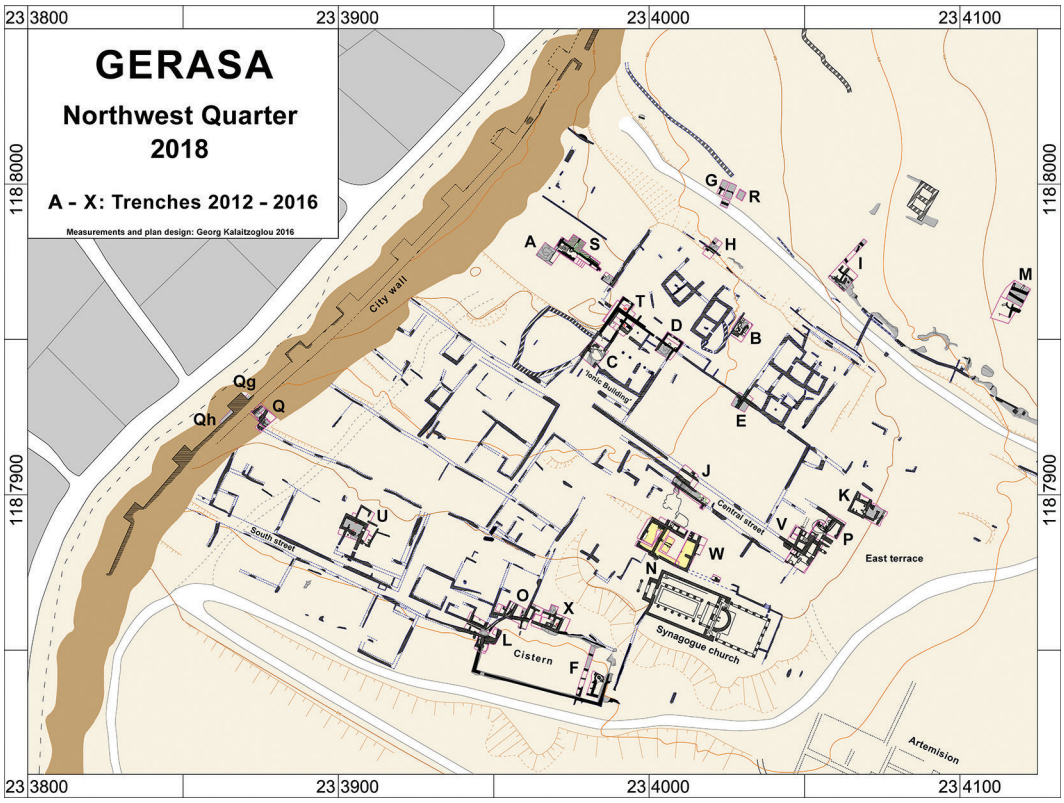


1. Map of Gerasa. © Danish-German Jerash Northwest Quarter Project.



2. Map of the Northwest Quarter. © Danish-German Jerash Northwest Quarter Project.

as well as the nature of the Middle Islamic settlement. The Northwest Quarter had only received little attention prior to the work of the Danish-German Jerash Northwest Quarter Project.[4] This is partly due to the fact that no noticeable structures were visible on the surface apart from the church, until recently called the Synagogue-Church (now Church of the Electi Justiniani), excavated by the Anglo-American team in the 1920s.[5] The most significant result of the project is the overview we have gained of the settlement history of this prominent area with little activity in the Hellenistic and Early Roman periods, the area's role in the water infrastructure of the city, the late-antique expansion, the gap of settlement after the AD 749 earthquake as well as the moderate resettlement during the Middle Islamic period. Some observations such as the investigation of the western extension of the North Decumanus have considerable impact on our understanding of the overall urban history of Gerasa. The project's work has been characterised by the implementation of high-definition methods drawn from the natural sciences. They have been integrated in the analyses of the project's material on all levels and have served, on the one hand, to create basic research baselines (*e.g.*, for pottery, metal, and glass), and on the other

[4] Clark and Bowsher 1986 for a short report on the soundings undertaken in the area during the Jerash Archaeological Project.

[5] Haensch *et al.* 2016; Lichtenberger and Raja 2018b. For the excavation reports relating to the so-called Synagogue-Church: Crowfoot 1929; 1931; 1938: 234–41; Crowfoot and Hamilton 1929.

hand, for understanding research questions focussing on, for example, much wider issues such as urban recycling and pollution.

Numerous of our findings from the excavations have been published over the years, and currently our final publications are well under way and will be published both in print and as e-books in order to make them as widely available as possible.[6] Since 2012, more than 100 publications have been published connected directly to the works of the Danish-German Jerash Northwest Quarter Project. A full bibliography listing all of these publications can be found at the end of this contribution. Since no comprehensive publication on Gerasa has been published since the volume edited by Kraeling in 1938, we have deemed it important to give open access to our raw data, and therefore we have emphasised publishing our material in open-access publications as well as sharing our data in online repositories.[7] Publications and results stemming from other missions' archaeological work have been incorporated and addressed within the framework of the project.[8] However, the work we have done has also shown the extreme challenges when working archaeologically in Jerash; one challenge is the fact that only few other archaeological projects have produced and published final publications. This remains a serious constraint and detriment to the further understanding of the site's development.

With the project we hope to have shown that highly important insights into the overall development of a site can be gained through focussed archaeological work done on a fairly small area, but through the application of the right methods and analyses as well as full quantification of the finds found in the excavations.

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[6] Lichtenberger and Raja 2020 and forthcoming. Further volumes include a monograph on the Middle Islamic ceramics (Peterson in preparation) as well as one on the Hellenistic to Early Islamic ceramics (Möller in preparation) and a final volume on the stratigraphy (Lichtenberger, Philippsen, and Raja in preparation). Also see a full bibliography from the project at the end of the contribution. An updated list of publications can always be found here: doi.org/10.6084/m9.figshare.12116286.

[7] Barfod *et al.* 2015; 2018; Lichtenberger and Raja 2015; 2017b; 2019b; 2019c; 2020c; Lichtenberger *et al.* 2015; 2019; Holdridge *et al.* 2017; Cresswell *et al.* 2018; Stott *et al.* 2018; Birch *et al.* 2019; Lichtenberger, Raja, and Stott 2019; Ting, Lichtenberger, and Raja 2019. Figshare data: data from the 2015 unfolding of silver scroll: doi.org/10.6084/m9.figshare.12136380.v1; data from the 2020 unfolding of silver scroll: doi.org/10.6084/m9.figshare.12145236.v1; geomagnetic data from the 2011 survey: doi.org/10.6084/m9.figshare.8277248.v1.

[8] Lichtenberger and Raja 2017a; 2018a; 2018c; 2019a; 2020b.

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Thomsen, K. 2019. "Urban Life in Jerash, Jordan: The Technological and Stylistic Development of Mortar, Plaster and Wall Paintings from Roman Times to the Middle Islamic Period from an Archaeological and Geoarchaeological Perspective." Ph.D. diss., Aarhus University.

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Ebeling, P. 2019. "The Roof-Tiles from the Excavations in the Northwest Quarter of Jerash." MA thesis, Westfälische Wilhelms-Universität Münster.

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Who Owns This Part of the Past? Protecting Tall al-ʿUmayrī's Cultural Heritage

Archaeological ethics cover a range of issues, interests, and intentions. Among these, the concern over "ownership" of archaeological sites is significant. While not always at the center of attention in archaeological ethics conversations which are often concerned about illicit excavations and the illegal trade in artifacts, ancient *Talls* and settlements hold high value as repositories of human cultural remains, without which modern scholarship would be unable to reconstruct much of the past.

Who "owns" these archaeological sites, this part of the past? Do they belong to private parties? To governments? To special-interest groups like foreign scholars? To the people of Jordan? To the world? Or is there some kind of formula one might utilize to parcel out degrees or levels of ownership within a tent full of vested stakeholders? This article will trace the history of sorting through the issue of the "ownership" of Tall al-ʿUmayrī, explore legal and economic dimensions to the discussion, and raise the major ethical issues surrounding responsibilities for "this part of the past" (Fig. 1).

Some might ask: What's the big deal? Why is this an issue? Why not simply negotiate and pay an annual rental fee? Why not dig and be gone? And, of course, publish before we perish? The answers to these questions have to do with the ethics of archaeological research which demand best practices in the "recovery, analysis, interpretation, preservation, and presentation of human cultural remains." Encapsulated within these marks of quotation is a multifaceted definition of archaeology which has emerged and expanded over nearly 45 years in the field. Decades ago, archaeologists could be quite satisfied with recovering, analyzing, and interpreting excavated material culture. But the notion of preservation developed traction as archaeologists and anthropologists recognized the moral obligation not only

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1. *Tall* with land-owner dividing line and arrow to Bisharat land at Site 84.

to dig up sites and artifacts, record and digitize records, run artifacts through rigorous and extensive lab analyses, process the hermeneutics undergirding our best efforts to understand function, and pursue the demanding and seemingly eternal steps toward publication of finds, *but also* to conserve, consolidate, restore, and preserve these remains for generations to come. Add to this the obligation to present the results of our research for professional and popular education in order to expand knowledge of our world, but also to serve as a preventive against the destruction and loss of global cultural heritage, and one begins to capture a more comprehensive definition of our marching orders if we hope to fulfill 21st century ethical imperatives.

The answers also reveal the at times ragged-edged intersection between: 1) protecting ancient cultural remains AND 2) protecting the property rights of modern land owners. Over the years of negotiating with land owners at Tall al-ʻUmayrī, this dual mantra has been pronounced and consistent (Mr. Bishara Bisharat, owner of the land on which Site 84 is located has no issues with archaeologists working on his land). Best practices in the modern world of the Middle East, grounded firmly on the bedrock of ethical principles of cultural heritage preservation and the ethical principles surrounding the rights of landowners, demand absolute adherence to these two requirements. And therein lies our dilemma.



2. Panel at January 2014 Tall al-ʿUmayrī event.

January 2014 Symposium

In January, 2014, at a symposium in the new Jordan Museum dedicated to sorting through the issues involved in, and hopefully working toward, solutions for the challenges we faced at Tall al-ʿUmayrī, and organized by Sharifa Nofa Nasser and myself, a distinguished panel of specialists and friends of Tall al-ʿUmayrī considered our options regarding one of the best preserved Bronze and Iron Age sites in the country (Fig. 2). Following a presentation of the major contributions of the Madaba Plains Project excavations at Tall al-ʿUmayrī to our understanding of these publicly under-represented period sites in Jordan's landscape, panelists approached the problems from a variety of perspectives, some very personal, others academic, ethical, and/or economic. For brief reports and a list of panelists, see the La Sierra University online news announcement[1] and the winter 2014 issue (2:1) of *La Sierra Digs*, the newsletter of the Center for Near Eastern Archaeology at La Sierra.[2]

Toward the end of the symposium, HRH Princess Sumaya bint El Hassan brilliantly articulated a vision statement about our responsibility for the preservation of archaeological sites, in particular Tall al-ʿUmayrī. Excerpts from her comments are as follows: (Fig. 3).



3. HRH Princess Sumaya at Tall al-ʿUmayrī event.

- "We cannot underestimate the urgency of acting now to save Tall al-ʿUmayrī from damage and destruction as Amman spreads inexorably southwards. And we must ask ourselves, how harshly will our descendants judge us if we fail to secure the imprint of so many millennia of history?"

[1] See https://lasierra.edu/article/jordan-museum-meeting-opens-door-for-saving-la-sierra-dig-site/.

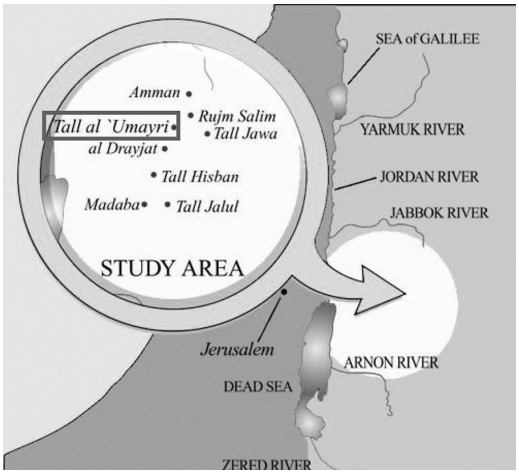
[2] See https://lasierra.edu/fileadmin/documents/cnea/newsletter/cnea-newsletter-winter-2014.pdf.

- "It is vital that we raise awareness now about Tall al-ʻUmayrī and its rich cultural heritage, for both local and foreign visitors. We owe it not only to ourselves to preserve this great historical resource, but also to the world. For this is a treasure that we act as custodians of for the benefit of all mankind."
- "We share our territory with the physical remnants of human ingenuity, of creativity and of a dogged determination to survive. But these abundant material remains of lost and faded communities are also impressive reminders to us that we occupy our part of the earth, not as outright owners, but as custodians."
- "I commend you all for your dedication to preserving and securing our national and global heritage. We must unite to ensure that we all become a small part of this site's long history, and not recorders of its demise."

The symposium concluded with public commitments from the two landowners of $700,000 each, as long as the government follows through with supplying the funds for the remainder of the purchase price. Unfortunately, nothing has materialized over the past two years to meet the financial challenge, leaving things without resolution.

Tall al-ʻUmayrī

Remarkable for the state of preservation of its architectural remains from across the Bronze and Iron Ages, Tall al-ʻUmayrī (Fig. 4) has made numerous important contributions to our understanding of Jordan between its prehistorical and classical periods. A summary of major finds includes the following:



4. MPP study area map.

- *Early Bronze Age*—Before the Early Bronze settlement in the middle of the 3rd millennium BC, the largest occupation area during the entire history of the site, nomadic groups buried their dead in megalithic dolmen structures, at least two of which are represented at Tall al-ʻUmayrī, one whose contents were completely preserved *in situ* (Fig. 5). Twenty-eight individuals were interred, including eight adults and 20 sub-adults, many suffering from various pathologies (osteomyelitis, arthritis, lipping, cribra orbitalia, dental abscesses, osteoarthritis, osteophytes, cancer/systemic diseases), metabolic disorders (anemia, osteoporosis), and injuries (fractures, breaks). Ongoing analyses include C-14 dating, aDNA (ancient DNA), and forensic facial reconstruction.
- *Middle Bronze Age*—Although only exposed on the western part of the *Tall,* the Middle Bronze Age is represented in the site's

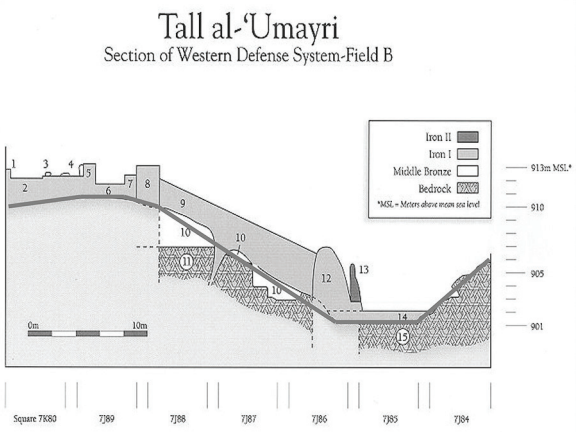


5. Early Bronze Age dolmen.

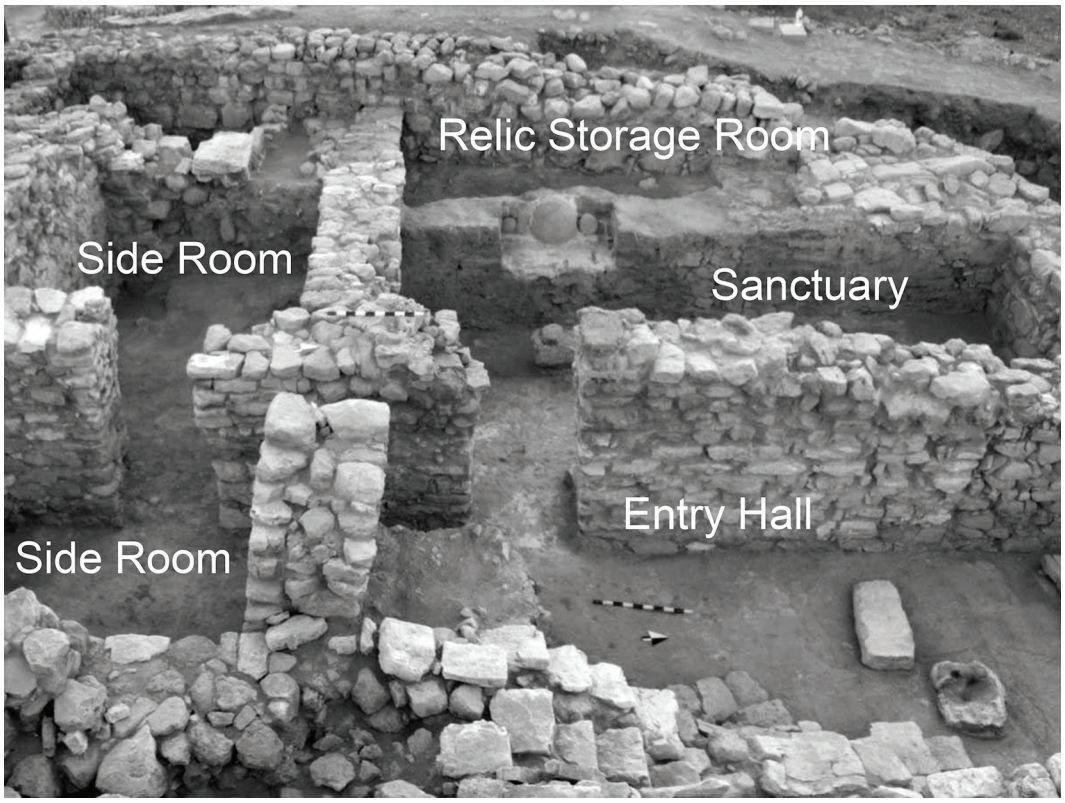
well preserved defense system, consisting of a 5 m-deep dry moat, a massive 35° rampart which rose 10 m and then crested at the top, along which line towers had been strategically placed (Fig. 6).

- *Late Bronze Age*—Characterized by limited settlements in the central highlands of Jordan, the Late Bronze Age nevertheless accorded Tall al-'Umayrī an extremely well preserved temple complex, complete with entry hall with standing stones, two adjacent rooms, the main sanctuary with an altar in front of a cultic niche containing five standing stones and various cultic implements, as well as a favissa for storage of a dozen crude clay figurines (Figs. 7–8).

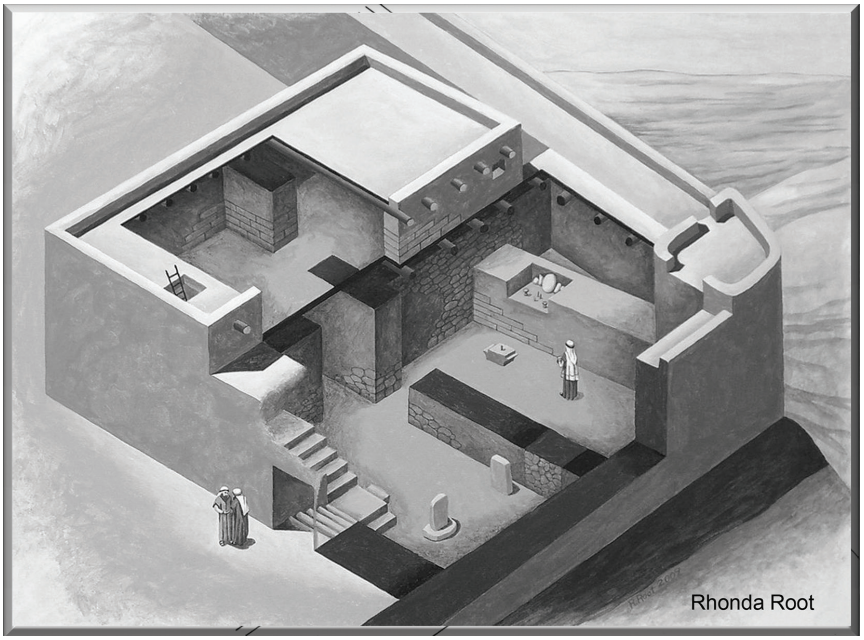
- *Iron Age I*—Thus far the signature period of occupation at Tall al-'Umayrī, the Early Iron Age produced the best preserved "four-room" or pillared house anywhere in the southern Levant, completely encased in the mudbrick destruction debris of the second story when it collapsed under violent conditions (Figs. 9–10). The structure was part



6. Middle Bronze Age defense system.



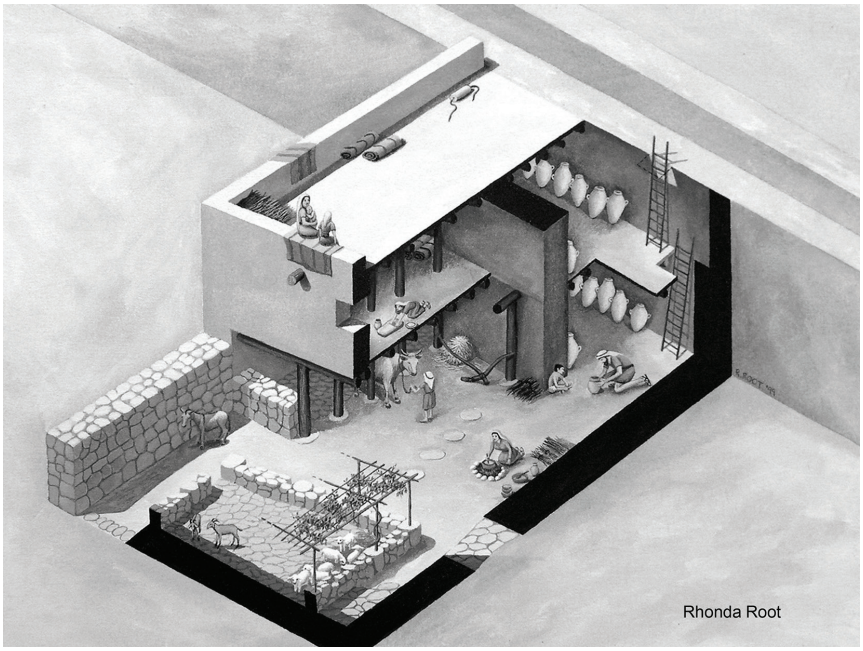
7. Late Bronze Age temple complex.



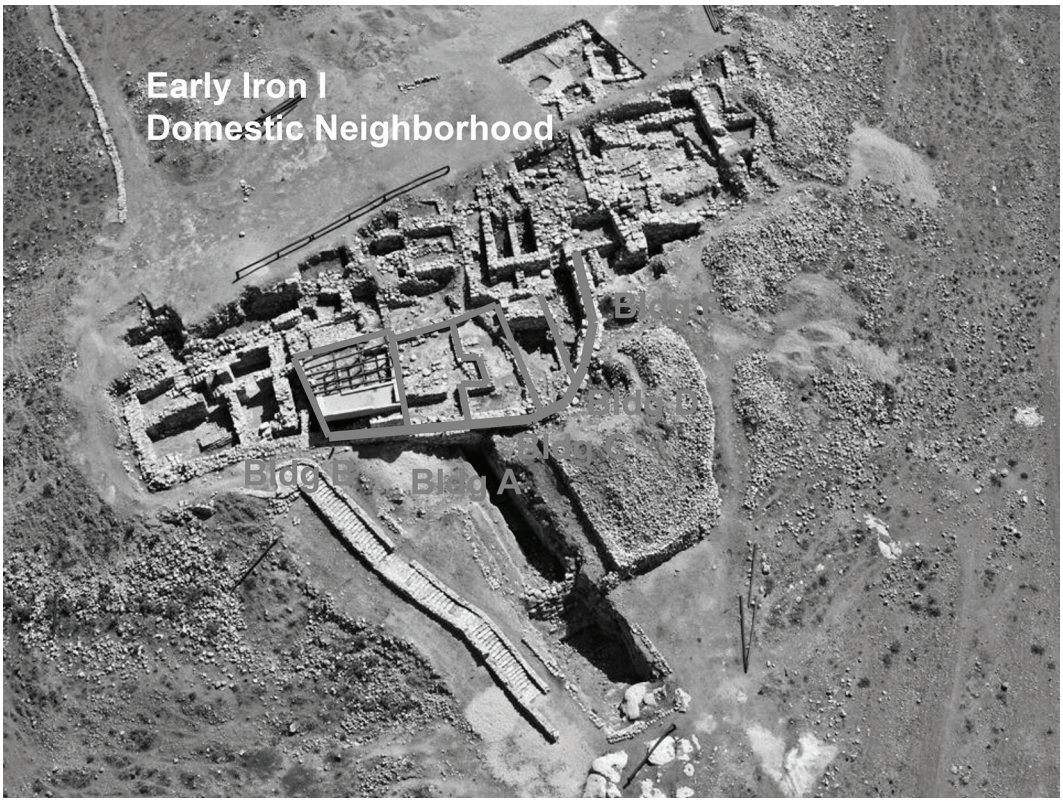
8. Late Bronze Age temple painting by Rhonda Root.



9. Early Iron I four-room house partially reconstructed.



10. Early Iron I four-room house painting by Rhonda Root.



11. Early Iron I western neighborhood.



12. Late Iron II Site 84 farmstead on Bisharat land.

of a larger western neighborhood of several houses excavated to this point, and the period was represented across the *Tall* (Fig. 11). A later "four-room" house, expanded beyond the typical four-room structural footprint, appeared mid-12th century, following a site-wide destruction.

- *Iron Age II/Persian Period*—Following diminished settlement activity during much of the Iron II period at Tall al-ʻUmayrī, a resurgence occurred in the late 7th century and early 6th. This period saw the construction of numerous domestic structures as well as a large administrative complex, likely controlling agricultural production at a series of farmsteads in the surrounding hinterland, including Site 84. Lying 2 km south of Tall al-ʻUmayrī, Site 84 encompassed a fortified farm building and scores of agricultural features necessary for the production of wine (Fig. 12).

- *Late Hellenistic Period*—On the southern edge of the *Tall's* acropolis was established an agricultural complex in the 2nd c. BC, complete with domestic and storage facilities.

American Legal and Ethical Standards

In responding to the ethical dilemmas surrounding the preservation of Tall al-ʻUmayrī, a wider perspective might help. Since the foreign partners of the Department of Antiquities in the excavation of Tall al-ʻUmayrī are North Americans, primarily from institutions located in the United States, we often look for parallels in our own country to the guidelines of Jordan. Here are citations of relevant legal guidelines from Hutt *et al.* (emphasis mine):

- The Historic Sites Act of 1935 (HSA) declared a "national policy to preserve for public use historic sites. . . of national significance for the inspiration and benefit of the people" (16 U.S.C. § 461).
- The Historic Sites Act delegates to the Secretary of the Interior the authority to survey historic and archaeological sites, buildings, and objects to determine which may possess "exceptional value as commemorating or illustrating the history of the United States" (16 U.S.C. § 462 [b]).
- The Secretary is also authorized to acquire, "by gift, purchase, or otherwise," nationally significant properties (16 U.S.C. § 462[d]; Hutt *et al.* 2004: 23).

Thus, there exist deep-seated moral obligations, grounded in American values, to preserve national heritage for the benefit of the people and the nation's historical priorities. However, United States guidelines do not grant collective ownership of antiquities to the citizens of the country; for the most part they privilege those who own the land in the removal and ultimate ownership of excavated materials (emphasis mine):

- Moreover, while the Act does make it unlawful "for any person or his agent or employee" to excavate archaeological sites on private land with the use of mechanical earth-moving equipment without a permit, [§ 18-6-11(A)] the Act does not require that a landowner "obtain a permit for personal excavation on his own land, provided that no transfer of ownership is made with the intent of excavating archaeo-

> logical sites as prohibited in this section, and provided further that this exemption does not apply to marked or unmarked burial grounds" [§ 18-6-11(E)]. This section has been interpreted to mean that NO PERMIT IS REQUIRED IF THE OWNER OF PRIVATE PROPERTY IS CONDUCTING THE EXCAVATION. . .
>
> - *Regulation of Cultural and Historic Resources on Private Land* With the exception of human burials and skeletal remains (see Section 2.1.2), regulation of CULTURAL RESOURCES ON PRIVATE LANDS PRESENTS A GREATER CHALLENGE than such regulation on state lands, primarily because of the friction between those who advocate broad application of private property rights and those who hold to the idea that cultural items found on the land are part of a national patrimony (Hutt *et al.* 2004: 78).

On another level, the role of UNESCO in preserving sites of historical and prehistorical significance is captured in this citation (EMPHASIS mine):

> - In 1976, UNESCO adopted its *Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas*. [www.unesco.og/culture/laws/historic/html_eng/page1.shtml] "Historic areas" were defined to include "historic and architectural (including vernacular) areas," such as "groups of buildings, structures and open spaces INCLUDING ARCHAEOLOGICAL AND PALEONTOLOGICAL SITES, constituting human settlements in an urban or rural environment, the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or sociocultural point of view are recognized"—presumably by some cognizant authority. The overall thrust of this recommendation is to encourage a sort of holistic planning and preservation; IT URGES THAT HISTORIC AREAS BE CONSIDERED IN THEIR TOTALITY, AS COHERENT ENTITIES, AND PROTECTED FROM FRAGMENTATION (King 2004: 210).

The holistic approach advocated in this citation sets out conceptual best practices for conservation efforts globally, and it speaks profoundly to efforts at Tall al-'Umayrī to preserve the site's material culture, its geographical setting, and the theoretical constructs by means of which we seek to understand it better.

However, there is also a caveat from American policy and practice (EMPHASIS mine):

> - Considering THE SANCTITY OF PRIVATE PROPERTY RIGHTS IN THIS COUNTRY [THE UNITED STATES], it is not surprising that UNESCO's recommendations about requiring people to report finds and confiscating stuff not declared have fallen on deaf ears. FOR THE MOST PART, U.S. ARCHEOLOGICAL LAWS AND REGULATIONS APPLY ONLY ON FEDERAL AND FEDERALLY ADMINISTERED TRIBAL TRUST LANDS AND TO SITUATIONS IN WHICH THE U.S. GOVERNMENT PROVIDES NONFEDERAL PARTIES WITH SOME KIND OF ASSISTANCE OR PERMITS (King 2004: 275).

American legal traditions and guidelines

capture, on the one hand, an extensive, comprehensive, and holistic vision of its national patrimony, anchored in the fundamental principle of universal value to all citizens of the country. However, they also hand over ultimate ownership of cultural heritage located on private property to landowners and not to the state.

Ethical Statements of Archaeological Organizations

While all archaeological organizations have adopted and publish the ethical principles under which they operate,[3] the institution most relevant for these discussions is the American Schools of Oriental Research, the premiere archaeological organization overseeing many of the excavations in Jordan through its Committee on Archaeological Policy (CAP); the Tall al-ʻUmayrī project has been CAP-affiliated from its inception. Here are segments of this policy (EMPHASIS mine):

Statement of ASOR Policy on Preservation and Protection of Archaeological Resources[4] *as passed by the ASOR Board of Trustees 18 November 1995; modified 22 November 2003*

I. Preamble

A. ASOR's policy is based upon and derived from the principle that ITS PRIMARY RESPONSIBILITY IS ONE OF STEWARDSHIP OF THE ARCHAEOLOGICAL RECORD. STEWARDS ACT AS BOTH CARETAKERS AND ADVOCATES. The archaeological record consists of ARCHAEOLOGICAL SITES, archaeological collections, records, and reports. IT SHOULD BE USED FOR THE BENEFIT OF ALL PEOPLE, and not be treated as a commodity to be exploited for private enjoyment or profit. ASOR AND ITS MEMBERS WORK FOR THE PERPETUAL PRESERVATION AND PROTECTION OF THE ARCHAEOLOGICAL RECORD, and actively promote public understanding and support for these goals.

II. Preservation of Sites

Archaeological sites are a non-renewable resource, each containing unique information about the human past. THE LOSS OF SITES PRESENTS PART OF THE WORLD'S CULTURAL HERITAGE THAT CAN NEVER BE RECOVERED.

A. THERE IS AN URGENT NEED WORLDWIDE TO DOCUMENT THE ENDANGERED ARCHAEOLOGICAL RECORD BEFORE IT IS LOST FOREVER. ASOR supports and encourages its members to undertake efforts to document the archaeological record through surveys, inventories, and other means.

B. DIRECTORS OF EXCAVATIONS SHOULD PLAN FOR APPROPRIATE POST-EXCAVATION SITE PROTECTION IN THEIR INITIAL RESEARCH DESIGNS. Such plans must take into account the natural conditions affecting the site and the demands of

[3] For example, Archaeological Institute of America Code of Ethics (https://www.archaeological.org/sites/default/files/files/Code%20of%20Ethics%20(2016).pdf) and Professional Standards (https://www.archaeological.org/sites/default/files/files/Code%20of%20Professional%20Standards%20(2016).pdf); American Anthropological Association (http://www.americananthro.org/ParticipateAndAdvocate/Content.aspx?ItemNumber=1656); Society for American Archaeology (http://www.americananthro.org/ParticipateAndAdvocate/Content.aspx?ItemNumber=1656).

[4] Visit http://www.asor.org/excavations/policy.html, but also see: http://www.asor.org/about/policies/conduct.html.

multiple uses.

C. Unplanned development poses a threat to archaeological sites worldwide. ASOR encourages a partnership among governments, archaeologists and developers to make and execute proper plans to preserve the archaeological record. ASOR urges the United States government, UNESCO, and the United Nations to play a leadership role in efforts to protect the world's cultural heritage from unnecessary destruction through development.

These ethical guidelines focus on the moral obligation of stewardship over the archaeological record we are investigating. This is particularly true, in the cited sections, of archaeological sites, of the urgent need to carry out research before sites disappear or are destroyed, of the pressing demand to preplan site protection following excavations, and of the collaborative, growing international imperative of protecting sites from "unnecessary destruction through development." Tall al-'Umayri qualifies on all scores.



13. Department of Antiquities of Jordan logo.

Antiquities Laws of Jordan

While supplemented occasionally, the primary legal formulation of regulations concerning antiquities in Jordan (Fig. 13) appears in: "Law No. 21 for the Year 1988—The Law of Antiquities—Definitions and General Provisions."[5] From this document, the following excerpts relate to antiquities sites (emphasis mine):

Article 2

The following words and terms set out in this law shall have the meanings assigned to them below unless the context denotes otherwise.

7. Antiquities:

a. Any movable or immovable object which was made, written, inscribed, built, discovered or modified by a human being before the year AD 1750 including caves, sculpture, coins, pottery, manuscripts and other kinds of manufactured products which indicate the beginning of the development of science, arts, handicrafts, religious traditions of previous civilizations, or any part added to that thing or rebuilt after that date.

8. Antique site:

a. Any area in the Kingdom that was considered an historic site under former laws.

b. Any other area that the Minister decides that it contains any antiquities …

9. Immovable antiquities:

[5] Online source currently unavailable on the Department of Antiquities website: doa.gov.jo. Also see updated regulations for excavations in Jordan (effective 1 January 2016) at: http://doa.gov.jo/en/Uploads/Regulations_Eng.pdf.

> These are FIXED ANTIQUITIES THAT ARE CONNECTED TO THE GROUND whether built on it or existing underground including antiquities underwater, and those in territorial waters.

Article 3

a. THE DEPARTMENT will carry out the following:
   2. The APPRAISAL OF THE ARCHAEOLOGY OF OBJECTS AND ANTIQUE SITES AND EVALUATION OF THE IMPORTANCE OF EVERY PIECE OF ANTIQUITY.
   3. The administration of antiquities, ANTIQUE SITES and antique protectorates in the Kingdom, THEIR PROTECTION, MAINTENANCE, REPAIR AND PRESERVATION, BEAUTIFICATION OF THEIR SURROUNDINGS AND DISPLAY OF THEIR FEATURES.
   4. The SPREAD OF ARCHAEOLOGICAL CULTURE and the establishment of archaeological and heritage institutes and museums.

Article 5

a. OWNERSHIP OF IMMOVABLE ANTIQUITIES SHALL BE EXCLUSIVELY VESTED IN THE STATE. No other party may own these antiquities in any way or challenge that states right to such ownership by delay or any other means.
d. THE OWNERSHIP OF THE LAND WILL NOT ENTITLE THE LANDLORD TO WON [OWN?] THE ANTIQUITIES PRESENT ON ITS SURFACE OR IN ITS SUBSURFACE OR DISPOSE THEREOF NOR SHALL IT ENTITLE HIM TO PROSPECT FOR ANTIQUITIES THEREIN.
e. IT IS PERMISSIBLE TO APPROPRIATE OR PURCHASE ANY REAL ESTATE OR ANTIQUITIES WHICH THE DEPARTMENT INTEREST REQUIRES THE APPROPRIATION OR PURCHASE THEREOF.

While Jordanian antiquities laws resemble those of other countries, including the United States, particularly in this context in the enlarged conceptual framework of value to the entire country, even if not as clearly stated, the major, and I would say extremely positive, point of departure is the clear sense that private ownership of property in Jordan carries with it absolutely no privileges of ownership of cultural remains, moveable or immoveable, found thereon or therein. And it is precisely at this intersection of antiquities laws with property laws that questions about the ultimate survival and protection of Tall al-ʻUmayrī reside.

Who owns this part of the past? Is it private landowners/developers who plan to sell lots for construction of new homes or businesses, who see archaeological activity as devaluing their investments? Or is it the people of Jordan whose national patrimony is embedded in this *tall*? And how do we come to a resolution which protects both cultural heritage and landowners?

The Stakeholders

The continuing quest to unpack, sort out, and resolve these questions takes us to the many and multifaceted layers of stakeholders whose time-honored investments in this issue are deep and extensive:

- *The Hashemite royal family*—They are the guardians of the cultural resources of the Kingdom, some (HRH Prince Hassan bin Talal

and HRH Princess Sumaya bint El Hassan, in particular) with long-term personal interest in the MPP-ʻUmayrī excavation results and plans for conservation and presentation of the site.

- *Parliament*—They carry legal responsibility for protecting and preserving Jordan's considerable cultural heritage.
- *Ministry of Tourism and Antiquities*—Theirs is the responsibility, for moral and economic reasons, of protecting and presenting Jordan's cultural heritage to Jordanians and the wider world.
- *Department of Antiquities (DoA)*—They are tasked with the primary responsibility of ensuring best practices in the recovery and protection of Jordan's cultural heritage.
- *Amman Region of the DoA*—They have been given specific responsibility for the DoA's interests in the region of Amman.
- *Madaba Region of the DoA*—They provide the repository for artifacts excavated in the Madaba region, including the Madaba Plains Project site of ʻUmayrī and are in the process of establishing a regional museum where ʻUmayrī's finds will be displayed.
- *Greater Amman Municipality (GAM)*—The municipality includes Tall al-ʻUmayrī within its borders and has long been interested in this site along the Airport Highway as the southern archaeological gateway into Amman.
- *Land owners*—Theirs represents the major financial investments in the land of Tall al-ʻUmayri for family and economic reasons.
- *Bunayat families*—They represent the labor force at Tall al-ʻUmayrī and earn income for the village of between $5,000 and $7,000 per season (*ca.* $100,000–$125,000 since 1984), and are now far into the second generation of workers at the project. From their stories has grown an ethnographic study: Community Ethnographic Project at Tall al-ʻUmayrī.[6]
- *Jordanians*—They enjoy economic benefits from each season ($50,000–$60,000/season, with an estimate of $900,000 since 1984); they also carry moral responsibility for the country's cultural heritage. And for the thousands who visit Amman and Ghamadan national parks each week during the summer, who can also stop by Tall al-ʻUmayrī since it is located between them, the site provides an immersive educational experience as a living source of information on the under-represented Bronze and Iron Ages in Jordan (Fig. 14).

- *Archaeologists working at Tall al-ʻUmayrī*—Theirs is the scholarly and moral responsibility to recover, analyze, interpret, preserve, and present findings according to best practices.
- *Archaeologists working in Jordan*—They all provide collaborative and mutual support for the joint archaeological endeavors we undertake in Jordan.
- *The world*—The people of the globe are beneficiaries of our contributions to the growth of knowledge and the responsible use and protection of Jordan's cultural heritage.

These stakeholders—the royal family,

[6] See: http://www.madabaplains.org/umayri/cepu.htm.



14. Tall al-ʻUmayrī, between Amman and Ghamadan National Parks.

governmental ministries and departments, educational institutions, local communities, regional populations, and global entities—form a powerful coalition of the ultimately concerned. What happens to Tall al-ʻUmayrī affects them all, affects us all. It is not the only Jordanian archaeological site impacting numerous overlapping and interfacing circles of interest and influence, but it is one of them, and for our purposes in this presentation, the focal point of our attention which might make a difference for other "immoveable" archaeological treasures in the country.

Not only a coalition of the ultimately concerned, these stakeholders also represent a potential collision of vested interests. Possible contact points of success or failure include gain or loss for private owners, archaeological research, tourism, educational institutions, in terms of local economies, and among other sites constituting the country's national patrimony.

Next Steps

History, we hope, will come down on the side of cautious collaboration. Nothing happens in the context of complicated issues like this one without shared commitments to resolving the problems. We are all friends. We are all dedicated to finding some kind of resolution that: 1) preserves the cultural heritage of Tall al-ʻUmayrī and 2) protects the interests of landowners. What

we lack are the resources to purchase the land and place its title into the hands of the Department of Antiquities.

Over time several options have emerged for generating the necessary revenue for a transaction of this nature. If we could prioritize them, our list would begin with an outright purchase of the property, which is becoming more expensive by the year, a purchase involving perhaps the Ministry of Tourism and Antiquities, the Department of Antiquities, the Greater Amman Municipality, perhaps with the help of international donors. But we have also discussed government land trades as part of a workable arrangement. And landowner donations, which have already been pledged. In the end, successful action will likely involve some combination of these possibilities.

Two undesirable options include maintaining the status quo, which is unsustainable and costly with no long-term benefits to landowners and perpetual uncertainty for excavators, and expropriation of the land which carries legal limits as well as negative diplomatic outcomes.

In the context of *ICHAJ* 13 in May of 2016, two deadlines loom. Landowners set 31 December 2016 as the time for negotiations to close. The Madaba Plains Project excavation leadership has said that 30 June 2017 represents the final date before which we need to make other plans if Tall al-ʿUmayrī is no longer available to us. It is impossible for us to maintain focus on responsible research goals when we are not allowed to excavate on major parts of the *Tall* and when we do not know what to expect for the next season.

Of course, anything is possible and the optimist in all of us continues to hold out hope. In spite of the potential for bleak outcomes, we maintain hopeful openness to:

- Ongoing excavations at one of the best preserved Bronze and Iron Age sites in the country
- Development of the Raouf Abujaber Archaeological Park as an enjoyable, immersive educational center



15. The 2016 excavation team at Tall al-ʿUmayrī.

for citizens of Jordan, especially Amman, and foreign visitors
- Creation of the southern archaeological gateway into the Greater Amman Municipality
- Satisfaction that we have been good custodians of the considerable cultural heritage of Jordan represented at Tall al-ʻUmayrī
- Satisfaction that we have been honest and fair with those long privately invested in the land (Fig. 15)

Acknowledgements

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16. Sponsors and supporting organizations.

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For more information on Tall al-ʻUmayrī, see volumes 1–6 of the preliminary reports, *Madaba Plains Project-ʻUmayrī*, published by Andrews University Press in Berrien Springs, MI, and seasonal reports in the *Annual of the Department of Antiquities of Jordan* and *Andrews University Seminary Studies*.

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SCHEP Workshop: Sustainable Cultural Heritage Through Engagement of Local Communities Project

Workshop Overview

This panel-based session provided an overview of the USAID Sustainable Cultural Heritage Through Engagement of Local Communities Project (SCHEP), implemented by the American Center of Oriental Research (ACOR; now the American Center of Research). USAID SCHEP has developed a number of innovative approaches to cultural heritage through the engagement of local communities over the past four years. A special focus was made on community engagement and site stewardship models, which have been integral to SCHEP and its activities at sites in Jordan. Through a focus on four case studies of SCHEP-affiliated projects: the Umm al-Jimāl Archaeological Project, the Community-Based Rock Art and Epigraphic Recording Project in Wādī Ramm, the Mādābā Regional Archaeological Museum Project, and the Temple of the Winged Lions Cultural Resource Management Initiative in Petra, this session presented an overview of the key aspects of SCHEP and its main activities and achievements primarily between 2014–2018, including its role in training and capacity-building, job creation, community and stakeholder

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Amman: Department of Antiquities, 2022

engagement, site conservation and interpretation, educational awareness, and the development of sustainable tourism and economic opportunities within local communities. A series of panelists and co-panelists presented on each case study, which was followed with questions and discussions. A key aim of the session was to raise awareness of the project's unique, multi-level model, and to review its successes and challenges for the benefit of future projects.

The SCHEP Community Engagement Model (Nizar Al Adarbeh)

Jordan hosts a vast number of archaeological sites that are important cultural heritage resources (CHRs) for the country. These CHRs could have substantial tourism appeal if properly developed using a sustainable preservation model that ensures their viability as long-term resources for Jordan. Implemented by ACOR, USAID SCHEP aims to engage local communities in sustainable site preservation, management, and promotion as a way to both enhance the management of Jordan's CHRs and to create opportunities for economic growth. Through funded field projects across Jordan, SCHEP and its partners demonstrated the substantial benefit of community engagement at nine pilot CHR sites during its first phase of implementation, from 2014 to 2018.

SCHEP fostered a collaborative environment with key local partners, including the Department of Antiquities, Petra Development and Tourism Region Authority, and the ʻAqaba Special Economic Zone Authority, to strengthen the role of communities in preserving cultural heritage. The following sections will highlight the key areas of community engagement that form overall SCHEP Model. This is demonstrated also in the four projects presented in this session, which highlight different case studies and approaches to site preservation and development through community engagement.

Site Development

SCHEP selected diverse CHR sites to serve as the base for site development activities focused on engaging local communities. Across the country, nine sites were chosen: Karak, Busayra (Ṭafīla), Umm al-Jimāl (Mafraq), Bīr Madhkūr (Wādī ʻArabah), the Temple of the Winged Lions (Petra), Bayt Rās (Irbid), Wādī Ramm, Ayla (ʻAqaba), and Mādābā (Fig. 1). SCHEP partnered with pre-existing CHR projects at some sites to ensure the effectiveness and sustainability of interventions in addition to establishing new ones in collaboration with local and international partners. The sites were chosen in part due to their diversity in terms of location, accessibility, size, etc. By working with a wide variety of sites, SCHEP confirmed that there is no one standard model to be followed to preserve, protect, and promote heritage sites with the direct involvement of the surrounding communities; however, engagement of these communities in such projects is indispensable.

Community members worked with the CHR projects in all aspects of site preservation, development, presentation, and



1. A map showing the SCHEP nine associated CHR sites.



2. Local community members in Umm al Jimāl help to clear new pathways throughout the archaeological site as part of the Umm al-Jimāl Project. Photo courtesy of USAID SCHEP.



3. Participants in the Archaeological Surveying Diploma—Phase IV. Photo by Zaid Kashour.

interpretation, which all have been combined with hands-on training programs (Fig. 2). Although specific forms of intervention necessarily varied from site to site, the ultimate goal was to ensure that each site was able to reach its potential as a destination for education, exploration, and community-building, in addition to enhancing its readiness to receive visitors and eventually contribute to the development of the local economy.

Capacity-Building

In partnership with its affiliated projects as well as CHR institutions, universities, and others, SCHEP offered a wide range of capacity-building opportunities for both local community members and cultural heritage sector employees. The aims of the capacity-building program were to foster career development and better employment outcomes, strengthen the cultural heritage sector on the whole, and ensure transfer of knowledge from international experts to those doing work on the ground.

By conducting needs assessments, evaluating past projects, and holding conversations with stakeholders, SCHEP's training courses and workshops targeted areas that needed strengthening or new skills that were lacking. In its first four years, SCHEP conducted more than 20 training programs in key areas of cultural heritage, including documentation, conservation, interpretation, management, museum studies, and tourism development, benefiting more than 300 community members and cultural heritage professionals (Fig. 3).

Job Creation

Many of Jordan's CHRs lie in economically under-served areas. Sustainable development of these CHRs could help to grow local economies by creating new opportunities for revenue and employment. Seizing on this potential, SCHEP-



4. Local community members work on site development in Ghawr aṣ-Ṣāfī. Photo by Barbara A. Porter.

supported projects and companies helped generate 300 job opportunities, including 134 opportunities for those living in poverty pockets or areas with high concentrations of refugees. SCHEP and its partners made sure that many of these opportunities went to women, aiming to increase women's participation in the cultural heritage sector and in the workforce overall. As detailed further below, SCHEP has also helped community members to establish heritage and tourism companies and supported them to become self-sufficient and sustainable sources of employment for local community members (Fig. 4).

Tourism and Economic Development

In order to ensure sound and sustainable development of SCHEP CHR sites, enhance marketing and promotional efforts, and strengthen the mobilization of local resources towards tourism development, SCHEP supported the establishment of four local Micro and Small Enterprises (MSEs) at SCHEP sites (Fig. 5). In ʻAqaba, Busayra, Ghawr aṣ-Ṣāfī, and Umm al-Jimāl, former SCHEP partners and site stewards are now leading their own initiatives, aiming to help manage local CHRs, develop tourism products and experiences, attract new visitors, and provide income and employment opportunities for their communities.

As part of the effort to achieve sustainable growth in tourism to its nine supported sites and to ensure that they are included on the national tourism map, SCHEP has also worked with organizations like



5. Logos for the four MSEs established with the support of USAID SCHEP.



6. Awareness activity with handicapped youth in Wādī Ramm, World Tourism Day 2017. Photo by Yusuf Ahmad.

the Jordan Inbound Tour Operators Association (JITOA) and Jordan Tourism Board to introduce tour operators to the lesser-known sites and produce materials that introduce curious visitors to what they have to offer. The project also offered training on site promotion, offering local stakeholders the knowledge and skills they need to turn their local sites into national and international destinations.

Awareness

SCHEP works with communities to foster pride and a close relationship with nearby CHRs through awareness and education activities. Under the SCHEP "Generations for Heritage" (#Generations4Heritage) Awareness Program, the project focused on raising awareness of youth and students near SCHEP sites and other CHRs by conducting workshops, site visits, and lectures that promote the value of cultural heritage. SCHEP engaged more than 6,000 students in awareness and education activities, including a series of interactive workshops for schools using hands-on learning activities, such as field visits to archaeological sites, visiting museums, mending broken modern pottery, making mosaics, and identifying and reading ancient inscriptions (Fig. 6). SCHEP engaged multiple stakeholders in awareness activities, including the Ministry of Education, Madrasati Initiative, the Children's Museum, and Jordan Friends of Archaeology and Heritage Society (FOAH), with the active participation of the CHR institutions, SCHEP team members, and Site Stewards in conducting the activities.

CHRs Institutional Development and Knowledge Sharing

SCHEP is working towards embedding its results within official structures and organizations to ensure information transfer and enhance the institutionalization of knowledge and practice. In this capacity, SCHEP helped to develop several important policies and guidelines to guide the Jordanian heritage sector toward sustainability, self-reliance, and engagement of local communities at all levels. Over the project's first four years, SCHEP created a list of general best practices for site management, helped compile Archaeological Site Usage Guidelines, contributed to the development of Petra's Integrated Site Management Plan, and provided other institutional support for the CHR sector. Finally, SCHEP

brought together sector stakeholders to initiate the development of a new, holistic Archaeological Heritage Strategy for Jordan for the coming years.

Conclusion

SCHEP's model for community engagement has proven its effectiveness in enhancing the work of the heritage sector and shown how CHRs can be managed more sustainably, contributing not only to the archaeological body of knowledge, but also to genuine local economic development which fosters employment, job creation, and poverty alleviation. A key lesson learned from the first four years of SCHEP is that community engagement is not a fixed model nor made up of rigid or strict components, but rather an adaptive and customizable approach that must be based on the specific nature of sites, communities, and other core factors. Moreover, a sustainable engagement model should be enhanced through working from the bottom-up as well as from the top down. This approach was demonstrated well during the first phase of USAID SCHEP, and can be the answer to guiding future projects toward more sustainable outcomes. The SCHEP team looks forward to learning from the experiences of the first four years and continue working on the new phase until 2022.

The Site Stewards Model (Jehad Haron)

Introduction

In this paper I will present the experiences of USAID SCHEP in developing its novel approach to site stewardship in Jordan. The model developed by the project has been applied in some other countries with different levels of engagement. The Site Stewards play a critical role in SCHEP due to their continuous presence at the sites and their deep engagement at the local community level. While Site Stewards fulfill roles and duties that are specific to their respective sites, they all work towards the overall goals of protecting, preserving, and promoting SCHEP sites in their host communities. Under the employment of SCHEP and its affiliated project directors, and in coordination with the SCHEP team, the Site Stewards fulfill the aims of both local sub-grantee projects and broader SCHEP objectives. With support from their project directors and the SCHEP team, the Site Stewards are entrusted with protecting CHRs for future generations.

Coordination Among Stakeholders

Site Stewards interface with various community, national, and international stakeholders to promote coordinated efforts and cooperation. Stakeholders may include, but are not limited to: the project director and his/her team, the SCHEP team, the Jordanian Department of Antiquities (DoA), academic researchers, municipalities, public and private schools, cooperatives, non-governmental and semi-governmental organizations, local businesses, and other associations. So far, SCHEP has successfully recruited 15 Site Stewards, distributed across the nine project sites.

The Role of the Site Steward

In the SCHEP model the below set of actions were carried out by the project Site Stewards:

- Act as the point of contact for SCHEP team and others in planning visits and meetings related to the site in host communities.
- Tell the story of the site based on the project directors' site narrative, conveying the site's history, significance, and potential.
- Convey information about archaeological work at the site, SCHEP, and other topics.
- Encourage all visitors to protect the site's cultural and natural integrity.
- Communicate with visitors in

Arabic and English.
- Provide information about available facilities and services (*e.g.*, restaurants and restrooms).
- Monitoring: the Site Steward is also required to report vandalism and other damage to the site's integrity (*e.g.*, degradation due to natural causes) to the project director, SCHEP, a DoA point of contact, and any other relevant parties.

Their role does not exceed the above actions in order to avoid any overlapping with other field key players.

Community Outreach

Working within local communities is not an easy task, especially if the work is related to preserving the cultural heritage surrounding these communities. This difficulty is due in part to the lack of any direct relationship between these communities and the archaeological sites that are in their surroundings. Such connections may be lacking for many reasons, such as a lack of in-depth awareness about the sites, in addition to the absence of any material benefit from preserving them. On the contrary, in some cases the presence of the archaeological site is a burden on the local population. Hence, SCHEP Site Stewards were chosen from among the rural or under-served communities living around the project's affiliated heritage sites. The site steward role proved critical to helping establish a relationship with the community, engage members of communities around and near SCHEP sites to encourage their participation in the project, raise awareness about local cultural heritage resources, and conduct events such as informational meetings, lectures, site visits, clean-up campaigns, and other activities. Such activities target children and youth especially, utilizing educational modules and curricula when available.

Capacity-Building

Various capacity-building courses have been customized to fulfill the needs of the Site Stewards to enhance their capabilities and ensure knowledge transfer, including:

- General courses (intro to the legal context, English language, management, tourism promotion and communication).
- Customized technical training in varied topics based on the site type (*e.g.*, conservation, world heritage site management, documentation, etc.).
- Field visits to some selected success examples in cultural and tourism sector, the aim was to expose the site stewards to other experiences.
- Participating in national conferences linked to cultural and tourism activities.

Conclusion

One of the most challenging issues that faced the archaeological project directors was the need to extend their projects' duration. Most of them committed to grant agreements with firm deadlines, but due to their commitments abroad they had to work on a seasonal basis, and this affected their achievements and work progress. Our model bridged this gap through finding qualified local people like the Site Stewards who could take over the project director's role on the ground, while the directors themselves could still oversee their work from abroad. In this way, the project meets deadlines and avoids major delays. This practical model was tested among SCHEP's nine affiliated sites, and we can claim successes in implementing this model, especially in Umm al Jimāl, Bayt Rās, and Mādābā. This applied model for site stewardship is the first of its kind in Jordan and we hope it will be generalized across Jordan and beyond, especially in remote communities and

around endangered archaeological sites. We believe that adopting the Site Steward model from the government's side would have a positive impact on the protection of many archaeological sites in Jordan.

Signage Manufacture at Umm al-Jimāl: Creating a Microbusiness for Vandalism-Resistant Installations (Bert de Vries)

Developing Signage Production at Umm al-Jimāl (UJ)

The production and installation of 33 signs for the UJ Interpretive Trail by the Umm al-Jimāl Archaeological Project (UJAP) through two grants by SCHEP helps provide visitors with answers to the question, "How did they live?" By June 2016, 20 signs had been installed. Production of these signs included training a local team in the design and production of (1) the graphic images, including the writing of text in English and Arabic, creating and editing photographs and graphics, and effective layout; (2) durable steel frames produced locally; (3) display panel printing by a Mafraq advertising firm; and (4) assembly of all components. All display panels were vetted and approved by the Department of Antiquities. Assembly and installation of the first twenty signs was done by a local team overseen by UJAP field director, Muaffaq Hazza (Fig. 7).

The signage development was financed by SCHEP's first-phase grant to UJAP.[1] The outcomes included the completion of the eastern portion of the Interpretive Trail and establishment of an experienced signage production team based at Umm al-Jimāl.



7. First generation sign, "Construction Techniques," installed summer 2016. Photo by Bert de Vries.

Monitoring and Evaluation

Study of signage performance at major sites in Jordan led to the conclusion that all signage systems failed within three years because usually the installation of new signs was considered the final step; there was no follow-up funding and staffing for maintenance. Therefore, UJAP decided that an Umm al-Jimāl signage system could succeed only with an annual maintenance and repair plan. For that UJAP implemented monitoring and evaluation of the twenty signs installed by in May 2016. Fortunately, this process could be incorporated in the resumption of SCHEP stage two grant renewal in March of 2017 along with the completion of the western portion of the trail and the remaining thirteen signs. The year of monitoring produced the following results:

- Adequacy of the steel frames—the steel frames proved durable, but the

[1] The design team included: concept design, UJAP Team; text development, Elizabeth Osinga, Paul Christians, Jenna Morton, and Bert de Vries; photographs, Jeff DeKock, Bert de Vries, and Paul Christians; graphic design, Jeff DeKock and Paul Christians of Open Hand Studios; frame design, Na'il Aqil and Muaffaq Hazza; frame manufacture, Na'il Aqil; sign assembly and installation, Muaffaq Hazza, Ali Aqil, and local site management trainees; Arabic translation, Abdullah al-Khdeer.

display panels were too horizontal, which proved problematic because: (1) the displays were difficult to view, and (2) windblown dust accumulated on the plexiglass covers. Solution: angle panels more vertically for improved visibility and better sustained cleanliness.

- Natural wear and damage—south-facing signs suffered splitting of the graphic printed on the plastic film. Solution: reorient signs at point of installation.
- Moisture and sand under the plexiglass—flexibility of stainless-steel lock-in wrap sealing was not adequate to prevent moisture and sand entry in rain and wind. Solution: a more waterproof lock-in frame in place of the stainless-steel wrap.
- Colorfastness of the printing—under plexiglass the colors and ink density remained stable without fading. Exposure without plexiglass (removed after vandalization) resulted in fading after several months. Conclusion: colorfastness on the plastic film is very good if sign damage can be prevented.
- Durability of the stainless-steel wrap and sealants—this wrap proved durable and impervious to the elements but was inadequate for protecting the plexiglass and for locking in a waterproof sealant. Solution: switch to a steel frame cover that is more rigid and easily removable for maintenance of the display panel.
- Vandalism was by far the worst cause of damage. Shortly after installation, people attacked the plexiglass with rocks (Fig. 8). Over the two-year life of this signage, 60% of the covers were completely gone and survive only in the immediate vicinity of House 119. In a third of the signs the plastic film was ripped away. While 19 of the frames remained securely, the 20th was tumbled on its side. Solution: include greater durability in the redesign and lobby for increased site security.



8. Vandalized first-generation sign. Photo by Bert de Vries.

Redesign Manufacture and Installation of All 33 Signs

The 20 signs were removed and their frames redesigned for a more vertical angle, and with an improved lock-in cover as demonstrated by Muaffaq Hazza (Fig. 9). The plexiglas specification was upgraded from 3 to 5 mm thickness, and better sealing gaskets were used. All graphic panels were reprinted. Frame design and assembly done by Muaffaq Hazza and production and by Na'il Aqil.

Signs 21–33 were fully designed and manufactured by the UJAP staff, ready for assembly and installation, but installation was delayed by lingering site security issues. Open Hand Studios trained the local UJAP architectural team in the graphic design methodology. Thus, production of the



9. Redesigned frames with greater display verticality and improved panel lock-in cover, demonstrated by project manager Muaffaq Hazza. Photo by Bert de Vries.



10. Graphic image of flora sign, layout produced by Dana al-Faraj and Mais Haddad.



11. Installation of second-generation sign at Double Church (Ali Aqil seated on apse wall). Photo by Bert de Vries.

second-generation signs became a totally local operation[2] (Figs. 10–11).

Training Effect: Ingredients for a New Signage Production Business at Umm al-Jimāl

The training process included deliberate localization of expertise in signage development, aspects of which include:

1. Design of all components and materials needed for durable signage.
2. Presentation content prep through access to archaeological and heritage data at Umm al-Jimāl.
3. Visual documentation of features to be displayed using cameras and architectural documentation.
4. Professional graphic design using the necessary range of computer software for drawing and layout.
5. Manufacture of steel frames at Umm al-Jimāl.
6. Market awareness for acquisition of all materials specified within the Mafraq district.
7. Assembly of all components at Umm al-Jimāl.
8. Installation skills by local trained site managers.
9. Marketing skills and capability to develop signage production on a national level.

[2] The production team included: Text development, Elizabeth Osinga, Jenna Morton, and Bert de Vries; photography, Bert de Vries and Open Hand Studios; translation, Abdullah al-Khdeer; graphic design, Dana al-Farraj and Mais Haddad; redesign of sign assembly; Muaffaq Hazza and Jehad Suleiman; manufacture, Muaffaq Hazza and Na'il Aqil. All signs were installed on the SCHEP-funded trail by a local team overseen by Muaffaq Hazza, Jehad Suleiman, and Ali Aqil in October 2018.

Conclusion

This project has proven it is possible to produce interpretive signs for archaeological sites locally in a rural setting like Umm al-Jimāl, with proper training and adequate experimentation. This process has not just created jobs but made it possible to create a highly technical local community sustainable business based on archaeological site management. The team reached the conclusion, that while signs can be made durable, they cannot be made vandalism-proof. Therefore, to have signs last over multiple years, any site management program needs to budget for repairs to cover both the ravages of weather and recurrent vandalism. UJAP's production and installation of 33 signs has set the stage for the establishment of signage production business operating countrywide to be established by Hand by Hand Heritage Corporation of Umm al-Jimāl, itself organized and chartered with funding and advice from SCHEP.

The project also pioneered in developing a high-quality set of signage texts and graphics that tell a coherent story on the theme, "How did they live?" Particularly this story included, not only the results of UJAP's archaeological research, but also included the modern community through information based on ethnographic study, surveys, and oral history. After a year in place the signs have proven to be popular among local, Jordanian, and foreign visitors, all of whom can understand the entire site through them, and some of whom can recognize themselves in them.

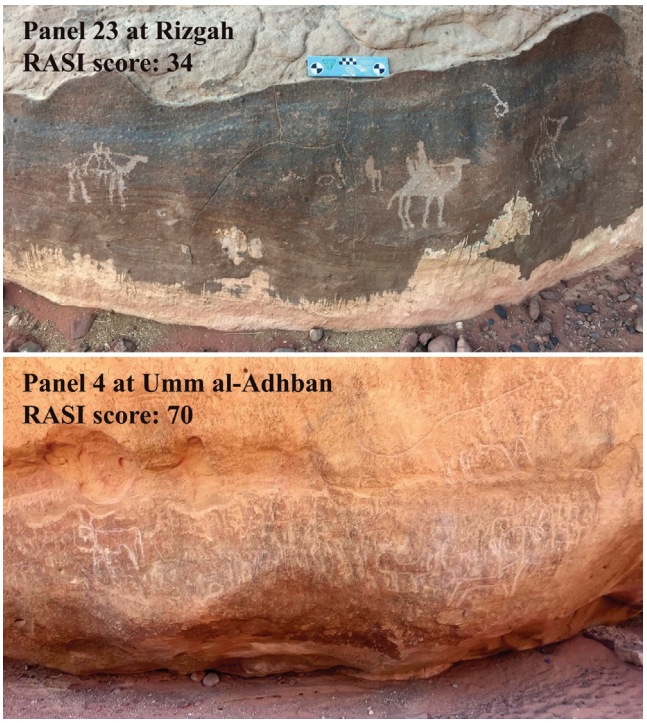
The Rock-Art Rangers Program: Enhancing Tourism and Improving Employment Outcomes in Wādī Ramm

(Kaelin Groom, Casey D. Allen, and George Bevan)

In 2017, the Community-Based Rock-Art and Epigraphic Recording (CB-RAER) Project, funded by USAID SCHEP, completed several interrelated goals in the Wādī Ramm Protected Area (WRPA). Besides providing an effective site stability monitoring program for this World Heritage site via smartphone-based GIS data-collection, the project combined Jordanian and foreign CB-RAER team leaders' expertise with data gathered during field surveys to create the Rock-Art Rangers (RAR) program, expanding local guides' knowledge and skillsets. Despite being one of the last projects initiated by the SCHEP team—thus the shortest overall in duration—the CB-RAER and RAR programs surpassed all expectations both in terms of productivity as well as community awareness and engagement.

The initial phase of the project addressed the project's primary, and ultimate, goal of helping create a long-term, sustainable system, run by local WRPA staff to document and protect the abundant rock-art and epigraphy in the Wādī Ramm area using the Rock Art Stability Index (RASI) and online GIS. Created by a multidisciplinary team of heritage scientists, RASI is an observationally based field assessment tool to identify and evaluate rock decay and other indicators of geologic instability of rock art panels (Dorn *et al.* 2008; Cerveny *et al.* 2016). The numerical RASI "scores" provide clear criteria for site management and prioritization of resources to the most at-risk panels as indicated by higher RASI values (Fig. 12). Specifically designed to be intuitive and self-explanatory, the index can be easily learned and understood by anyone—thus encouraging direct stakeholder and community involvement—but still providing in-depth geomorphological information vital for effective cultural resource management in the region (Groom *et al.* 2019).

The successful combination of RASI with user-friendly GIS data collection (smartphone apps) produced incredibly valuable and detailed stability reports



12. Comparative rock art and epigraphic panels in Wādī Ramm with corresponding RASI scores indicating different levels of decay/instability. Photos and scores from new WRPA online geodatabase.

addressing both human and natural geologic concerns geospatially tied to specific sites and panels. Beyond workshops and guided data-collection, the local CB-RAER documentation team continued RASI analyses throughout the year and have collected, to date, assessments of nearly 1,200 individual rock art panels across 85 different sites throughout the protected area. Ultimately, the documentation element of the project trained over a dozen local heritage professionals and volunteers by experts in the field, put commercial off-the-shelf (COTS) GIS and mobile data-collector solutions in the hands of local Wādī Ramm management, and took the first steps in creating a fine-grained comprehensive database of the truly vast rock art and epigraphic heritage in Wādī Ramm (Fig. 13).

Complementary to RASI, the other main aspect of CB-RAER project promoted knowledge sharing, capacity-building, and local empowerment through the Rock Art Rangers Program. More than 25 tour guides representing tourism guilds from Rum Village, Disi, and other neighboring villages participated in an intensive epigraphic and geographic workshop run by the CB-RAER core team in December 2017. Of these, 15 of the most committed were selected to participate in the official three-month Rock Art Rangers program, during which time they learned about the geology, geography, rock-art, and epigraphy of Wādī Ramm, and subsequently used this knowledge to create new rock-art tours in and around the WRPA. Upon successful completion of this program, tour guides were accredited as Rock-Art Rangers and as guides qualified to offer enhanced tours that focus on the region's rock-art heritage. As more tourists seek out new experiences in Wādī Ramm that go beyond its spectacular natural heritage, we believe that this RAR accreditation will become ever more important for local guides and many have already used their training to promote rock art heritage tours and local stewardship of heritage sites.



13. Core Team members, site steward, and Jordanian scholars practicing RASI in the field and learning mobile GIS collection methods (*i.e.*, smartphone GIS). From left to right: Mohammad Dmayan, Salem al-Zalabiyah, Nassar al-Zawaydeh, Saleh al-Noaimat, Kaelin Groom (behind Saleh), Zeyad al-Salameen, and Ibrahim Sadaqa. Photo by George Bevan.

It could be argued that the greatest success of the CB-RAER project has been the level of enthusiasm and dedication exhibited by the local community members who got involved in the research and training programs (Fig. 14). Throughout the program there were noticeable changes in the perception and attitude of the local community towards the WRPA's rock art and inscriptions. Especially after the epigraphic training when local community members learned how to read and write in the ancient language of the region. Many members of the program expressed gratitude and excitement for feeling reconnected with past peoples and histories of the region. While only a handful of members from the community directly participated in the RAR training programs and workshops, those participants then returned home and taught their friends and families what they learned. It was an ideal response to this kind of



14. Group of Rock Art Ranger trainees learning about Thamudic inscriptions and interpretation from Core Team member Mohammad Dmayan (center in tan shirt). Photo by Kaelin Groom.

project: organic knowledge sharing among those who can benefit from it the most.

While the primary focus of this project was capacity-building and community engagement, some on-site improvements were also provided in the form of two interpretive signs at the key rock art sites of Khazali Canyon and Alameleh rock outcrop, as well as a sign at the visitor center informing tourists of the new Rock Art Tours to be provided by certified Rock Art Rangers tour guides. In addition, Rock Art Rangers Handbooks were given to each RAR graduate for future reference, plus educational and training material were left with the WRPA, should they wish to resume the program in the future (Fig. 15).

Ultimately, one of the key products of the CB-RAER programs was attitude: by engaging local tour guides and community members alongside site management professionals as peers, the Rock Art Rangers program illustrated how valuable community engagement, instead of exclusion, in scientific research can promote more sustainable site management. Fighting the unfortunately common adage "it's lasted this long, how fragile can it be?," the knowledge and skill gained through this program are shared freely within the communities best suited to enact effective change. In the end, CB-RAER has not only provided geospatial stability data to help create new protective policies by the WRPA but also fostered mutual respect and collaboration within the local communities. By participating in the program as equals, both management and local communities can now support new policies and promote social agency to actively contribute to the protection and understanding of the region's immense natural *and* cultural stone heritage for generations to come.

Acknowledgements

Enough thanks and gratitude cannot be expressed to our Core Team in Wādī Ramm, Saleh Al-Noaimat, Mohammad Dmayan, Nassar al-Zawaydeh, and Salem al-Zalabiyah (official project site steward),



15. First graduating class of the Rock Art Rangers program with their certificates. Photo by Casey Allen.

who were instrumental in making the project a success, our Jordanian scholars Dr. Zeyad al-Salameen and Professor Ibrahim Sadaqa for their dedication and passion, as well as the support and guidance provided by SCHEP leadership and support teams.

Community Engagement in Downtown Mādābā: The Mādābā Regional Archaeological Museum Project (MRAMP) (Douglas R. Clark and Marta D'Andrea)

The Mādābā Regional Archaeological Museum Project (MRAMP) is an international endeavor to transform an endangered urban archaeological area in downtown Mādābā into a new regional archaeological museum for the preservation of the cultural heritage of the Mādābā region. Plans call for an open-design building situated above restored late 19th century architecture that also respects the layout of the Mādābā Archaeological Park West.

From its inception in 2015, MRAMP sought to engage a large number of stakeholder groups in the process of establishing a state-of-the-art regional archaeological museum in the Mādābā Archaeological Park West (Fig. 16). Embracing objectives of 1) protecting, preserving, and presenting Jordan's cultural heritage; 2) developing and enlarging present economic opportunities sustainably; and in the process 3) securing a future for Jordan's legacy and for Madaba's citizens, MRAMP was conceived within the field of community archaeology (D'Andrea *et al.* 2018a; 2018b; Richard *et al.* 2019).

Because of the nature of the community of Mādābā and of the museum project itself, the pool of stakeholders and stakeholder groups is diverse and robust. This factor assumes and affirms the essential participation of all stakeholders, individuals who can engage with the project, participate in discussions and decisions, collaborate with others in achieving project outcomes, and support the project through wealth, work, and/or wisdom.

As currently organized, MRAMP stakeholders fall into the following categories:

1. *Policy makers at the levels of international, national, regional, and local governments*: including United States and Italian embassies and related entities, the Jordanian Ministry of Tourism and Antiquities, the Department of Antiquities, the Mādābā Governorate, and the Mādābā Municipality.
2. *Business support organizations*: including the Mādābā Chamber of Commerce, the Mādābā Tourism Development and Heritage Preservation Society, and the Amman-based Talal Abu-Ghazaleh Organization.



16. Stakeholders Meeting, December 2018. Photo by MRAMP.

3. *Business and industry*: including construction industries and local shops, restaurants, and hotels.
4. *Academic research institutions/ projects*: institutions and projects of academic research, including USAID/ACOR/SCHEP; international universities such as Gannon and La Sierra in the US and Perugia and La Sapienza of Rome in Italy; regional archaeological excavation projects at ʿAtaruz, Dhībān, Ḥisbān, Iskandar, Jalūl, al-Mukhayyat/ Nebo, Lahūn, Machaerus, Mādābā, Safra Aṣ-Ṣafrāʾ, Wādī Thamad, ʿUmayrī, Umm ar-Raṣāṣ, and Murayghāt; and institutions like the Studio Strati architectural firm and CAMNES (Center for Ancient Mediterranean and Near Eastern Studies) in Italy.
5. *Public and private organizations (cultural, religious, educational)*: private and public organizations are many and varied, including organizations like the Mādābā Institute of Mosaic and Art Restoration, the La Storia Museum, and the Friends of the Archaeology and Heritage of Jordan, along with universities with which MRAMP is affiliated like the University of Jordan, Hashemite University, the American University of Mādābā, and the German Jordanian University. Other educational entities involve the Mādābā Department of Education and elementary and secondary schools. Religious institutions of both Muslim and Christian traditions are also important stakeholders, as are the many outlets of digital and print media.
6. *The tourism sector*: Tourism sector central stakeholders include the Ministry of Tourism (Amman and Mādābā), the Department of Antiquities (Amman and Mādābā), and the Mādābā Tourism Board.
7. *International organizations*: including the American Schools of Oriental Research, ACOR, the Council for British Research in the Levant, Institut français du Proche-Orient, the German Protestant Institute of Archaeology, the Italian Archaeological Consortium in Jordan, as well as a large contingent of international scholars.
8. *Families and citizens*: finally, there are the citizens of Mādābā (the city and the region), including the large Muslim population and the minority Christians, many of the latter who are descendants of the 1880s migration of Christians from al-Karak to Mādābā, which had been lying in ruins for a thousand years.

The local community in particular, but also the more broadly based community, is essential to MRAMP, and has been encouraged to participate in the project, developing a strong stakeholders base. This has occurred to a large degree by means of public and private meetings, symposia, and capacity-building workshops and training courses. The future will incorporate Open Learning Environments for deeper and more sustainable educational results.

To illustrate, Department of Antiquities employees and others in Mādābā (and at times from other places in Jordan) participated in workshops about mosaic and stone-wall conservation under Bettina Lucherini (May and September 2017) and Franco Sciorilli (March–May 2018). Many of them were also a part of training courses in museum management and museum curation with Fadi Balawi (June 2018) and artifact photography with Jillian Logee and artifact organization and display with Fatma Marii (Fig. 17), Qais Tweissi, and Jack Green (September 2018).



17. Artifact Organization and Display Workshop with Fatma Marii (left center). Photo by SCHEP.



18. Onsite visit by AUM architecture interns. Photo by MRAMP.

In addition, a program with local university architecture students was held in Mādābā in December 2017 in an open meeting sponsored by SCHEP; architectural museum design features were presented by the Studio Strati architects to students from University of Jordan, Hashemite University, and American University of Mādābā (AUM) and discussed by and with the students. Moreover, an entire course at the American University of Mādābā was dedicated to MRAMP, and AUM students presented their work to MRAMP staff in a class seminar and discussion held at AUM, still in December 2017. An internship program was developed in collaboration with SCHEP in order to engage AUM students in MRAMP (Fig. 18); the interns presented their work in July 2018.

The mapping of potential stakeholders and the development of the stakeholders' base was accomplished through a series of dedicated initiatives. An initial meeting of the local communities was held in December 2016. The official public MRAMP Launch sponsored by SCHEP took place on site at the Mādābā Archaeological Park West on May 17, 2017 with the participation of around 200 attendees, including key local, national, and international stakeholders, along with the citizens of Mādābā. Subsequently, a second stakeholders meeting was held at the Mādābā Institute of Mosaic and Art Restoration in December 2017. Finally, a



19. Stakeholders meeting at Talal Abu-Ghazaleh Organization. Photo by MRAMP.

symposium sponsored by the Talal Abu Ghazaleh Organization (Fig. 19) was held in Amman in September 2018, aimed at involving local stakeholders in the business and industry sectors.

In particular, the December 2017 stakeholders meeting was focused on the presentation of a draft proposal and 3D model of the envisioned new museum to the community, followed by discussion that allowed the MRAMP team to receive feedback, critique, and suggestions. This opened the way for engaging conversation about cultural heritage and best practices.

Emergency Conservation and Community Training at the Temple of the Winged Lions, Petra (Jack Green and Franco Sciorilli)

The Temple of the Winged Lions (TWL) is an important Nabataean site in Petra dated to the 1st to 4th centuries AD, excavated by Philip C. Hammond as part of the American Expedition to Petra (AEP) between 1974 and 2005. Key findings included the Cella, with its column capitals adorned with winged lions, an inscription from the reign of Aretas IV, and the "goddess of Hayyan" idol.

The Temple of the Winged Lions Cultural Resource Management (TWLCRM) Initiative, implemented by ACOR since 2009, has made efforts in excavation and documentation, conservation, safety and interpretation, and educational awareness at the site (Tuttle 2013). Initiated by Christopher Tuttle of ACOR, the initiative was supported between 2011 and 2017 by grants from the US Ambassadors Fund for Cultural Preservation, among other donors. From 2015, the Initiative was also supported by USAID SCHEP. A recent phase of activities at the site, supported by USAID SCHEP between 2017 and 2018, enabled the completion of vital emergency conservation of the Cella and the Southwest Quadrant, as well as backfilling areas to help preserve the site in future years. The preparation of pathways and addition of signage has made the site safe and accessible to visitors.

During 2017 and 2018, the project directors from ACOR were Glenn Corbett as Associate Director (until October 2017) and Jack Green (from October 2017). Elena Ronza served as a co-director until March 2017. Monther Jamhawi, former Director-



20. Before and after the application of a protective mortar capping on the Cella podium in 2017. Photos by Franco Sciorilli.

General of the Department of Antiquities (DoA), was a project co-director. Eman Abdessalam and Ahmad Mowasa were employed as SCHEP Site Stewards and played a vital role in project delivery. Franco Sciorilli was lead conservator. Giuseppe Delmonaco, engineering geologist of ISPRA, was a project consultant. Marco Dehner of Humboldt University helped document the site's Lapidarium. The TWLCRM Initiative acknowledges contributions by Sela for Vocational Training and Cultural Heritage, a non-profit organization based in Umm Ṣayhoūn. The TWLCRM Initiative is conducted with the support of the DOA and the Petra Development and Tourism Region Authority (PDTRA).



21. Landscape team members Agelah Jmeidi and Khatmeh Albedul backfilling in the SW Quadrant. November 2017. Photo by Eman Abdessalam.

Emergency Conservation

Emergency conservation in the Temple Cella was required due to the prevalence of salts, leaning columns, and exposure of its altar to the elements. These problems were exacerbated by poor drainage over several decades. Solutions included the provision of a mortar capping and a magnesium panel for the temple altar (Fig. 20). Backfilling of the Cella with geotextile at a gradient has helped improve drainage of rainwater away from the site. In the temple's west side, two leaning columns were braced with wooden supports; a third was partially restored. The Cella is now safe and accessible.

The rubble slope in the SW Quadrant

was in danger of collapse due to continued rainwater infiltration and the threat of earthquakes, which may have led to a landslide destabilizing the Temple podium. A sandbag buttress and over 130 m^3 of soil was used to support the rubble slope and backfill the quadrant (Fig. 21). A drainage channel was added. A cleaning and consolidation intervention was carried out with lime-based mortar applied between the joints of stone blocks to reinforce the walls. This helped stabilize the site and improve rainwater run-off. The SW Quadrant was cordoned off to discourage visitors from climbing over conserved areas. A graphic panel in this area highlights the role of local community team members in the site's conservation.

Training and Education

An important element of conservation has been the hands-on training of local TWLCRM team members and PDTRA staff, among others, during the project, enabling the transfer of knowledge, skills, and best practices (Fig. 22). This provides potential for new or enhanced employment opportunities for those who received such training. Several team members have since been employment within CRM roles within Petra and elsewhere in Jordan. Halemah Nawafleh, for example, a documentation assistant with the TWLCRM Initiative, helped record the Lapidarium and assisted in the conservation of Southwest Quadrant between 2017 and 2018. She since became a full time PDTRA employee.

In addition to practical on-the-job conservation training, the continued documentation of the site's condition and the recording of interventions has been a vital part of the project. Training of team members has included the analysis of the condition of archaeological areas, architectural documentation and monitoring, vegetation monitoring and removal, monitoring of rainwater channels and pools, and documentation following conservation interventions.

Through SCHEP's educational awareness program, team members played a vital role in sharing the message of site conservation and preservation through hands-on activities. Site Stewards Eman Abdessalam and Ahmed Mowasa hosted over 250 Jordanian schoolchildren and multiple tourist groups. Schoolchildren came from across Jordan, from Bayt Rās to ʻAqaba. The Experience Petra program gave participants the opportunity to engage



22. Training session at the Umm Ṣayhoūn Project Office. January 2018. Photo: Franco Sciorilli.



23. Experience Petra: TWL Team member Shaker Alfaqeer prepares Busayra girls' school pupils for mortaring of a demonstration wall. November 2017. Photo by TWL team.

in on-site activities including sifting for artifacts, washing pottery, cleaning and mortaring a wall (Fig. 23), and documenting the site through drawing and photography. Following a successful pilot, it is hoped that it may become part of a future program to help further communicate the value of cultural heritage preservation to schoolchildren and tourists.

Summary

In addition to sharing achievements and project outcomes, it is important to present experiences of training and education as a key element of site conservation and management, for local partners, local community members, and visitors. An important factor is the transfer of knowledge and skills, especially at the end of a project. Hands-on participation and continuity within long term, active projects are key to the transmission of skills and knowledge, as well as observing the impact of conservation interventions over time under changing conditions. While skills such as cleaning, mortaring, backfilling, and salts removal, can be transferred among multiple trainees and across projects, maintaining the specialist support of experienced conservation professionals is essential for quality control and guidance. Lastly, continued monitoring and maintenance of sites is important. It is hoped that a long-term site management plan will be developed for TWL. In the meantime, assigned PDTRA staff already familiar with the site's challenges continue to monitor and maintain the site.

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Community Engagement in Downtown Mādabā: The Mādabā Regional Archaeological Museum Project (MRAMP) 2016–2018

Introduction

The Mādabā Regional Archaeological Museum Project (MRAMP), formally initiated in 2015 by the authors of this article (Fig. 1) as a joint American, Italian, and Jordanian endeavor to establish a new state-of-the-art regional archaeological museum in Mādabā, Jordan, built on previous efforts of regional dig directors in cooperation with the Department of Antiquities of Jordan (DoA).

Initially, at the request of then Director General of the DoA, Dr. Fawwaz Al-Khraysheh in 2006, directors of regional excavations along with other specialists vested in the archaeology of the area were asked to assist in renovating the Mādabā Archaeological Museum, training its staff, and digitizing its records. Several meetings of this group resulted in a major pivot away from the current Mādabā museum as the best venue for displaying the wealth of central Jordan's archaeological legacy to a space located in the heart of historic downtown Mādabā. In 2012 Huda Kilani, then director of museums in the DoA, and Douglas Clark, representing regional dig directors, visited and agreed on the establishment of the new regional archaeological museum in the Mādabā Archaeological Park II (West), location of the 2nd century Roman cardo, the 6th century Burnt Palace and Martyr's Church, and the late 19th-century Jordanian traditional settlement.

The location, already mostly owned by the DoA, seemed a perfect fit for the needs of the proposed new museum (Fig. 2). It opened onto the Heritage Trail, a line of red bricks inlaid in sidewalks with adjacent touristic shops, conveying tourists from the Mādabā Visitors Center primarily to St. George's Greek Orthodox Church. The church housed the famous 6th century mosaic floor map of the Holy Land and represented the most important tourist destination in the city. Situated across a side street from St. George's, the proposed

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1. In-country coordinator Mahamid and co-directors D'Andrea, Clark, Richard, and Polcaro (courtesy of MRAMP).



2. Mādabā Archaeological Park West, looking east, museum location over ruins at bottom (courtesy of MRAMP).

site for the new museum created a unique opportunity for visitors to Mādabā to see the region's rich material culture from thousands of years of human occupation, thus extending their stay in the city and, in the process, providing a more sustainable means of protecting the region's cultural heritage in addition to improving the economic condition of Mādabā's businesses and citizens.

This review of MRAMP progress in the years 2016–2018 outlines: 1) support for the project, 2) objectives of the project, 3) objectives achieved, and 4) objectives anticipated. Reports and analyses can be found in numerous online venues (see bibliography under 2016–2017) and publications (Clark *et al.* 2018; D'Andrea *et al.* 2018; 2019; Richard *et al.* 2019).

Support

Support for this endeavor, mostly logistical, came from affiliated academic institutions and the Department of Antiquities. For financial backing, we are indebted to a Harris Grant from the American Schools of Oriental Research (ASOR), a major USAID grant through the Sustainable Cultural Heritage through Engagement of Local Communities Project (SCHEP), implemented by the American Center of Oriental Research (ACOR), which took us through 2017 and most of 2018. A second USAID/SCHEP grant cycle will support this endeavor in 2019–2021. Added to these sources is a major grant from the US Ambassador's Fund for Cultural Protection/the Cultural Antiquities Task Force (US Department of State) dedicated to repurposing the current museum. Other grants came from MAECI (Ministry of Foreign Affairs and International Cooperation of Italy), participant fees, and private donations, as well as in-kind contributions from the Studio Strati architectural firm in Rome, CAMNES (Center for Ancient Mediterranean and Near Eastern Studies) in Florence, as well as the Istituto per le Tecnologie Applicate ai Beni Culturali (ITABC-CRN), Impresa Alessandrini Peppino Restauri Monumentali e Scavi Archeologici, and the Cultural Association C.E.S.A.R. (Centro di studi di eccellenza e ricerca archeologica di Roma). In addition, MRAMP entered into a formal Memorandum of Understanding with the DoA, marking out parameters of the project and guaranteeing mutual commitments to see it through.

Objectives

From the beginning, MRAMP set out to accomplish three major general objectives. As with all archaeological endeavors in Jordan (and elsewhere in the Middle East and across the world), the project was intent first on saving the past by protecting, preserving, and conserving the cultural heritage of the Mādabā region. This represents a geographical area defined by southern Amman in the north, the Dead Sea to the west, the Wādī al-Mūjib in the south, and the eastern desert, where scores of excavations have been mounted over the decades, of which more than a dozen are currently active. Second was the goal of enhancing the present by developing and enlarging economic opportunities for the citizens of the region, the country, and in particular, of Mādabā in ways connected to their archaeological heritage. The third objective sought to secure a positive and sustainable future both for the region's archaeological patrimony and for its citizens. To accomplish these goals, MRAMP has long committed itself to sustainable "Community Archaeology," which views archaeology as a public asset, placing "ownership" of cultural heritage in the hands of the community.

Specific objectives for the years 2016–2018 were numerous, varied, and interwoven. They included:

Excavation and Conservation represented by 1) clearing and cleaning (and keeping clean) the entire park, with special attention devoted to the late 19th century traditional settlement which had been excavated 20 years previously but then left to accumulate debris and wind-blown loess and the resulting overburden of weeds, shrubs, and trees; 2) excavating a number of areas in the park, including soundings in several locations in search for data which could affect the placement of pillars to

support the superstructure of the museum; 3) undertaking mosaic and stone-wall conservation and consolidation.

Employment of Technology in 4) using 3D laser scanning equipment to obtain digital models which can be manipulated for educational, aesthetic, publicity, and architectural purposes; 5) utilizing sub-surface geotechnology to provide structural engineers with pre-construction data.

Removal/Repurposing of Buildings as seen in 6) removing a late and poorly built cinderblock domestic structure from space dedicated to part of the ground floor of the museum; 7) renovating and repurposing two early 20th century buildings to serve as welcome center and introductory building to the museum complex | *Artifact Curation* shown by 8) repurposing the current Mādabā Archaeological Museum as a venue for storing and studying the thousands of regional artifacts housed in the facility; 9) continuing the tedious work of entering digital data on the region's 14,000 excavated artifacts.

Educational Activities such as 10) developing, offering, and assessing workshops for short-term training exercises and longer training courses for more in-depth exposure to best practices in excavation, conservation, and museum management; 11) building capacity for various constituencies in techniques of excavation, conservation, curation, and museum management.

Stakeholder Development illustrated by 12) expanding and enhancing the development of various stakeholder groups; 13) collaborating with local university architecture students in the development of emerging architectural plans; 14) continuing efforts to engage the community (at several levels) in the project's ultimate vision for protecting the past and ensuring a prosperous future; 15) developing effective communications and publicity to raise awareness of the importance of cultural heritage conservation and protection to sustainable development.

Objectives Achieved

Excavation and Conservation: 1) clearing and cleaning, 2) excavation, 3) mosaic and stone-wall conservation and consolidation

The first excavation season in the Mādabā Archaeological Park West occupied two weeks in May of 2016 and hosted 18



3. 2016 MRAMP Team (courtesy of MRAMP).

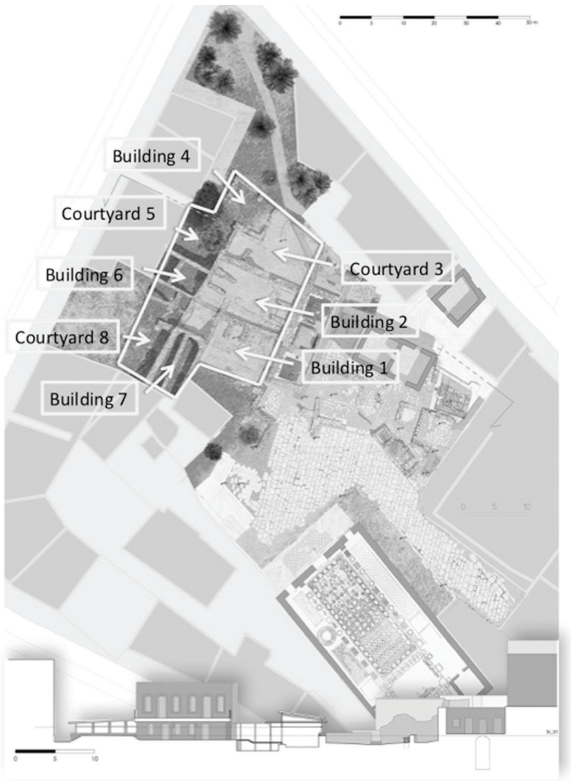


4. Archaeological Park BEFORE (courtesy of MRAMP).



5. Archaeological Park AFTER (courtesy of MRAMP).

participants, including staff, volunteers, and local laborers (Fig. 3). Before-and-after images (Figs. 4–5) demonstrate graphically not only how much debris and vegetation can accumulate at an archaeological site over 20 years since previous excavations, but also how transformative two weeks of work can be on the landscape. The team cleared the eastern and earliest half of the exposed late 19th century settlement, an area boasting two buildings and one large courtyard (Buildings 1 and 2 and Courtyard 3; Fig. 6). The structures were built over and into the Byzantine and Early Islamic strata on and near the surface of the *tall* by migrant Christian families arriving in the 1880s (see Richard *et al.* 2019). These "traditional" Jordanian houses incorporated arches to divide interior space into rooms and to support the roof, those in Building 1 *ca.* 5 m in radius and those in Building 2 *ca.* 8 m.



6. Topo of museum ground floor structures (courtesy of MRAMP and Studio Strati).

A second May season, involving three weeks in 2017 and 21 participants (Fig. 7), opened the way for continued cleaning and clearance beyond the two houses and one courtyard cleared in 2016 to include also Building 4 and part of Courtyard 5 (see Fig. 6). Results from 2017 included further exposure of the late 19th century buildings and courtyards, but also the beginning of the process of unearthing structures most likely from the early to mid-20th century in the western half of the settlement area. In addition, this season saw the first scientific interventions on the deteriorating Byzantine/Early Islamic(?) mosaics, with support from CAMNES.

The third May season, 2018, involving 33 participants (including the consolidation team; Fig. 8), completed the clearance of Buildings 6 and 7 and Courtyard 8 (see Fig. 6). This left only one room to clear, but the walls surrounding it were too unstable to work inside. Also accomplished during the May 2018 season was a stone-wall consolidation effort in the central part of the settlement, affecting Buildings 6 and 7, as well as an arch support wall and springer for Building 2. Building 6 also underwent several interventions affecting mudbricks, plaster, and paint.

During the time intervals between annual May excavation seasons, ongoing onsite cleaning and conservation activities continued apace with support from USAID/SCHEP funding. Site Steward Qusay Alshawabkeh, along with several long-term local laborers, maintained control over persistent weeds, regularly cleaned the park of ever-new deposits of wind-blown dirt and dust, and kept an open, if irregular schedule of group visits to the site.

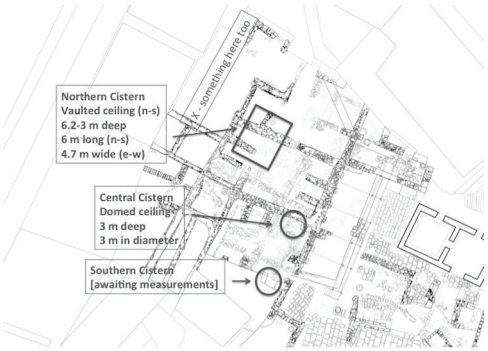


7. 2017 MRAMP team (courtesy of MRAMP).



8. 2018 MRAMP team (courtesy of MRAMP).

They were also engaged in cleaning three water cisterns, likely from the Byzantine Period, which provided water for Buildings 1 and 2. Already apparent from four stone openings in the ground, these three cisterns were explored and cleared. Two were silo-shaped and the other a large rectilinear cistern (Fig. 9). The team also worked with the Mādabā Municipality to remove soil overburden, sack it up for transport,



9. Cisterns in park (courtesy of MRAMP and Studio Strati).

and deliver the trash to a local landfill. Occasionally they would participate in an MRAMP-sponsored workshop on mosaic or stone-wall conservation.

Employment of Technology: 4) 3D laser scanning and total station, 5) subsurface geo-technology

The use of new technologies, standard on most modern projects, provided important data for the MRAMP team in documenting extant remains with the goal of recording and illustrating them for use in preparing for the new museum. A 3D laser scanner (Fig. 10), operated by Roberto Gabrielli of ITABC-CNR, recorded in detail the entire area of the traditional settlement, as well as other parts of the archaeological park, producing a 3D model; unfortunately, the equipment failed before we could laser-scan the three cisterns. Survey data, while scarce for the site, was geo-referenced by use of a total station from benchmarks around the city. And, in order to map any subterranean anomalies which could affect the structural integrity of the proposed museum, specialists from Italy utilized a georesistivimeter (Figs. 11–12). This was accomplished in October 2017 by a small team consisting of Andrea Polcaro (MRAMP co-director), Marilena Cozzolino (geo-physicist from Italy), and Maddelena Scattini (assistant and two-time former member of our May expeditions). Their report indicated anomalies which were reported to the architects and structural engineer of the project.

Removal/Repurposing of Buildings: 6) cinderblock domestic structure, 7) two early 20th century buildings

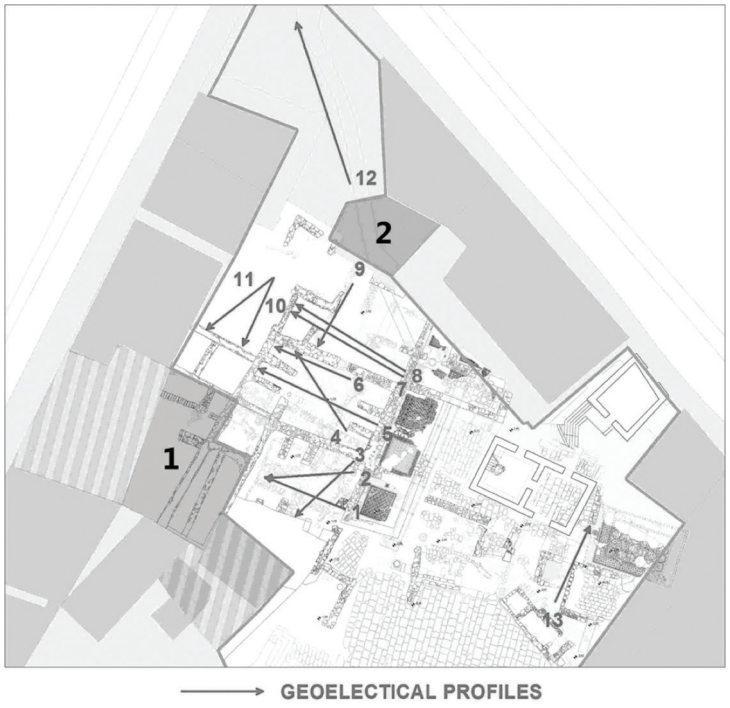
Three structures in the archaeological park, once modified, will play significant roles in the continuing development of the museum and its setting. At this point, only goals exist for intended transformations, but the buildings have been under considera-



10. Laser scanner (courtesy of MRAMP).



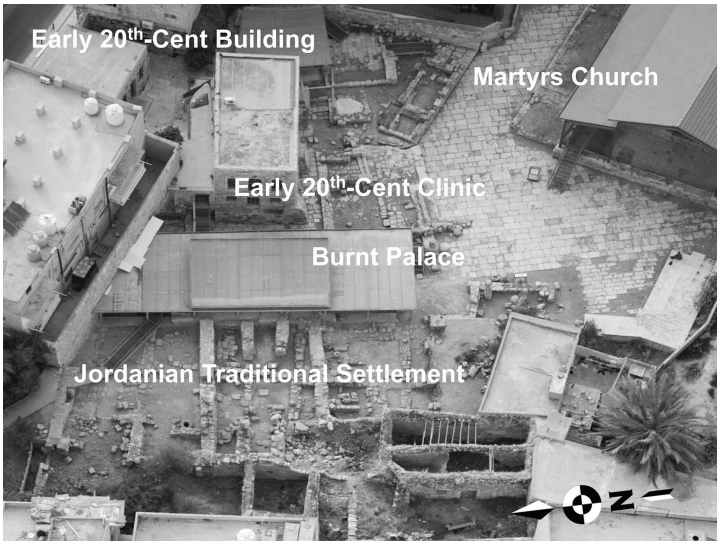
11. Georesistivimeter analysis (courtesy of MRAMP).



12. Georesistivimeter grid (courtesy of Studio Strati).

tion, with plans for their new functions, for several years. Essential to maintaining the proposed footprint of the museum is the removal of a late, poorly built cinderblock building presently being rented out to laborers. The land and the building are being purchased by the DoA, and once the structure is removed, excavation can take place beneath it before allowing construction of the new museum over it.

Two other buildings, both from the early 20th century, stand near the current entrance to the archaeological park (Fig. 13). One, consisting of a single room, forms



13. Early 20th-century buildings (courtesy of MRAMP).

part of the row of buildings and tourist shops fronting on the Heritage Trail and will ultimately serve as the museum's main entrance; its large traditional wooden doors are quaint and welcoming. The other, a two-story, four-room, former health clinic, the earliest in Mādabā, will be repurposed into an introductory hall for the park and the new museum. Plans call for remodeling and refurbishing the structure to create a timeline of archaeological history in the Mādabā region, complete with chronological panels and period artifacts. As well, this hall will provide information, digital (downloadable apps for smart phones, for example) and hard-copy, to help visitors find information on regional archaeological sites and navigate their way to these nearby sites.

Artifact Curation: 8) current Mādabā Archaeological Museum 9) digital data management

Given the decision of regional dig directors in the late 2000s to recommend relocating the museum to another and more central location than its present crowded and out-of-the-way venue, the situation now required discussion and decisions about how to utilize space in the current museum. One option quickly rose to the top of the list: repurpose the current museum into a storage and research facility for the 14,000 artifacts discovered in the region and stored in its two small and totally inadequate rooms. Space limitations and decrepit storage equipment made it impossible to keep thousands of objects organized and accessible, but moving present displays to the new museum once it is completed and then reusing these spaces for storage and curation would not only open up space for the organized and accessible storage of artifacts, but it would also allow for reassignment of the current museum as a state-of-the-art research facility for use by DoA staff, regional dig directors, and visiting scholars.

A strategic part of the overall regional museum endeavor, curating the 14,000 regional artifacts has always been a key component. While some artifactual data had been digitized in the past, most records



14. MRAMP/DoA data entry staff (courtesy of MRAMP).

were in hard-copy format. It was clear that any hopes of achieving best practices in the care of these artifacts required systematic data collection and data storage. This is true in part because the records were incomplete, but also because due diligence and best practices required as complete records as it is possible to obtain and sustainably preserve.

To achieve this monumental task, USAID/SCHEP funds were used to employ two local women, Najwa Al-Fuqaha and Suha Al-Zen, who came to the project with archaeology degrees and who demonstrated the ability and commitment, working alongside the DoA curator Amal Al-Rawahneh, to perform the demanding, tedious task of curation and data storage (Fig. 14). With additional tutoring from Adeeb Abu Shmais, retired Jordanian archaeologist, they entered comprehensive artifactual data first into Excel spreadsheets, then, with help from Bob Bates of Andrews University, posted the data to FileMaker Pro. Ultimately, these data will be migrated to and hosted by a newly developed online database created by Jutta Häser of the German Protestant Institute of Archaeology for use at the Jordan Archaeological Museum (or Citadel Museum) in Amman and then likely at other regional DoA museums. The process has been labor-intensive and time-consuming, lasting from the beginning of MRAMP's involvement to the present. With support from a recent grant award from AFCP/CATF to repurpose the current museum, data management will continue as a basic component of the project, resulting in a system that will be sustainable long into the future.

Educational Activities: 10) workshops and training courses, 11) building capacity

Workshops for small groups of DoA employees with the addition of others from Mādabā and sometimes from other parts



15. Stone wall conservation with Bettina Lucherini (top center; courtesy of MRAMP).



16. Artifact photography training session with Jillian Logee (center; courtesy of MRAMP).

of Jordan have characterized MRAMP's immersive and experiential educational approach to community archaeology from the beginning. The year 2017 saw two workshops, both directed by Bettina Lucherini of CAMNES in Florence, Italy. One in May focused on mosaic conservation, utilizing *in situ* examples from the Burnt Palace and from excavations in the area of the traditional settlement. This was followed in September by a workshop on stone-wall consolidation (Fig. 15). Two more intensive workshops in the spring of 2018, this time on museum curation and museum management, were offered by Fadi Balawi of Hashemite University. Given the positive responses to and outcomes of these workshops, MRAMP plans to continue utilizing them on a regular basis.

The employment of more extensive training courses also constitutes part of MRAMP's strategy to educate local stakeholders and contribute to building professional capacity. Several of these have been and continue to be offered as well, two of which occurred in the autumn of 2018. The first, a hands-on introduction to Artifact Photography, was conducted by



17. Artifact organization and display workshop with Fatma Marii (left center; courtesy of MRAMP).



18. Two interpretive signs (courtesy of MRAMP).

Jillian Logee, a professional photographer from Calgary, Canada, who has several years of experience photographing artifacts for archaeological projects in Jordan (Fig. 16). The second training course featured Artifact Organization and Display and was directed by Fatma Marii of the University of Jordan, with assistance from Qais Tweissi from Petra and Jack Green of ACOR (Fig. 17).

Both workshops and training courses, while intended for participants from various locales and backgrounds, were based on a commitment to enhance professional capacity. Capacity-building, especially for local DoA staff members, lay at the heart of these endeavors in order to prepare participants for engagement with and potential employment in the new museum. Building capacity by means of this project also encompasses the work force of Franco Sciorilli through his conservation and consolidation interventions onsite, as well as the general local laborers whose job skills have been expanded in the work they have done with MRAMP.

An additional onsite educational feature has been realized in the installation of two interpretive signs (Fig. 18), created and mounted in the archaeological park in 2018 (with plans for more).

Stakeholder Development: 12) stakeholder groups, 13) local university architecture students, 14) continuing efforts to engage the community, 15) effective communications and publicity

At the very heart of the establishment of a new regional archaeological museum

in Mādabā lies community engagement. Nothing is more central than community archaeology if we expect to protect the region's past while at the same time promote sustainable economic benefits. For this reason, MRAMP from its inception has focused on a rich, diverse, robust assemblage of potential stakeholders in the museum project.

Stakeholders include several broad categories, as currently organized: 1) policy makers at the levels of international, national, regional, and local governments; 2) business support organizations; 3) business and industry; 4) academic research institutions/projects; 5) public and private organizations (cultural, religious, educational); 6) the tourism sector; 7) international organizations; and 8) families and citizens (see a more complete treatment in Clark and D'Andrea in this volume). Each of these general groupings encompass numerous subcategories. For example, "policy makers" include U.S. and Italian embassies and related entities, the Jordanian Ministry of Tourism and Antiquities, the Department of Antiquities, the Mādabā Governorate, and the Mādabā Municipality, and Academic Research Institutions/Projects involve foreign research centers; international universities (Gannon and La Sierra in the US and Perugia and Sapienza of Rome in Italy); and regional archaeological excavation projects at ʻAṭarūz, Dhībān, Ḥisbān, Khirbat Iskandar, Jalūl, al-Mukhayyaṭ/Nebo, Lāhūn,Mukawir (Machaerus), Mādabā, Ṣafra, Wādī Thamad, al-ʻUmayrī, Umm ar-Raṣāṣ, and al-Murayghāt.

These stakeholder groups vary in terms of the levels and nature of their commitment. They stand to benefit in different ways and to benefit the project in different ways. It is without question extremely fortunate for MRAMP to be operating in an urban context like Mādabā and, in the process, to partner with such a wide array of committed players in a project like this one. As part of developing these relationships, MRAMP has facilitated stakeholder meetings numerous times since its beginning. Even before the project had external funding support, in December 2016, several co-directors and around 15 interested parties met to discuss the museum project about to be launched in their back yard. On 17 May 2017 MRAMP, along with ACOR, SCHEP, MOTA, the DoA, representatives from the Italian and American embassies, and several local stakeholder groups, numbering around 200 people, met onsite for the official MRAMP launch. Other stakeholder events punctuated 2017 and 2018, often held on the campus of the Mādabā Institute of Mosaic and Art Restoration, involving a variety of partner groupings. In addition, MRAMP presented the museum project to a group of business leaders and others at the Talal Abu-Ghazaleh Organization in Amman (Fig. 19).

Of particular interest to the project were university (undergraduate and graduate) architecture students and engaging them with Studio Strati architects in the design of the museum. The University of Jordan (UJ), Hashemite University (HU), and the American University of Mādabā (AUM) offered several opportunities for student participation and student projects focused on the museum. In 2018, five AUM students (Fig. 20) participated in a term-long internship which resulted in a final project on integrating the new museum into its urban setting.

Publicity and PR materials figured strongly in the project's efforts to raise awareness and encourage partnerships. Of special value were many iterations of an MRAMP brochure (in Arabic and English) which have been distributed widely. In addition, MRAMP developed two websites, one of them basic but live and functional (mramp.org) and the other, currently being developed in conjunction with a company



19. Stakeholders meeting at Talal Abu-Ghazaleh organization (courtesy of MRAMP).

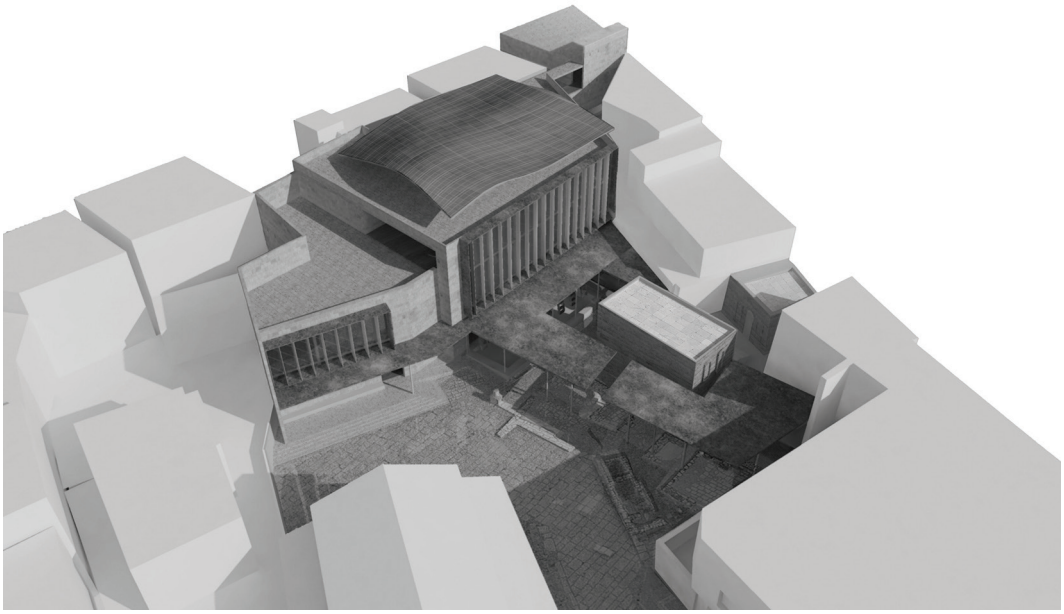


20. Onsite visit by AUM Architecture interns (courtesy of MRAMP).

in Amman, Imagine Technologies, which will provide the entire range of services needed in a robust museum website.

Objectives Anticipated

This all leads to a consideration of future hopes and trajectories for MRAMP. Objectives for the foreseeable future include continued development of the overall museum project onsite and repurposing of the current museum. A new Master Plan, completed recently, maps out next steps through to museum construction. Several pre-construction onsite projects still await completion: stone-wall conservation interventions and consolidation in the settlement that will become the museum's ground floor, removal of the recent cinderblock building which lies within the footprint of the museum, repurposing of the two early 20th century buildings which will become the entry and introductory halls, and core-drilling as required by the municipality for construction permits. And central to the next few years is broad-based training in a variety of cultural heritage fields and sub-fields, primarily through fostering and facilitating extended training courses and Open Learning Environments; these are absolutely crucial to informed sustainability.



21. Museum rendering by Studio Strati (courtesy of MRAMP, SCHEP, and Studio Strati).

While most of MRAMP's efforts at publicity and stakeholder development have been geared to making various publics aware of the cultural heritage and economic benefits of a partnership like this one, fund-raising will also begin to play a larger role. The project has been awarded significant grants for its work of preparing the site for the museum and repurposing the current museum, but will need to move more and more toward fund-raising for the museum itself in order to realize the desired results.

Future projections for the museum have been emerging over the past two years and address: 1) pre-construction phases (use of consultants, architects, specialists, and the local work force to excavate and clear the settlement, the intended ground floor of the museum, and the repurposing of the current museum); 2) construction phases (the new building and displays, in addition to the development of programs and technologies); and 3) post-construction phases (implementation of museum education and outreach programs and community engagement, publicity, augmented-reality programs and other technologies, and continued website development). Timelines for these phases and their cost estimates, while calculated with input from the architects, are tentative. Combined with further development of the current museum as a storage and research facility, the realization of a new regional archaeological museum will complete the project as a whole (Fig. 21).

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Bayt Rās Workshop

Overview of the Workshop

The Bayt Rās Tomb Project, based in Irbid, is one of nine projects supported by the USAID Sustainable Cultural Heritage Through Engagement of Local Communities Project (SCHEP) throughout Jordan and implemented by the American Center of Oriental Research (ACOR, now the American Center of Research). USAID SCHEP has been working at the site of the Roman hypogeum in Bayt Rās since April 2017 (Fig. 1), under the leadership of the Department of Antiquities (DoA) and was able to formulate a distinguished consortium of scholars from Jordan, France, and Italy to help in managing the necessary complex interventions in the tomb. SCHEP was successful in bringing together a group of professional international and national institutes renowned on their remarkable work in heritage preservation in Jordan and the region. The consortium members were subsequently expanded to include new institutes to cover different components of the project. Specifically, the consortium includes the DoA, USAID SCHEP, ISCR (Istituto Superiore per la Conservazione ed il Restauro), ISPRA (Istituto Superiore

Studies in the History and Archaeology of Jordan XIV:
Culture in Crisis: Flows of Peoples, Artifacts, and Ideas
Amman: Department of Antiquities, 2022



1. Site location (Google Maps).

per la Protezione e la Ricerca Ambientale), CNRS (Le Centre National de la Recherche Scientifique), and Ifpo (Institut français du Proche-Orient).

Through the Bayt Rās Tomb Project, USAID SCHEP offered financial and technical support for excavation, conservation, and documentation efforts within the tomb, as well as training for DoA employees, graduate students, and local community members in relevant skills.

History (Jehad Haron and Ahmad Lash)

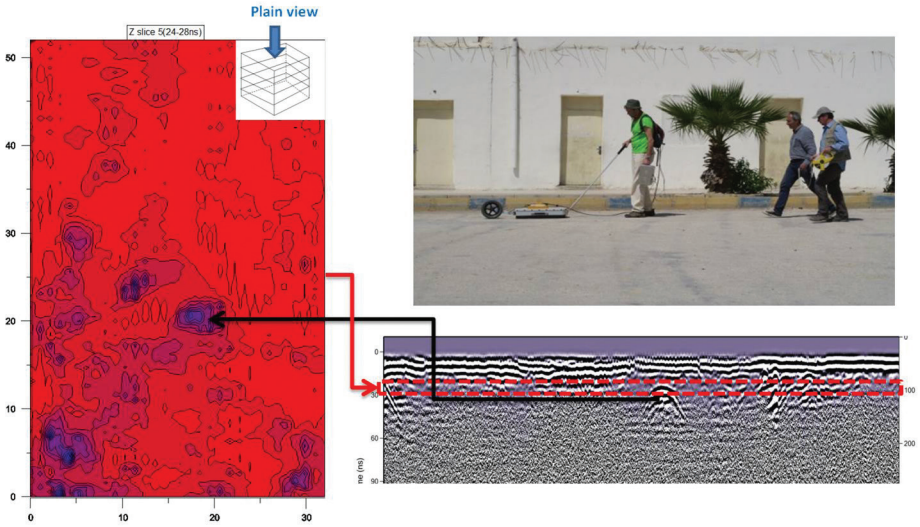
The town of Bayt Rās, located in northern Jordan, stands atop ancient Capitolias, one of the ten cities of the Decapolis League listed by Pliny the Elder. Many explorers and travelers have documented Bayt Rās over the years, including Seetzen (1806), Burckhardt (1812), Merill (1885), Buckingham (1816), Schumacher (1878–79), and Glueck (1951). Salvage excavations were conducted by the Jordanian Department of Antiquities in 1960 (Bowsher 2011). The name of Bayt Rās is mentioned in many early Arabic sources; especially in pre-Islamic and early Islamic periods, likely due to its reputation in producing wine (Al Bakri 1983). The Umayyad period Caliph Yazid II even lived in Bayt Rās (Lenzen 1992).

Project Protection and Management (Amajd Al Batayneh)

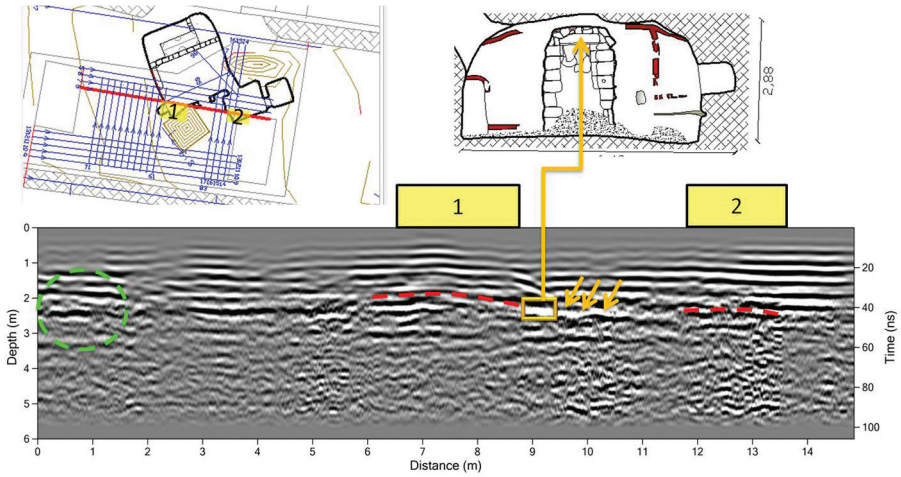
The nature of this rare discovery indicated to everyone the necessity of protecting it and presenting it in an appropriate scientific manner. For this reason, the tomb was completely closed until the formation of the project consortium, and even when the work began, policies related to the management and protection of this discovery imposed limited entry into the tomb. Moreover, we took steps to protect it from the movement of cars, because the tomb is located in the middle of a main street and adjacent to a public school. For protection from rainfall and flash floods, special soil barriers were installed to divert water flow away from the entrance of the tomb. A metal fence with a gate was installed at beginning of the project to prevent vandalism at the site and special guards were hired.

Geophysics (Giuseppe Delmonaco)

Geophysical and geotechnical surveys were conducted in two distinct campaigns: 27–29 April 2017 and 30 July–2 August 2017. These surveys mainly focused on the hypogeum (inside and outside) and the surrounding area such as the elementary school and the Roman theatre as areas of great potential archaeological interest. The geophysical investigation coupled with a Ground-Penetrating Radar (GPR) and geotechnical non-destructive techniques were applied to: (a) detect potential underground structures around the recently discovered cavity and in the neighbouring areas; (b) reconstruct the geological and geotechnical characteristics of the site; (c) set up a stability modeling of the tomb structure; and (d) provide recommendations and advice to local authorities for the safe conservation of the tomb with possible future tourism also in mind. A geotechnical analysis of a set of potential trenches and



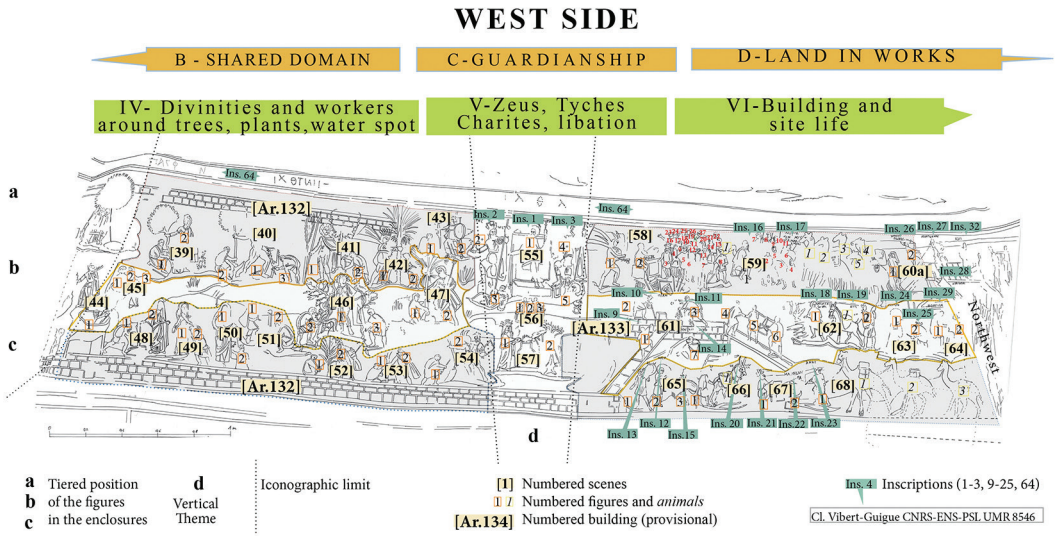
2. The geophysics field work (ISPRA) and the data analysis results (ISPRA).



3. The data analysis results (ISPRA).

design plans was carried out in support of archaeologists for further excavation of the entrance area of the tomb. (Fig. 2).

The main recommendations suggested urgent and long-term actions such as: (i) provide a temporary support to the ceiling in the eastern sector with reinforcement of the door lintel; (ii) install a monitoring system to assess displacement of the largest cracks; (iii) execute backfilling and impermeabilization of the tomb area; (iv) divert superficial waters flowing from the northern side of the road; (v) design and implement structural reinforcement of the top soils and limestone ceiling and E side of the tomb; and (vi) carry out further indirect and direct investigation of the underground structures found in the surrounding areas (Fig. 3).



4. Iconographical mapping of the composition, numbering, and hypothetical thematic (Cl. Vibert-Guigue, CNRS-ENS, PSL).

Documentation (Claude Vibert-Guigue)

More than 3,000 photographs of the tomb have been collected, as well as many drawings, in order to prepare an iconographic inventory and catalogue. The wall paintings within the tomb contain 15 main topics and 127 scenes, including almost 270 figures dominated by an image of Zeus flanked by Tyche of Capitolias and Tyche of Caesarea Maritima. The ceiling depicts signs of the zodiac and planets in a circular composition surrounded by Nereids on sea monsters and figures on a boat or amphora. A long uninterrupted narrative runs on the three walls facing the entrance: 152 figures, 66 divinities, and 24 animals make the long frieze very lively. Enclosure walls, segments of walls, and three standing facades give a building character to the narrative where trees and plants appear.

The first goal was to map and number the surfaces to be sure nothing was missed. Hand line drawings were completed to show both the state of conservation of the plaster and all the decorative details and the inscriptions (Fig. 4). This approach helped to prepare for the description and analyses of the paintings. The building scene [60], for example, reveals the painter's way of representing workers in action (Fig. 5). Unfortunately, with careful observation of the activity of each figure, what they are actually building remains unclear because of the fading of the wall and the colors of the background.

Epigraphy (Julien Aliquot and Pierre-Louis Gatier)

The epigraphic survey was conducted by Julien Aliquot, Pierre-Louis Gatier, and Jean-Baptiste Yon (IGLS[1] Project, CNRS/Lyon University, HiSoMA,[2] Ifpo). The work focused on the 65 Greek and Aramaic painted inscriptions in the tomb and attempted to understand their relationship to the images and to propose an overall historical interpretation of the entire program. The paintings running on three of the walls compose a unique narrative.

[1] Greek and Latin Inscriptions in Jordan.
[2] Histoire et Sources des Mondes Antiques.



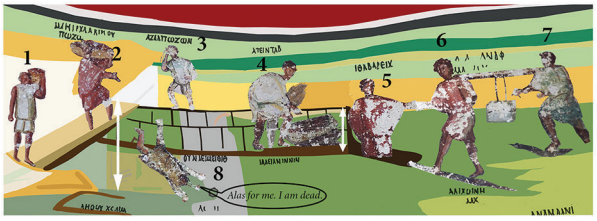
1 - North-west corner. Scene [60]. Photograph.



2 - Hand line drawing as a first sketch of understanding of the components (figures, structure,tools, colors, etc.).



3 - The wall under construction appears in transparency on the background which is treated as a patchwork of colours. From left to right, we see: a ramp reaching the extremity of a wall which begins below by a kind of masonry (viewed in perspective?); the surface of the wall (confusion with the joints of the stones?); a construction trench.



4 - Two arrows suggest a difference in height between the ends of the wall, hence the deadly falls on the left (8) (while on the right a man stands in a trench (5).

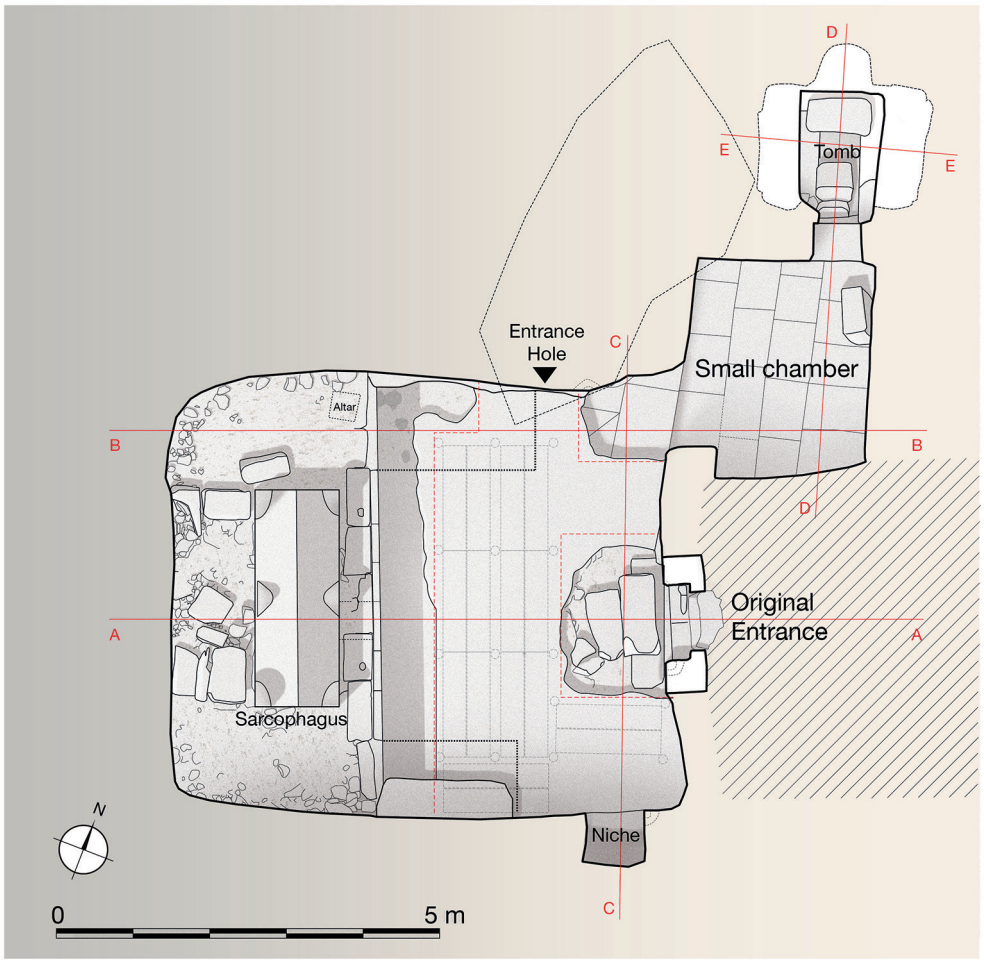
5. North-west corner, building scene and attempt of reading. The drawings of the inscriptions just remind their presence, not for a reading (the one in 8 is translated, thanks to the epigraphists; Cl. Vibert-Guigue, CNRS-ENS, PSL).

In six panels, they trace the foundation of the Greek city of Capitolias on the site of modern Bayt Rās (on the history of the city, see the overview by Bader and Yon 2018 and, for the dating of its foundation, Aliquot and Gatier 2018: 679). The gods of Olympus, who preside over this process, come to help mere mortals. The two panels on the south wall show (i) the gods at a banquet and then (ii) a series of images of rural life that evoke the appearance of an estate that preceded the city. In the following panel, on the west wall, the gods help men to cut down trees in order to clear the site of the future city. Three deities are highlighted and identified by Greek inscriptions in the middle of the same wall (iv): Zeus Kapitolios (Jupiter Capitolinus), who gave his name to Capitolias, is enthroned in majesty between the great Tyche (Fortune) of Capitolias, or guardian goddess of the city to the right and the specific Tyche of Caesarea Maritima, capital city of the Roman province of Judaea, standing to his left. Below this group, the character who offers a sacrifice in the Roman way must have the status of a Roman citizen. On the northwest corner and the adjacent walls, the construction of



6. Zeus Kapitolios enthroned between the civic Fortunes of Capitolias and Caesarea Maritima above a scene of sacrifice (CNRS HiSoMA 2019).

In six panels, they trace the foundation of the Greek city of Capitolias on the site of modern Bayt Rās (on the history of the city, see the overview by Bader and Yon 2018 and, for the dating of its foundation, Aliquot and Gatier 2018: 679). The gods of Olympus, who preside over this process, come to help mere mortals. The two panels on the south wall show (i) the gods at a banquet and then (ii) a series of images of rural life that evoke the appearance of an estate that preceded the city. In the following panel, on the west wall, the gods help men to cut down trees in order to clear the site of the future city. Three deities are highlighted and identified by Greek inscriptions in the



7. The hypogeum top plan (Ifpo).

middle of the same wall (iv): Zeus Kapitolios (Jupiter Capitolinus), who gave his name to Capitolias, is enthroned in majesty between the great Tyche (Fortune) of Capitolias, or guardian goddess of the city to the right and the specific Tyche of Caesarea Maritima, capital city of the Roman province of Judaea, standing to his left. Below this group, the character who offers a sacrifice in the Roman way must have the status of a Roman citizen. On the northwest corner and the adjacent walls, the construction of the city wall is depicted in detail (v): carving of stones, transport of materials on camels and mules, architects and foremen at work, but also scenes of fights, accidents, and even the payment of workers. The narrative ends (vi) with an assembly of the gods and goddesses of the city.

The epigraphic material is organized in three groups: three Greek labels describing the gods of the cities of Capitolias and Caesarea Maritima (Fig. 6); 61 sentences written in the Aramaic language, but transcribed in Greek letters, pertaining to the activities of workers and remarks

spoken by the characters; and a later Greek inscription on the red band along the top of the wall.

Excavation (Soizik Bechetoille)

The tomb is composed of two rooms. Room 1, the biggest, bears the paintings. It contains a colossal sarcophagus of basalt and a niche has been set in the south wall. Room 2 is covered with white plaster and includes, in its north wall, a pit tomb with three loci. The archaeological study is based on a systematic observation of the apparent features and completed by excavations in both rooms. Chiara Fornace excavated Room 2, and Jean-Sylvain Caillou, head of the archaeological mission, conducted trench excavations in Room 1, in front of the main entrance and between the scaffolding and the wall in front of the sarcophagus. Soizik Bechetoille completed an architectural survey. In the main entrance to the tomb, a doorframe of local limestone ashlars was added in antiquity to close the doorway with a large monolithic stone panel. A lead pipe brought water to a basin (missing), fixed between the entrance and the niche. On the wall a river God depicted is handling an amphora from which water flows precisely where the basin used to stand.

Lucie Duvignac (Ph.D. candidate) studied the basalt sarcophagus in detail. The sarcophagus is unique in terms of its dimensions and the quality of its decoration. The excavation of the sarcophagus was led by Joyce Nassar who found that the deposits were disturbed and displaced several times in the recent past. The general overview and documentation were completed after the cover of the sarcophagus was moved slightly. The deposit was found composed almost exclusively of broken, scattered, and commingled human remains. Due to the breakage of the bones, the anthropological team used a specific methodology to study them. The observation of the bones inside the sarcophagus and inside the small tomb did not lead to the identification of skeletons that could be dispersed inside the two contexts.

The excavation work done in the two arcosoli chambers and inside the sarcophagus helped us to understand the use and reuse of the space. The first phase of excavation gives us clues to understand different visible periods of occupation inside the burial chamber. The first results lead to new questions, and so far five phases of use have been identified. The second



8. First aid conservation for the mural painting (ISCR).

campaign of excavation, planned for 2019, and the results of C14 study of the collected bones should help us to better understand the varied usage and occupation of the Bayt Rās tomb (Fig. 7).

Conservation (Giorgio Sobra' and Marie Jose Mano)

Due to the rarity and fragility of the mural paintings, the need for a rapid condition assessment was essential to evaluate the situation of the paintings. Based on the results of this assessment a responsive action plan was designed. Controlling the environment inside the hypogeum prior to any intervention presented a challenge. As of July 2017, two missions were carried out by ISCR[3] with the aim of preserving the mural paintings. The aim of the first intervention was to save and stabilize the paintings, in order to allow subsequent operations to take place inside the hypogeum according to schedule. For this reason, the mechanic cleaning of the painted surface was completed only where necessary to ensure the cohesion and adhesion of the materials (without fixing the salts). The cleaning of the surface has therefore been limited to cases of necessity, and aesthetic preservation has not performed yet. During the first phase of graphic documentation, a detailed photographic campaign was conducted, aimed at the definition of the specific themes to make them recognizable and uniquely identified. Conservation data sheets were used and the graphic documentation allowed for the immediate visualization and localization of technical data and conservation status, especially to assess the extent and location of conservation problems and intervention. The methods of intervention and the materials to be used in the restoration were carefully selected according to the particular conditions of temperature and humidity in the hypogeum. The use of organic substances (alcohols, natural resins, etc.) has been restricted because they could encourage the growth of biodeteriogens, and they are a source of carbon which can be metabolized (Fig. 8).

[3] The name of the institute name was changed in late 2019 to Istituto Centrale per il Restauro (ICR).

Conclusion

Three peculiarities make this Bayt Rās tomb exceptional: the narrative centered on the sacrifice offered by a priest to the deities of a city and of a provincial capital; the combination of Greek and Aramaic, the main languages of the Roman Near East (Yon 2007, on this topic); and the historical connotation of the programme illustrating the foundation myth of Capitolias in AD 98. The person who ordered the decoration of the tomb before being buried there is very likely depicted within the paintings as the one who is officiating in the scene of the foundational sacrifice. He can be identified as a Roman citizen who was responsible for the founding of the city, under the orders of the Roman authorities.

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A New Database for the "Documentation of Objects in Jordanian Archaeological Museums" (DOJAM)

Introduction

Due to the regional crisis and growing illicit trafficking in cultural heritage, there was a great need for a large-scale inventory of archaeological material in Jordanian museums. Therefore, a collaborative project between the German Protestant Institute of Archaeology in the Holy Land (GPIA) and the Department of Antiquities of Jordan (DoA) was established in January 2017. It is financed by the German Gerda Henkel Foundation, whose main objective is to support the historical humanities, archaeology, the history of art, and other disciplines with a historical component. The project is entitled "DOJAM—Documentation of Objects in the Jordanian Archaeological Museums." The aim of this four-year project is the protection and management of archaeological objects stored or displayed in DoA museums, which is compatible with the 2014–2018 DoA strategy, with the focus on the Jordan Archaeological Museum (JAM) at the Amman citadel as a pilot project.

In February 2017, a Memorandum of Understanding was signed by H.E. Dr. Monther Jamhawi (at that time Director General of the DoA) and Dr. Katharina Schmidt as representative of the GPIA on behalf of Prof. Dieter Vieweger, Director General of the GPIA and Chief of the German DOJAM project's team. Dr. Jutta Häser has been designated as the local project manager, Bernard Beitz as software engineer, Dr. Hashem Khries as project assistant, and Ziad Aziz as conservator. Samia Khouri, Director of Museums and Awareness, as well as H.E. Yazed Elayan (Director General of the DoA since autumn 2019) are responsible for the project on the Jordanian side.

Project Aims

The Jordan Archaeological Museum on the Amman Citadel will act as a pilot model. It was previously the National Museum

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from the 1950's until 2013 when the Jordan Museum opened. It is particularly suitable for a pilot project because it contains a large collection of objects: there are approximately 1,500 finds on display and more than 8,000 objects in the storage rooms. Furthermore, the collection encompasses a diversity of archaeological objects, such as pottery vessels, worked stone with either inscriptions and/or decorative elements, flint tools, glass vessels as well as metal objects. The objects range in date from the Palaeolithic to the Ottoman period. Therefore, it provides examples for a wide array of entries for various archaeological objects in Jordan.

The objectives of the project are manifold. They comprise three spheres of engagement:

1) the archaeological objects
2) the storage facilities
3) the museum staff

Several aims are in focus in the first sphere:

1) building up a database for the museum objects
2) registration of archaeological objects
3) photographing of each object
4) 3D-digitization of high priority objects
5) conservation of endangered archaeological objects

The second sphere is dealing with the storage and lab facilities in the JAM:

1) renovation of the four storage rooms in the lower part of the museum
2) equipment of the storage rooms
3) management of the storage facilities
4) establishment of a risk-preparedness plan

The third sphere is focused on the training of the DoA's staff:

1) handling of archaeological objects
2) basic cleaning of archaeological objects
3) packing and storing of archaeological objects
4) inventory of archaeological objects
5) photographing of archaeological objects
6) 3D-digitization of archaeological objects

The DOJAM Database

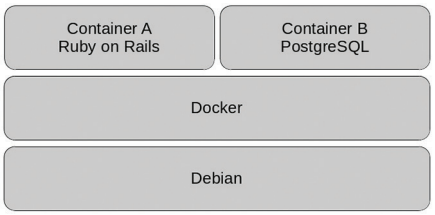
The focus of this paper is a short presentation of the new database which has been built up for the museums of the DoA. In order to provide a modern way to manage information about the archaeological objects, a database application has been designed with the two key aspects, namely usability and sustainability.

To achieve long-term sustainability, only open source and well established and mature technologies have been used. Relying on open source has also the advantage of being independent of licensing, which means lower and more predictable cost in the long run. "Ruby on Rails" has been used for building up the actual database-application and "PostgreSQL" as the database management system. Both can be run on common servers, Debian stable has been chosen, which is a common choice. "Ruby on Rails," often just called "Rails" is in use since 2005 and received very good reviews for its design and the way in which it allows for a high degree of productivity. Today, other similar frameworks are common, but nevertheless "Rails" is still a highly popular framework. As "Rails" is a web-application framework, the database-application can be accessed by any modern browser, which provides a lot of flexibility and long-term

compatibility. While "PostgreSQL" differs in many ways from the better-known MySQL, it also uses tables to store data, and it is possible to use SQL to query the database. "PostgreSQL" was chosen as it is the best supported database system for "Rails." Finally, Linux is used more often for servers than for desktop PCs, Debian is a very common Linux-based system and it was chosen because it provides a highly stable platform.

As hardware and software become deprecated relatively fast, two approaches have been levered to enable long-term usage: the application is designed as a web-application, which means that it is accessed through a web browser by the user. This avoids the necessity to install any additional software on the user's computer. Additionally, the application itself is encapsulated inside of what is called a "container" that contains any needed software and thus minimizes external dependencies so that the software can be easily run on future hard- and software (Fig. 1).

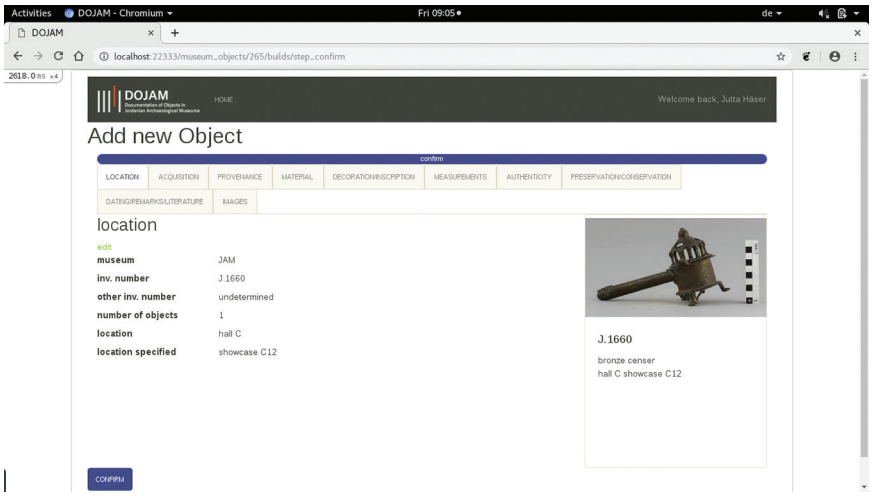
The application will be used as an administrative tool for the inventory in different archaeological museums in Jordan. Therefore, it must provide high usability. The main user group working with the database on a regular base will only have a limited scientific or technical background. To have a database that has a good technical long-term maintainability is one aspect, a second important aspect is if it is easily usable on a daily base. In order to achieve this usability, common tasks like inserting an object into the database must be kept as simple as possible. To avoid visual overloading, the data entry was split into several meaningful steps, starting with general and necessary data about the storage location up to detailed descriptions.



1. Overview of involved technologies. Docker has been used to separate the application (Container A) from the database (Container B) and from the underlying operating system (Debian).

Wherever reasonable, the user is not allowed to enter information as free text. Instead, predefined lists are presented to the user for avoiding typing errors and enabling a clearly defined terminology, which also makes querying the database much easier. As archaeological terminology tends to be very complex, this approach leads to relatively long lists, a poor overview of the possible terms, and bad usability. This is avoided by introducing smart lists. As the user inputs more and more information about the object, these data have been used to narrow possible choices in later steps. For example, as there is no armory made of glass, there is no reason to show "armor" as a possible choice for a glass object. Smart lists are made possible by an approach called "materialized path." The user starts to choose the material (*e.g.*, metal) of the object first. In a second step, he chooses the more specific material type (*e.g.*, bronze), in a third step the kind of object (*e.g.*, vessel), and at last the more specific type of an object (*e.g.*, censer). Based on this input, only sensible choices are presented to the user later. The associated paper has been published in the meantime (Beitz *et al.* 2022)

Since the database should not only be used as administrative tool for the museums but also for scientific research, a wide range of information about one object can be entered, such as production methods or bibliographical references. However, the information depth depends on the knowledge of the person who enters the data.



2. Screenshot of input mask of the DOJAM database for the step "location."

If a great number of objects has to be registered in a short period of time, it is possible to enter just the location of the object in the museum and the museum inventory number (Fig. 2). All other data can be added later.

To ensure ease of access for colleagues in the Arab world as well as for foreign researchers, the database can be used in English and Arabic.

The experience of the work in the JAM from 2017 to 2019 shows that about 40 to 50 archaeological complete objects can be entered in a relatively detailed manner to the DOJAM database by an experienced person in one day. This excludes searching and adding bibliographical references, as this process takes longer.

In 2018 and 2019, the professional photographer Johannes Kramer took photographs of the high priority objects in the JAM. In spring 2018, he trained the assistant of the project, Hashem Khries. Since then, he has photographed almost all available objects in the exhibition, *i.e.*, approximately 1,500 objects. Each object was photographed from several sides. All photographs are stored as raw- and jpg-files. Tiff-files can be generated from the raw files. At least one photograph per object has been entered to the database. In future, the number of photographs for each object inserted in the database depends on the server capacity.

In autumn 2019, the 3D-scanning of high-priority objects has been started in the JAM. These files can also be integrated in the database.

In 2020, the database will be installed on a server at the DoA and, from 2021 onwards, it should be used in all archaeological museums under the auspices of the DoA in Jordan.

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Assessment of Interpretation and Presentation Methods of Archaeological Sites in Mādābā (Archaeological Park 1, Archaeological Park 2, and Visitor Center)

Introduction

Jordan has a large number of highly significant archeological sites such as Petra, Jerash, and Mādābā. Mādābā is the fifth most populous city in Jordan. It is best known for its Byzantine and Umayyad mosaics, especially the large Byzantine-era mosaic map of "the Holy Land." Mādābā is located 30 km south-west of the capital ʿAmmān. Mādābā is a timeless city of people, cultural history, and mosaics, located in the heart of "the Holy Land" of Jordan, influencing world history for thousands of years from its first mention in the Bible, through early Roman times, into the Byzantine era, and continuing through today.

Mādābā is also one of the richest cities in Jordan in terms of archaeological monuments. It contains many different archaeological features of either historical or religious importance. All these immovable antiquities deserve augmented efforts for their protection and preservation. The Ministry of Tourism and Antiquities (MOTA) and Department of Antiquities (DoA) would like to improve the quality of visits, and at the same time, ensure the preservation of cultural heritage for future generations. Improving interpretation at sites is one way to do this. In economic terms, good, high-quality interpretation increases visits to the site and makes the site a highly desirable destination. For the people of Jordan, interpretation allows a better understanding and appreciation of their heritage and will support the protection of the sites into the future. Jordan needs to achieve both goals.

Heritage interpretation is an educational activity, which aims at revealing meanings and relationships using original objects, illustrative media, and firsthand experience, rather than simply communicating information. When presenting and interpreting the historical development of heritage sites, it is necessary to be selective and decide which

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elements will be most interesting to the kind of people that the site will attract.

Statement of the Problem

Mādābā is considered to be one of the most important examples of how methods of interpretation can be applied to archaeological sites. Hence, this study assesses the methods that were applied in Mādābā. A problem to be discussed is whether these methods, adopted according to international standards, are ideal ones for the case of this city or not? Do these methods impart the sufficient information on the site required by visitor or not? Another question to be posed is whether these methods achieve their aims and objectives at Mādābā? And, is it possible to apply the same methods to other sites in Jordan?

Aims of the Study

- To assess the methods of presentation and interpretation at Mādābā and determine whether these methods are compatible with the sites in Mādābā.
- To evaluate the success of presentation and interpretation methods at the archaeological sites of Mādābā.
- To estimate whether the local community and the visitors benefit from such a project or not.
- To calculate the impact of such a project (*i.e.*, interpretation plan) on the economy of the city of Mādābā.
- To assess the ability of the archaeological sites' staff to deal with panels and other tools of information.
- To research the possibility of the application and implementation of these methods at other sites in Jordan.
- To evaluate the visitor's opinion on the interpretation methods at Mādābā.

Methodology of Research

In this study, a literature survey, fieldwork, and interviews were conducted. Because we intend to assess the presentation and interpretation of the archaeological sites in Mādābā, it is necessary to explain the method applied there.

I. Literature Survey

The theoretical part of the study is based on a literature survey. The researcher begins by conducting a critical survey of previous studies, which are concerned with cultural resources and heritage management, as well as the presentation and interpretation of archaeological sites. This methodological step includes a survey of studies related to the methods and tools of interpretation and provides the researcher with a firm foundation of knowledge for the study.

II. Fieldwork

Fieldwork is a very important element because this study will assess the methods that are applied in archaeological sites in Mādābā. For this reason, all of the sites with interpretation (Visitor Center, Virgin Mary Church, and Archaeological Parks 1 and 2) are visited, and the various interpretive tools are compared with the ideal or standard methods applied across the world.

III. Interviews

The interviews are conducted in Mādābā city, especially in areas surrounding the sites to be studied. The main audience for this study consists of:

- Educated and non-educated visitors
- Students
- Tourists—FITs and Groups
- Local community
- Staff at the sites
- Tour guides

I. Literature Survey

The ICOMOS *Charter for the Interpretation and Presentation of Cultural Heritage Sites* (2008) defines "interpretation" as the carefully planned public explanation or discussion of a cultural heritage site, encompassing its full significance, both tangible and intangible. Interpretive communication media can range from text panels, to live guides and interpreters, to complex "Virtual Reality" applications. Whatever the choice of specific media may be, they should provide information about the site which would be otherwise unavailable. Interpretation should be a combination of the treatment of the site's fabric, the use of the site and activities connected with it, and explanatory information based on research activities and collections.

Tilden (1957) defined six principles of interpretation that has set the standard for site interpretation. These principles are:

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile, therefore the interpretation tools should be match the visitor's needs.
2. Information, as such, is not interpretation. Interpretation is revelation based on information. They are entirely different things. However, all interpretation includes information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree teachable.
4. The chief aim of interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part and must address itself to the whole rather than any phase.
6. Interpretation addressed to children (up to the age of twelve) should not be a dilution of the presentation to adults but should follow a fundamentally different approach. To be at its best it will require a separate program.

Following a similar approach, the *Siyaḥa* Project in Mādābā 2007 (interpretation and implementation) has published general guidelines for the creation of interpretation panels:

- Each panel should have only ONE message (theme) per exhibit.
- The text in each panel should be short. Make every word count. Strive for no more than 50 words per text block (divide longer text into columns or paragraphs).
- Say it with graphics. Visitors remember 30% of what they read and 50% of what they see.
- Proof-read! Make sure your spelling and grammar are correct.
- Use active verbs, encourage involvement, be specific to the site, speak to the reader.
- Avoid jargon and technical language.
- Use good interpretation: be relevant, provocative, meaningful, creative, fun.
- Assist visitors in visualizing meaning and connecting to the story and the landscape.
- Strive for 2/3 graphics and blank space, 1/3 text.
- All elements of the page-text, color blocks, graphics, even blank space, have "weight."
- The 3-30-3 rule: 3 seconds to hook the visitor, 30 seconds to review if hooked, 3 minutes if very interested.
- Use good design: make it uncluttered, attractive, balanced, and readable.

- Use good graphics. *A picture is worth 1,000 words.*
- Use strong contrasts for text and background for readability.
- Pyramid the text: titles: 72–100 pt., main text: 32–48 pt., subtext: 24–30 pt., captions: 18 pt., no text smaller than 18 pt.
- Use no more than two typefaces: one for titles and the other for text. Pick simple styles. Use CAPS only for titles.
- Maintain consistent style for exhibits in a series.
- Seek to spark the visitor's interest and let them move on to explore the special place.

The ICOMOS *Charter for the Protection and Management of the Archaeological Heritage* (1990) Article 7 mentions that the presentation of the archaeological heritage to the general public is an essential method of promoting the understanding of the origins and development of modern societies. At the same time, it is the most important means of promoting the understanding of the need for its protection.

Presentation and information should be conceived of as a popular interpretation of the current state of knowledge, and it must therefore be revised frequently. It should take into account the multifaceted approaches to imparting an understanding of the past.

Interpretation is the art of telling a good story. But it is not as simple as it sounds! If you only list a few facts, you are not *interpreting* your resource—you are just *describing* it. Interpretation, on the other hand, helps visitors to *connect* with what they are experiencing. Interpretation does not just teach what something *is*, but what it *means*. That is the real meaning of a good story. When you tell a story about a resource in your community, and what it means to you, you are "interpreting" something. You are making a connection between things and ideas and giving visitors an opportunity to experience something with their minds *and* their hearts (Lancaster County Planning Commission 2001).

The goal of interpretation is to engage visitors' senses while challenging them to think about what things mean—to look at them in entirely new ways. Interpretation can create memorable and meaningful experiences for visitors and inspire them to learn more. Thorsten Ludwig (2003) explains the method of writing texts for interpretive panels as below:

How Do We Find Our Theme?
- Conclude the sentence: "After reading my text, I want the visitor to understand that. . ."
- A theme is a short, essential, impressive sentence.
- A theme gets under our skin.
- A theme has a relationship to the visitor's world.
- A theme deals with objects or phenomena on site.

What Should We Keep in Mind When Preparing the Text?
- The text contains 2 to 3 short and pithy statements about the theme.
- The text should cause an impressive image to form in the visitor's head.
- The text provokes (a), relates (b), and reveals (c).
- Every fact is condensed into a story which touches the visitor.
- The text should be understandable for every 7th grader.

How Do We Make Our Texts Readable?
- Use one simple type font (*e.g.*, Helvetica) in running text without special markings.
- Use adequate type size (about 48 pt.) and pleasant color contrasts.
- Write in a simple and stimulating

way (*e.g.*, use humor)—and structure it clearly.
- Use words with few syllables and active verbs.
- Illustrate extraordinary sizes or periods of times.

What Should We Avoid?
- Running text in capital letters.
- Boring short sentences, secondary clauses, and convoluted sentences.
- Filler words, unnecessary adjectives, unfamiliar words, foreign words, and jargon.
- Elongated verb forms and hyphenated words.
- Numbers (when not necessary or if we cannot make them understandable).

What Makes Our Facts Easy to Remember?
- A connection to something actual.
- Staging a surprise revelation (ah ha! effect).
- Pointing out an individual (this person, this tree. . .).
- An example, metaphor, comparison, analogy, quotation from the visitor's world.

Interpretation Theories

Archaeological sites, heritage buildings, natural reserves, local museums, and visitor centers all have something in common. All of these things have something of interest to show visitors, and they all have something to say about these things. The significance of some cultural heritage items is easy to understand, but the values of others are not obvious and require interpretation. To convey information to visitors, interpretation and presentation is used and should balance the need of the visitors with the conservation of the place, which is its subject.

As previously discussed, interpretation is the communication of ideas and feelings that enable people to enhance their understanding and appreciation of their world and their role in it (Interpretation Australia 2022).

Heritage interpretation is about sharing memories and experiences. It respects the relations between people and place, whether a place is a natural landscape, an archaeological site, or other site modified by use. It involves partnerships between interpreters and a range of different stakeholders, including Indigenous and other communities, archaeologists, historians, and artists (Australian Capital Territory Heritage Council 2007).

Interpretation and Presentation Definitions

Although there are many ways to define interpretation, all definitions convey the idea of sharing significant information with others. It is also important that people will actually see or experience for themselves the place or thing that is being interpreted. Nevertheless, these are some of the various definitions of "interpretation" and "presentation":

> Interpretation:
> The full range of potential activities that aims to increase public awareness and improve understanding of cultural heritage sites through different means of presentation, such as print and electronic publications, public lectures, on-site and directly related off-site installations, educational programs, community activities, and ongoing research, training, and evaluation of the interpretation process itself (ICOMOS 2008).

> Interpretation:
> The way to help visitors understand the history and importance of events, people, and objects from the

site that they visited (Alderson and Low 1996).

Presentation:
Denotes, in particular, the carefully planned communication of interpretive content through the arrangement of interpretive information, physical access, and interpretive infrastructure at a cultural heritage site. It can be conveyed through a variety of technical means, including, yet not requiring, such elements as informational panels, museum-type displays, formalized walking tours, lectures and guided tours, and multimedia applications and websites (ICOMOS 2008).

Interpretation:
A process, a rendering, by which visitors see, learn, experience, and are inspired firsthand. Interpreters must be skilled in communication and knowledgeable in natural and cultural history consistent with their site's mission (Beck and Cable 2011).

Interpretation:
The National Park Service and other American agencies define interpretation as the process of providing each visitor the opportunity to connect personally with a place. Each individual may connect to the place in a different way, some may connect later, but everyone should have an opportunity to explore the importance of the place and its value (National Park Service 2021).

Interpretation:
A type of communication that goes beyond truth—a means of communicating ideas and feelings that help people enhance their understanding and appreciation of their world, and their role in it (Interpretation Australia 2022).

Presentation:
An essential method of imparting an understanding to the general public of archaeological heritage and the origins and development of modern societies. At the same time, it is the most important means of promoting an understanding of the need for its protection (ICOMOS 1990).

Why Do We Have to Interpret Sites?

Interpretation can play an important role in heritage management and cultural sites, and all interpretation requires that the subject be something interesting. If you do not have a good story to tell, perhaps you need other solutions to meet your needs (Carter 1997).

The importance of heritage and cultural sites is often easy to understand, but the values of others are not as understandable, therefore they need interpretation because of its ability to impart understanding of heritage items to different audiences with different levels of experience and different learning styles. Interpretation strengthens and sustains the relationships between the community and its heritage and may have economic and social benefits for local people (NSW Heritage Office 2005).

The resources that we as a society preserve in archaeological sites, museums, cultural items, and heritage sites are important to many people and that importance has to be clear for all. These resources have the ability to express many different things to many different people. The reason we engage in interpretation is to help visitors discover and understand the meanings of these sites. For those visitors

who already relate to the site, interpreters offer opportunities to discover a broader understanding, to see the site with new eyes. The meanings that these sites provide can help to inspire and revive, possibly leading to an appreciation for the wealth and complexity of life (Mayo and Larsen 2009).

We interpret to:

- Improve people's lives by giving them something to consider, remember, or explore.
- Bring things to light.
- Pass on knowledge.
- Seek to change behavior (Edwards 1994).

Interpretation helps fulfill our goals and share knowledge with others. We interpret to:

- Enrich the visitors' experience, informing them about the how, what, and why of protecting special places for this and future generations.
- Raise awareness, understanding, and support for conservation.
- Promote a particular issue or message, and to foster desired visitor behavior, *e.g.*, minimal impact
- Promote positive relations with the community, understanding about programs, and facilitate volunteer involvement and engagement.

What Do You Want to Interpret?

Interpretation could cover a huge number of subjects at any place and can send a strong message to all people who visit it (Savage and James 2001). An interpretive plan must define what is important for the interpretation of the place. To do this, you need to find out what is important about it, select the features you feel visitors will find interesting, and decide what it is you want to tell them about those features. As part of this, you must also consider how much, and where and when, to encourage access to the features you select. However, whether something is significant or not can depend on your viewpoint. You can find out what others think is significant from books. If you want your interpretation to reflect the real character of a place, it is worth getting opinions from those who live there about what they would like to show visitors. You will not be able to include every suggestion that is made, but if your interpretation can include something of what local people regard as special, it will give them a sense of ownership. It may also give visitors a greater sense of the unique character of that place (Carter 1997).

At most places there is an endless number of topics and stories which could be interpreted. Identify site features such as views, popular activities, uniqueness, stories, topics.

- Consider what is interpreted elsewhere and what links there may be to this site or topic.
- Reflect on how interpreting it will relate to achieving your overarching objectives.
- Reflect on how well any existing interpretation has worked and what may be retained.

Above all, your interpretation must be factually accurate, so record detailed references as you collate material and always reference quotes. Interpreters must concern themselves with the quantity and quality (selection and accuracy) of information presented. Focused, well-researched interpretation will be more powerful than a longer discourse (Beck and Cable 2011).

The Benefits of Interpretation

Local communities and councils, community organizations, tour operators,

and visitors can benefit from heritage interpretation. Specifically, because interpretation can:

- Make you want to return to the site again.
- Specify what is unique and special about places and things.
- Preserve environmental and cultural resources from damage by explaining the impacts of various actions, therefore encouraging visitors to care about the places they visit and to behave responsibly.
- Helps to meet the increasing demand for educational visitor experiences (Australian Capital Territory Heritage Council 2007).

Moreover, good interpretation will give us social, environmental, and economic benefits. The social benefits of good interpretation will:

- Give local people or visitors opportunities for enjoyable leisure time experiences and entertainment.
- Provide learning opportunities for audiences and staff through various media.
- Empower volunteers and paid workers through the development of skills in preparing interpretation projects and communicating with visitors.
- Allow participants to think about how a place or a community has been formed, and what it is important and unique about it (Australian Capital Territory Heritage Council 2007).

Environmental Benefits

Interpretation includes cultural and natural heritage, and natural heritage interpretation involves very important issues concerning the protection of our environment. Therefore, good interpretation of natural heritage will increase appreciation of natural and cultural landscapes and expand understanding of the environmental issues that are now affecting all of our lives. Good interpretation can help protect ecosystems, biodiversity, and natural resources by changing attitudes and promoting suitable behavior that will minimize impact (Australian Capital Territory Heritage Council 2007).

Economic Benefits

Heritage interpretation utilizes environmental and cultural resources that offer economic benefits to governments, businesses, and communities. Our natural and cultural heritage already attracts domestic and international tourists. Tourism offers great economic opportunities and a stimulus for urban and regional renewal, which is particularly important in regional communities that are declining with the increasing centralization of population and services in the 21st century. Visitors will come and stay longer in a place if attractions and features are available, well- marketed, and have benefit through interpretation.

Visitors require services, particularly meals and accommodation, which will enhance the hospitality and business outlets to meet their demands and create new job opportunities, and this will increase income, enabling heritage councils to expand their range of services (Australian Capital Territory Heritage Council 2007).

Principles of Heritage Interpretation

At the beginning of this literature survey, Tilden's (1957) six principles of interpretation were discussed. In addition to these, others have formulated their own principles as well. For instance, the ICOMOS (2008) has seven principles:

Principle 1: Access and Understanding
The appreciation of cultural heritage sites is a universal right. The communication of their significance should be as broad as possible through effective, sustainable interpretation suited to a wide range of visitor and stakeholder groups.

Principle 2: Information Sources
The interpretation of heritage sites must be based on accepted scientific evidence, with due regard for the coexistence of alternative cultural traditions.

Principle 3: Context and Setting
The interpretation of cultural heritage sites should relate to their wider social, cultural, historical, and natural contexts and settings.

Principle 4: Authenticity
The interpretation of cultural heritage sites must respect their authenticity and seek to protect their original fabric.

Principle 5: Sustainability
The interpretation of cultural heritage sites must be well planned and sensitive to their natural and cultural environment. Social, financial, and environmental sustainability should be among the central goals of any interpretive project.

Principle 6: Inclusiveness
The interpretation of cultural heritage sites must actively involve the participation of all stakeholders and relevant communities.

Principle 7: Research, Training, and Evaluation
The interpretation of a cultural heritage site must be an ongoing evolving process of explanation and understanding that includes continuing research, training, and evaluation.

Beck and Cable (2011), on the other hand, have developed 15 principles for interpretation:

1. To spark an interest, interpreters must relate the subject to the lives of the people in their audience.
2. The purpose of interpretation goes beyond providing information to reveal deeper meaning and truth.
3. The interpretive presentation as a work of art should be designed as a story that informs, entertains, and enlightens.
4. The purpose of the interpretive story is to inspire and to provoke people to broaden their horizons.
5. Interpretation should present a complete theme or thesis and address the whole person.
6. Interpretation for children, teenagers, and seniors when these comprise uniform groups should follow fundamentally different approaches.
7. Every place has a history. Interpreters can bring the past alive to make the present more enjoyable and the future more meaningful.
8. Technology can reveal the world in exciting new ways. However,

incorporating this technology into the interpretive program must be done with foresight and thoughtful care.

9. Interpreters must concern themselves with the quantity and quality (selection and accuracy) of information presented. Focused, well-researched interpretation will be more powerful than a longer discourse.
10. Before applying the arts in interpretation, the interpreter must be familiar with basic communication techniques. Quality interpretation depends on the interpreter's knowledge and skills, which must be continually developed over time.
11. Interpretive writing should concentrate on what visitors would like to know, with authority, respect, humility, and care.
12. The interpretation programs must be capable of attracting support—financial, volunteer, political, and administrative, whatever support is needed—for the program to prosper.
13. One of the interpretation aims should be instill in people the ability, and the desire, to sense the beauty in their surroundings to provide spiritual uplift and to encourage resource preservation.
14. Interpreters can promote optimal experiences through intentional and thoughtful program and facility design.
15. Passion is the vital ingredient for powerful and effective interpretation—passion for the resource and for those people who come to be inspired by it (Beck and Cable 2011).

Interpretation and Presentation Tools

As previously discussed, presentation is the way that all the ideas are conveyed through the use of different tools, such as those listed below:

Publications/Publicity/Souvenirs:

Posters, pamphlets, books; internet web sites, interactive search programs; videos, audios and tapes/CDs; school project material; souvenirs—postcards, models, tea towels, images (NSW Heritage Office 2005).

Events/Access:

Oral histories; video recordings; providing opportunities for people to assist with maintenance; access to the item through day-to-day use and management; access via tours, open days, events; commemorative and celebratory events; events for associated people and special interest groups; and artist in residence programs (NSW Heritage Office 2005).

Activities Away from the Item:

Events and activities related to the place; exhibitions; other media—such as radio, TV, internet, etc. (NSW Heritage Office 2005).

How to Create Interpretive Panels

Guidelines for Producing Interpretation Panels

- Keep it simple (text short): the best panels are often the simplest. A single panel should communicate one or two main messages. Panels that try to do too much will be ignored. As a guide, you should aim for a maximum of 200 words per panel, and a simple and attractive design, (divide longer text into columns or paragraphs, as suggested by the *Siyaḥa* Project in Mādābā in 2007).

- Layering the message: layering makes your message more accessible to everyone. Research shows that people look at adverts (and panels) in the following order:
  - The headline (use minimum 12 mm, 60–72 pt. text size).
  - The main picture.
  - Subheadings (use minimum 8 mm, 48–60 pt. text size).
  - Bullet points.
  - Further illustrations (use minimum 5 mm, 24 pt. text size).
  - The main text (use minimum 5 mm, 24 pt. text size).
  - The main text can contain all the necessary detail. The panel must look attractive and be accessible at a glance. Many people will decide in seconds whether they will read it. These few seconds are vital: provoke and stimulate their interest, and you have them! (Scottish Natural Heritage n.d.)
- Use good visuals: good visuals can make all the difference between a good and bad panel. Visuals could be photographs, drawings or illustrations, and have important roles in communicating with your audience:
  - Drawings are often better at illustrating something than photos.
  - All illustrations should have a clear relationship with the text
  - All illustrations should be clearly labeled or annotated.
  - Allow sufficient time and money to research and sources the visuals, commission drawings if necessary, and pay any copyright fees.
  - If a map is needed on an interpretive panel, it must be clear and easily understood
    - Make sure you have copyright clearance for the map.
    - Only include information that is necessary.
    - Make sure the map is large enough for the panel.
    - Make sure the design is clear and easily understood. Consider using an oblique "3-D" map if possible (Scottish Natural Heritage n.d.).
- Layout and design: good layout and design will unite the text and visuals and will ultimately dictate how well your message is putting across
  - Always involve your designer at the earliest stage and provide them with all relevant information about your panel such as why, who for, the site layout, etc.
  - At an early stage you should decide what materials you want to use for the panel by considering what will best enhance the on-site experience and blend with the surroundings .
  - A number of production techniques are available depending on your design, budget and desired lifespan of the panel. Most manufacturers can provide up-to-date technical advice on each technique they offer.
  - Make sure your panel is properly maintained by keeping its surfaces clean, tightening all fittings, and cutting encroaching vegetation, etc. (Scottish Natural Heritage n.d.).

Audiences and Their Needs

In planning your project, it is essential for you to understand your audience in order to tailor your interpretation to meet their needs. You will need to undertake surveys to tell you who your visitors are and why they visit. The range of common audiences consists of:

- General visitors: layer the interpretation so that it offers something for everyone regardless of their knowledge, ability, or interest in a subject.
- Local people: interpret the particular local significance of your heritage asset, and possibly involve them in planning and implementing the scheme.
- Children: provide activities, games and interactive displays using simple language in a bright, lively, and fun design style and which appeal to families.
- Repeat visitors: provide changing displays that offer something new on a regular basis.
- Specialist interest visitors: provide interpretation options containing more detailed, in-depth material such as printed fact sheets.
- Formal learning groups: tie the content to national curricula or to the learning programs of further, higher and adult education.

If you wish to attract new audiences, you should provide interpretation specifically for them. This is particularly relevant if you want to encourage audiences who may previously have been excluded or under-represented at your site, such as people from ethnic minority cultures, young people, and low-income visitors. For such groups you should consider the advantages of live interpretation by peers, for example an interpreter from a minority culture for an audience from the same group (Heritage Lottery Fund 2009).

II. Fieldwork

Methodology of the Study

This study is based on the use of two approaches to scientific research methods:

- A: Descriptive and analytical approach: this approach was used to review the literature to explore the assessment of interpretations and presentations of archaeological and heritage sites. The case study: Mādābā Visitors Centre (MVC).
- B: Research field methodology: this approach was used to cover the practical side of this study, through testing the validity of hypotheses of the study, answering questions, and drawing their results out of the questionnaire that developed for the purposes of the study according to the steps of scientific norms.

The Study Population and Sample

The study population consisted of visitors, tourists, tour guides, local people, and staff in Mādābā Visitor Center in the governorate of Mādābā. The study sample consisted of 60 individuals, and after initial questionnaires, 13 were excluded to identify the lack of validity for the purposes of statistical analysis. One was the final questionnaire (n=47), representing a rate of 88% of the study sample, with the results of data analysis being used for the distribution of demographic sample of the study in order to find frequencies and percentages to characterize the study sample. Table 1 shows the characterization of the members of the study sample.

Validity of Study Tool

Four arbitrators from faculties of universities in Jordan verified the strength of the questionnaire's language. They gave

Variable	Frequency	Percent
Gender		
Male	25	53.2
Female	22	46.8
Age		
Less than 25	4	8.5
26–35	20	42.6
36–45	12	25.5
46–55	5	10.6
56–65	6	12.8
Greater than 65	**	**
Nationality		
Jordanian	27	57.4
Arab	1	2.1
Non-Arab	19	40.4
Education		
School education	5	10.6
Community college diploma	11	23.4
First university degree	11	23.4
Post-graduate	20	42.6
Occupation		
A public sector	17	36.2
Self-employed	15	31.9
Student	3	6.4
Unemployed	9	19.1
Retired	3	6.4
Sector		
Tourism related	24	51.1
Non tourism related	23	48.9
How many times you have been to Mādābā		
The first time	20	42.6
Twice to 3 times	8	17.0
4 times and more	19	40.4
Would you like to visit Mādābā again		
Yes	42	89.4
No	5	10.6
Would you recommend that friends visit Mādābā		
Yes	46	97.9
No	1	46
Did you have difficulty reaching the Mādābā Visitor Center?		
Yes	29	61.7
No	18	38.3
Total	**47**	**100%**

Table 1. Characteristics of the member study sample.

their opinions, re-worded some of the content, and suggested modifications. The questionnaire was presented to a sample test group of 20 visitors and workers in the Visitor Center in the governorate of Mādābā in order to identify the degree of responsiveness. Members of the study sample expressed their willingness to respond to the question, which confirms the utility and validity of the tool (Table 2).

Reliability of Study Tool

To calculate the stability of the study tool, the researcher used an equation of internal consistency using Cronbach's Alpha test shown in Table 3. The test results where the values of Cronbach's Alpha for all variables of the study are ≥60% are considered acceptable, which gives the questionnaire as a whole a reliability coefficient ranging between 89–97%, as shown in Table 3.

Statistical Processing

To answer the questions of the study, descriptive and analytical methods were used. The statistical software SPSS, which includes standard descriptive statistics (Descriptive Statistic Measure), was used to describe the characteristics of the

Table 2. The study tool, consisting of five parts.

First Part: Demographic Variables	Gender Age Nationality Education Occupation Sector How many times you have been to Mādābā? Would you like to visit Mādābā again? Would you recommend friends visit Mādābā? Did you have difficulty reaching the Mādābā Visitor Center?
Second Part: Information on the interpretation methods at the Mādābā Visitor Center.	
Third Part: Data on the extent of the impact of methods of interpretation in the Mādābā Visitor Center on tourists and their duration of stay in Mādābā.	
Fourth Part: Data related to presentations, tour guides, and staff at the Mādābā Visitor Center.	
Fifth Part: Data on the implementation of interpretation and presentation projects and local community participation.	

Table 3. The stability of the study tool by Cronbach Alpha test.

Variables	**Cronbach's Alpha**
Information on the interpretation at the Mādābā Visitor Center.	0.89
Data on the extent of the impact of methods of interpretation in the Mādābā Visitor Center on tourists and their duration of stay in Mādābā.	0.90
Data related to presentations, tour guides, and staff at the Mādābā Visitor Center.	0.92
Data on the implementation of interpretation and presentation projects and local community participation.	0.97
The Total of the questionnaire statements as a whole	**0.98**

Table 4. Scale of weighted means of descriptive statistics used in the study.

Weighted Mean	**Degree**
1–2.33	Low
2.34–3.66	Medium
3.67–5.00	High

sample, such as frequencies and percentages. In order to answer the research questions of the study, means and standard deviations, as well as the Cronbach's Alpha test were used to ensure the stability of the study tool, and a one sample T-test was used to answer the hypotheses of the study.

The Results

The results of the descriptive statistical analysis of the data (which includes means and standard deviations for all independent studies, axes, and questions consisting of each axis) were graded using the scale presented in Table 4.

Table 5. Mean, standard deviation, and degree of information on the methods interpretation at MVC ranked in descending order.

Response Number	Information on the interpretation methods at MVC	Mean	Standard Deviation	Degree
2	Diverse and gives tourists the freedom to choose the site	3.81	0.92	High
8	Correct and easy to understand texts	3.70	0.69	High
5	Contributes to better understanding of sites	3.66	1.01	Medium
6	Contains diversity of ways of presentations	3.64	0.97	Medium
9	Properly and easily accessible interpretation panels	3.64	0.97	Medium
1	Containing sufficient tourism information	3.60	0.95	Medium
7	Suitable size of panels for all visitors	3.49	0.88	Medium
3	Available for all visitors	3.32	1.20	Medium
4	Suitable all age groups	3.11	1.18	Medium
10	Available in different languages	2.87	1.17	Medium
	Total	3.48	0.99	Medium

Table 6. Mean, standard deviation, and degree of the extent of the impact of interpretation methods in the Mādābā Visitor Center on tourists and their duration of stay in Mādābā ranked in descending order.

Response Number	Tourists are impacted by interpretation panels in many ways	Mean	Standard Deviation	Degree
3	Allows tourist a wider space to explore the city	3.83	0.60	High
1	Gives options to tourists	3.72	0.77	High
2	Prolong the stay of visitors in Mādābā	3.70	0.83	High
5	Leaves an impression on tourists about the development of tourism in Mādābā	3.55	1.02	Medium
4	Allows tourists to know more about the importance of monuments in Mādābā	3.02	1.24	Medium
	Total	3.57	0.89	Medium

III. Interviews: The Study Questions and Their Answers

Question Number One: How would you characterize the methods of interpretation in the Mādābā Visitors Center (MVC)?

The answers to this question were collated, and averages and standard deviations were calculated (Table 5).

It is clear that the weighted mean of this axis (*i.e.*, information on the interpretation at MVC) ranged between 3.81–2.87, where the axis earned a weight mean of total of 3.48, which is a level of Medium on the scale. Response 2 (diverse and gives tourists the freedom to choose the site) earned the highest mean reaching 3.81 and a standard deviation of 0.92, which is a level of High. The second highest ranking was response 8 (correct and easy to understand texts) with a mean of 3.70 and a standard deviation of 0.69, which is a level of High.

Response 10 (available in different languages) was ranked last, with a mean of 2.87 and a standard deviation of 1.17, which is

a level of Medium. Next to last was response 4 (suitable for all age groups) with a mean of 3.11 and a standard deviation of 1.18

Question Number Two: How do the methods of interpretation that exist in the Mādābā Visitor Center impact the tourist?

The answers to this question were collated, and averages and standard deviations were calculated (Table 6).

The weighted mean of this axis (tourists are impacted by interpretation panels in many ways) ranged between 3.83–3.02, where the axis earned a weighted mean total of 3.57, which is a level of Medium. Response 3 (allows tourist a wider space to explore the city) earned the highest mean of 3.83 and a standard deviation of 0.60, which is a level of High. The second highest was response 1 (gives options to tourists) with mean of 3.72 and a standard deviation of 0.77, which is a level of High.

Response 4 (allows tourists to know more about the importance of monuments in Mādābā) was ranked last, with a mean of 3.02 and a standard deviation of 1.24), which is a level of Medium. Next to last is response 5 (leaves an impression on tourists about the development of tourism in Mādābā) with a mean of 3.55 and a standard deviation of 1.02, which is a level of Medium.

Question Number Three: Does the guide give tourists ample opportunity to view the content of the panels?

The answers to this question were collated, and averages and standard deviations were calculated (Table 7).

The weighted mean of this axis (guide gives tourists ample opportunity to view the content of the panels) ranged between 3.91–2.64, where the axis earned a weighted mean of a total of 3.48, which is a level Medium. Response 2 (insufficient experience of the staff at MVC in presenting the site properly) earned the highest mean of 3.91, and with

Table 7. Mean, standard deviation, and degree of the extent of the ways of presentation and how tour guides and staff handle it at MVC ranked in descending order.

Response Number	The ways of presentation and how tour guides and staff handle it at MVC	Mean	Standard Deviation	Degree
2	Insufficient experience of the staff at MVC in presenting the site properly	3.91	1.08	High
5	The presentation methods are diverse	3.79	0.88	High
6	The methods of presentation are interactive and they encourage the visitor to care about the site	3.64	0.92	Medium
7	The methods of presentation at MVC contribute to the revival of the old neighborhood of Mādābā	3.62	0.90	Medium
8	Methods of presentation encourage visitors to preserve the site	3.47	1.00	Medium
3	The staff of MVC is well trained in how to deal with the presentation methods	3.45	1.16	Medium
4	Showing a film at MVC increases the diversity in the presentation	3.30	1.14	Medium
1	Tour guides are considered to be a significant component of the site presentation	2.64	1.24	Medium
	Total	3.48	1.04	Medium

a standard deviation of 1.08, which is a level of High. The next highest ranking was response 5 (the presentation methods are diverse) with a mean of 3.79 and a standard deviation of 0.88, which is a level of High.

Response 1 (tour guides are considered to be a significant component of the site presentation) was rated last, where it earned a mean of 2.64 and a standard deviation of 1.24, which is of the level Medium. Next to last is response 4 (showing a film at MVC increases the diversity in the presentation) with a mean of 3.30 and a standard deviation of 1.14.

Question Number Four: Is there any implementation of interpretation and presentation projects and is there local community participation?

The answers to this question were collated, and averages and standard deviations were calculated (Table 8).

The weighted mean of this axis (implementation of interpretation and presentation projects and local community participation) ranged between 4.38–3.85, where the axis earned an weighted mean total of 4.18, which is a level of High. Response 7 (local community participation, encourages youth in showing more interest in the implementation of these projects) had the highest mean of 4.38 with a standard deviation of 0.71, which is a level of High. The second highest was response 5 (local community participation in these projects benefits the community financially) with mean of 4.28 and a standard deviation of 0.65, which is a level of High.

Response 1 (local community participation is an essential component in project planning) was rated last, with a mean of 3.85 and a standard deviation of 0.93, which is a level of High. Response 4 (local community participation helps decreasing

Table 8. Mean, standard deviation, and degree of the extent of the ways of implementation of interpretation and presentation projects and local community participation ranked in descending order.

Response Numbers	Data on the implementation of interpretation and presentation projects and local community participation	Mean	Standard Deviation	Degree
7	Local community participation, encourages youth in showing more interest in the implementation of these projects	4.38	0.71	High
5	Local community participation in these projects benefits the community financially	4.28	0.65	High
6	Local community participation gives incentives to better protection and presentation of the site	4.28	0.77	High
2	Local community involvement is a precondition to the success of the project	4.15	0.75	High
3	Local community awareness of the importance of the project helps with the conservation and protection of the site	4.15	0.78	High
4	Local community participation helps decreasing unemployment	4.15	0.81	High
1	Local community participation is an essential component in project planning	3.85	0.93	High
	Total	4.18	0.77	High

unemployment) was next to last with a mean of 4.15 and a standard deviation of 0.81, which is a level of High.

First Hypothesis: There Are No Methods of Interpretation in the Mādābā Visitors Center

This hypothesis was tested using a one sample T-test to identify the methods of interpretation in the Mādābā Visitors Center.

The average responses of the scale (3.48) is higher than average default scale (3). The results of the T-test indicate that are significant differences at the level of significance (0.05) between the average responses and average default scale, as the value of (T) Calculated (6.22) is more than the value (T) Tabulated, and therefore rejects the null hypothesis, so there are ways to properly impact the interpretation of Mādābā Visitors Center.

Second Hypothesis: The Methods of Interpretation in the Mādābā Visitors Center Have No Effect on Tourists and the Duration of Their Stay in Mādābā

This hypothesis was tested using a one sample T-test to identify the effects of interpretation in the Mādābā Visitors Center on tourists and the duration of their stay Mādābā.

The average responses of the scale (3.56) is higher than average default scale (3). The results of the T-test indicate that there are significant differences at the level of significance (0.05) between the average responses and average default scale, as the value of (T) Calculated (6.24) is more than the value (T) Tabulated, and therefore rejects the null hypothesis, so the interpretation methods at the Mādābā Visitor Center do have an effect on tourists and the duration of their stay in Mādābā.

Third Hypothesis: There Is No Presentation and the Tour Guides and Staff Do Not Handle It in the Mādābā Visitors Center

This hypothesis was tested using a one sample T-test to identify if there was presentation and if the tour guides and staff handled it in the Mādābā Visitors Center.

The average responses of the scale (3.53) is higher than average default scale (3). The results of the T-test indicate that there are significant differences at the level of significance (0.05) between the average responses and average default scale, as the value of (T) Calculated (6.69) is more than the value (T) Tabulated, and therefore rejects the null hypothesis, so there are presentations handled by tour guides and staff in the Mādābā Visitors Center.

Fourth Hypothesis: There Is No Implementation of Interpretation and Presentation Projects and Participation of the Local Community

This hypothesis was tested using a one sample T-test to identify if there is implementation of interpretation and presentation projects and participation of the local community.

The average response of the scale (4.18) is higher than average default scale (3). The results of T-test indicate that there are significant differences at the level of significance (0.05) between the average responses and average default scale, as the value of (T) Calculated (13.72) is more than the value (T) Tabulated, and therefore rejects the null hypothesis, so that there is the implementation of interpretation and presentation projects and local community participation.

Summary of Results

This study explored whether the interpretation methods that were applied in Mādābā were adopted according to international standards and whether these methods provided sufficient information about the site to the visitor. Also, this study

Table 9. Mean, standard deviation, and degree of the extent of the ways of implementation of interpretation and presentation projects and local community participation ranked in descending order.

Mean	Standard Deviation	T Tabulated	T Calculated	DF	Significance
3.48	0.532	1.96	6.22	46	0.000

Table 10. Test (one sample T-test) to identify the effect of methods of interpretation in the center of Madaba visitors to the tourist and the duration of his stay in Mādābā [significant at level 0.05, (t) – (3.00)].

Mean	Standard Deviation	T Tabulated	T Calculated	DF	Significance
3.56	0.621	1.96	6.24	46	0.000

Table 11. Test (one sample T-test) to identify the ways of presentations and how the tour guides and staff handled it at MVC in the Mādābā Visitors Center [significant at level 0.05, (t) – (3.00)].

Mean	Standard Deviation	T Tabulated	T Calculated	DF	Significance
3.53	0.540	1.96	6.69	46	0.000

Table 12. Test (one sample T-test) to identify implementation of interpretation and presentation projects and participation of the local community [significant at level 0.05, (t) – (3.00)].

Mean	Standard Deviation	T Tabulated	T Calculated	DF	Significance
3.53	0.540	1.96	6.69	46	0.000

discusses whether these methods achieve their aims and objectives at Mādābā, and if it possible to apply the same methods at other sites in Jordan.

Individuals in the study sample associated with the Mādābā Visitors Center were asked 41 questions and the responses were studied using a descriptive and analytical approach. The questions focused on: 1) the methods of presentation and interpretation at Mādābā and whether these methods were compatible with the sites in Mādābā, 2) the success of presentation and interpretation methods in the archaeological sites of Mādābā, 3) whether the local community and the visitors benefited from such a project or not, 4) the impact of such a project (interpretation plan) on the economy of the city of Mādābā, 5) the ability of the archaeological sites' staff to deal with panels and other tools of information, and 6) the visitor's opinion about the interpretation methods in Mādābā. The results the statistical analysis are described below:

- Most of the visitors prefer to visit Mādābā again and they also recommended it to their friend and relatives.
- It is difficult to reach and access the Mādābā Visitors Center.

- The information presented through interpretation methods at the Mādābā Visitors Center is diverse and gives tourists the freedom to choose the site and the text was easy to read and understandable for visitors.
- Visitors were less satisfied with the following characteristics: the contribution to better understanding of sites, containing diverse methods of presentations, properly and easily accessible interpretation panels, containing sufficient tourist information, suitable size of panels for all visitors, available for all visitors, suitable for all age groups, and available in different languages.
- The impact of interpretation panels on tourists were that they allow tourists a wider space to explore the city, provide options to tourists and prolong the stay of visitors in Mādābā.
- Member of the study sample were less satisfied with the way in which interpretation panels gave an impression to the tourists about the development of tourism in Mādābā and allowed tourists to know more about the importance of monuments in Mādābā.
- It was felt that the staff at the Mādābā Visitors Center do not have enough experience in presenting the site. However, the presentation methods are diverse and interactive, and they encourage the visitor to care about the site. Also, the methods of presentation at the Mādābā Visitors Center contribute to the revival of the old neighborhood of Mādābā and encourage visitors to preserve the site. Furthermore, showing a film at the Mādābā Visitors Center increases the diversity in the presentation and tour guides are considered to be a significant component of the site presentation.
- Regarding the implementation of interpretation and presentation projects and the participation of the local community, community participation is deemed essential at all stages of the project because of community participation helps the project succeed and helps the community further develop socially and economically.

Recommendations

After observing the situation of interpretation and presentation in Mādābā and how this project benefits the local community and archaeological sites, the researcher would like to suggest the following recommendations:

1. Enhance the facilities and services for visitors.
2. Make a new area with shelters for presentations to accommodate a large group of visitors.
3. It is difficult to reach the Mādābā Visitors Center, so we recommend:
    - Proclaim the location of the Mādābā Visitors Center in accessible media such as publications or websites.
    - Put the Mādābā Visitors Center on tourist maps or GPS devices and distribute other basic information about the site (*e.g.*, brochures, displays, orientation lectures) to visitors.
    - Clear direction and text on the signage system..
4. The presentation methods in the Mādābā Visitors Center must:
    - Contain an interactive panels with touch screens to be more attractive, understandable, and enjoyable for visitors, and in

particular for children.
- Contribute to revival of the heritage of Mādābā City through illustrators' panels that indicate aspects of the heritage of Mādābā and create an involvement program for visitors to engage with local community.

5. The staff and tour guides at the Mādābā Visitors Center must:
   - Be a qualified and specialist staff in the tourism field.
   - Take training courses on the interpretation and presentation methods and communication skills.
   - Tour guides must be aware of the importance of the role of interpretation tools at visitor centers and their role to help the visitor to understand the site.
6. The interpretation panels at the Mādābā Visitors Center must be:
   - A suitable size for all visitors and easily accessible.
   - Available in different languages.
   - Distributed in probable places that are easy for the visitor to reach.
   - Text that is clear and easily readable for all ages.
7. Participation of the local community in interpretation and presentation leads to:
   - The success of the project by raising awareness in the local community of the importance and the benefits of these projects.
   - Help in conservation and protection of the site through the explanation of the importance of the site.
   - Decreased unemployment by creating job opportunities .
   - Incentives to better protection and presentation of the site.
   - Encouraging youths to show more interest in the implementation of these projects.s

Finally, the interpretation and presentation project that was applied at the Mādābā Visitors Center was a good example of such a program in Jordan and should be further developed and applied at other sites in Jordan.

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Northern Jordan from the Air: Landscape Change in the Governorates of Irbid, Ajlun, and Jarash over the Last 100 Years

Introduction

This paper will discuss the work of the Endangered Archaeology in the Middle East and North Africa (EAMENA) project at the University of Oxford in documenting a set of historic aerial photographs covering part of north-western Jordan, and the value of this data for recording heritage sites and understanding landscape change in this region. This photograph set relates to a mapping mission undertaken by the British forces in late 1930, providing near complete coverage of the eastern Jordan valley from the Syrian border in the north to Wādī az-Zarqāʾ at the southern end of Ajlun governorate. The extensive coverage of this photograph set is important because it enables the assessment of an extensive area as captured in 1930, which can be compared with recent commercial satellite imagery, as well as intervening comparable data sources such as the U.S. Corona satellite imagery from the 1960s. The paper will highlight the archaeological potential of this 1930 data source, and the value of making this data open-access via systems such as the EAMENA database.

The Jordan Valley Survey, 1930–31

Historic aerial photography is an invaluable dataset for understanding long-term landscape change and its impact on heritage sites. Analysis of these sources and comparison with more recent satellite imagery can allow us to detect sites that were undocumented prior to being buried or destroyed by more recent activity, as well as giving a broader understanding of the rates of landscape change. Even in the context of the first mass use of aerial photography in the Middle East during the First World War, the academic potential of this imagery was being identified by Hugh Hamshaw-Thomas, who had operated as an RAF intelligence officer on the Palestine Front during the war (Thomas 1920a; 1920b).

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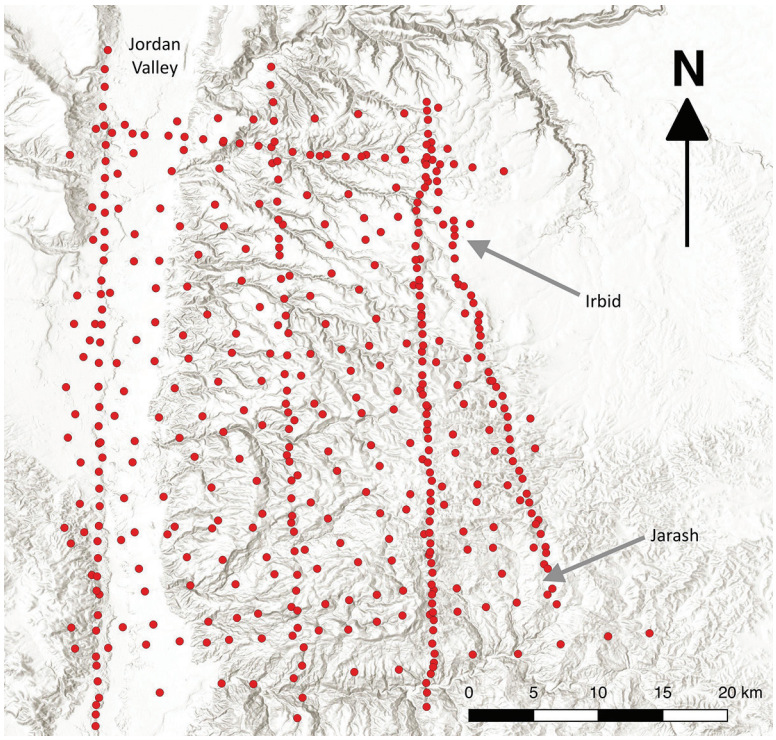
In spite of the case made by Hamshaw-Thomas for the value of aerial photography in the region for supporting archaeological research, as well as other disciplines such as botany, geology, and meteorology, limited scientific use was made of this material, in part because of restricted access beyond official military and mapping uses. It is in this context that the subsequent use of aerial photography in this region by individuals such as O.G.S. Crawford and Auriel Stein are relatively exceptional (Banks 2017).

The survey of the eastern Jordan Valley was undertaken to help plan the construction of a railway line connecting Haifa and Baghdad (Anon. 1932: 240; War Office 1936: 137–42). While the British Mandate of Palestine was relatively well mapped, there was a deficit of topographical mapping east of the River Jordan. From the end of the First World War, the British administrators of this region had considered developing a rail connection from the Mediterranean to Baghdad, although development was held back by issues of investment and a lack of formal agreement on the defined borders of the Mandate of Transjordan. However, renewed interest by 1930 led members of the Air Survey Committee to push for the use of the new photogrammetric methods of air survey that they had developed, a radial lines technique known as the "Arundel Method" (Collier 2006: 104–5), which would support their decision of which route to take across this region. This survey would lead to the construction of a pair of 1:50,000 topographical maps (General Staff, Geographical Section 1933a), published, and an earlier set of six 1:24,000 maps (General Staff, Geographical Section 1931). In terms of practical application, this mapping mission was too slow to influence the route decision made by ground surveyors and engineers, although the cartographers responsible for the air survey work felt the project would still be useful for administrators in the future. In turn the railway project itself would be cancelled, and instead a formal motor route was established (Briggs 1939), which was apt as the main purpose of the link was to facilitate the transfer of oil from Iraq to the Mediterranean, as evidenced by the rapid establishment of a pipeline along a comparable route.

The set of photographs discussed in this paper relate to an aerial mapping mission across the eastern section of the northern Jordan Valley (Fig. 1). Overlapping strips of photographs could be used to photogrammetrically construct topographical maps, utilizing the same basic principles as our contemporary 3D digital photogrammetry, and differs from the more standard use of aerial photography during this period for observation, military interpretation purposes, or constructing less accurate map mosaics. While there had been rapid developments in photogrammetric mapping during the First World War on the Palestine Front, when it had enabled surveyors to map regions in inaccessible conflict zones or behind enemy lines, there had been limited investment by Britain after the war as surveyors returned to ground survey techniques that they considered more accurate and cost-effective (Gavish and Biger 1985; Collier 1994; 2014). After the war there were calls to continue this work, including by Hamshaw-Thomas and Stewart Newcombe, the latter undertaking a limited survey of the Nile Valley in 1920, there is little evidence of continued aerial mapping in the region during the 1920s (Newcombe 1920; 1921a; 1921b).

A renewed push by the British Air Survey Committee following a change of leadership in the 1920s saw a small group of Royal Engineers in the British Army able to take advantage of new mapping opportunities in the Middle East region to trial new methods that they had been developing (Collier 2014). The British Royal Air Force (RAF) took the photographs as part of a mapping mission, largely during November and December of



1. A plot of center-points of vertical aerial photographs taken by the RAF in November–December 1930 in north-western Jordan. Background mapping: ESRI World Hillshade.

1930. Although the mission was officially undertaken by 14 Squadron RAF who were stationed in the mandates of Palestine and Transjordan, the work was actually undertaken by a detachment of 45 Squadron RAF, B Wing, who were stationed in Egypt. It has not been possible to uncover exactly why a detachment from 45 Squadron RAF was needed to undertake this survey, as well as a subsequent survey of the al-'Azraq lava fields (General Staff, Geographical Section 1933b), rather than the crew of 14 Squadron. This survey is particularly interesting from an archaeological perspective, as the cartographers included details on the location of desert kites and stone enclosure features on the six maps from this series that were published. It is possible that members of 45 Squadron had already received training in air mapping techniques, and had received cameras and camera mountings for their aircraft, having been involved in a survey of the Suez Canal Zone earlier in the year in conjunction with Lieutenant John Salt, the Research Officer of Britain's Air Survey Committee (General Staff, Geographical Section 1932).

The mission was flown in a series of linear, parallel runs, with a smaller number of cross-strip runs to ensure the integrity of the layout of the main runs. Pre-radar, these runs would have to be set out on the ground, incorporating ground control points that could be used in the triangulation process, while the flight runs would have to rely on the skill of individual pilots to fly in straight lines at a fixed altitude over long distances. In the related survey of the al-'Azraq lava fields through into 1931 the team would also experiment with a gyroscopic rudder-control to maintain route and altitude with some success, but in this earlier mission it is

still possible to identify areas of pilot error in the "swerving" of the photograph run alignments (War Office 1936: 140–1).

In the UK staff of the Geographical Section, General Staff (GSGS) constructed the resulting maps. Multiple prints would be made from the negatives, with each set being used to inform different components of the map. An information strip would be photographed and appear on the right-hand side of each print, giving information such as the time, altitude, and mission data, although in many cases this information is masked by a poor exposure. Different portions of these photograph sets have been preserved, and make up the archive scanned by the EAMENA project. Some images contain details drawn over the prints in colored pencil or ink by the cartographic team, including the course of roads, names of settlements, and topographic contours. In some cases, pencil notes were also scribbled on the reverse of the images, which often depict the photogrammetric process, possibly as one member of staff was explaining it to a less experienced staff member.

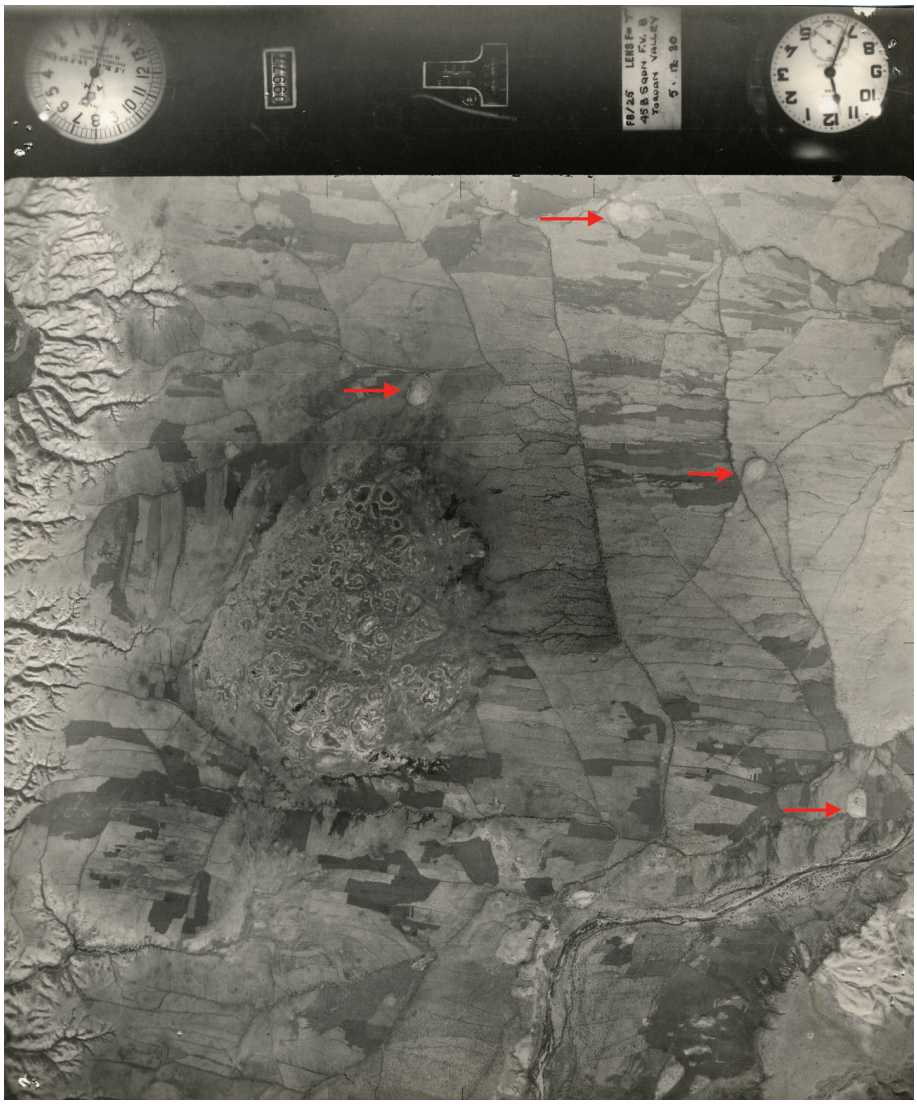
The digitized collection is from a partial set of original prints used during the map-construction process in the 1930s, and have therefore been subject to a certain amount of deterioration and wear over time. Several prints would originally have been made of each negative set to develop a different part of the map content (*e.g.*, contours, control points, toponyms). Not all of these groups would require every overlapping photogrammetric image, and as such the surviving digitized collection only includes every other image in the majority of east-west traverses. Other damage, such as the use of pins, staples, and adhesives tapes on the face of the photographic prints has also left damage, which in some cases can be mistaken for features on the ground. However, in spite of these deficiencies, the collection still holds a great deal of potential for further scientific study, and the paper will now briefly cover some examples.

The Changing Landscapes of North-Western Jordan

While there has been significant change across this area of Jordan, the most complete alteration has been in areas of agricultural and urban intensification, such as the Jordan Valley and in the area around Irbid. It is in these areas that the 1930 aerial photograph collection has the greatest potential to inform of landscape change in the region, and potentially identify archaeological sites lost or significantly altered over the last 90 years.

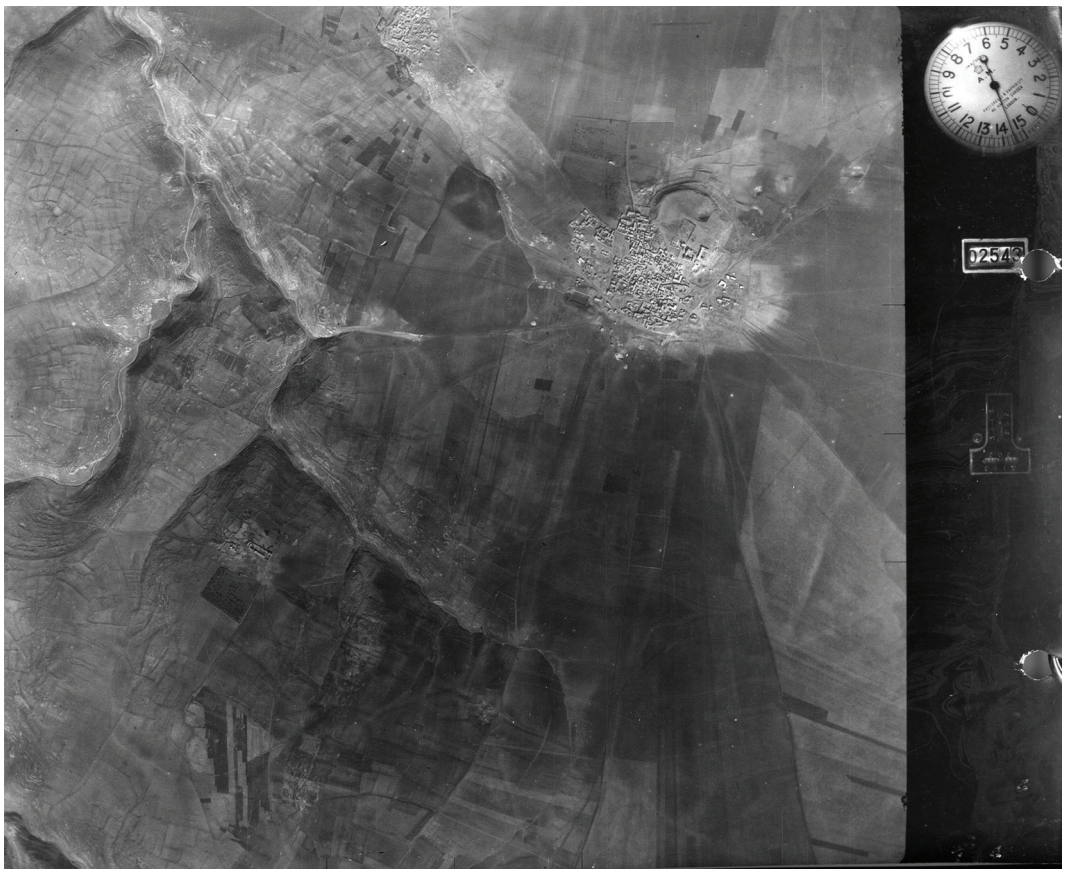
In the Jordan Valley, near the Wādī az-Zarqāʾ at the southern end of the survey area, it is possible to see the two of these aspects at play (Fig. 2). A comparison between a digitized print from this area and any recent satellite image of this area shows a landscape changed, with the expansion of settlements, laying out of modern roads and a complete change of agricultural regime in the intervening period. Additionally, it is possible to analyse a number of potential mound (*tall*) features extant across this area. While a number of these features have been documented previously by archaeologists, this imagery enables the sites to be reassessed. This includes an ability to study the wider landscape of these sites, including their relationship with former drainage channels that are prominent on these historic aerial photographs.

The area around Irbid has also changed dramatically since 1930, most conspicuously through the rapid expansion of the city from a small, mound-side settlement to an expansive urban center over the past 90 years (Fig. 3). As in the Jordan Valley, there is the opportunity to analyse documented archaeological sites, prior to the impact of more recent encroachment and development. The fabric of settlements such as Irbid can also been assessed in



2. An aerial photograph of the Jordan Valley north of the confluence of Wādī az-Zarqāʾ and the Jordan River, taken on 5 December 1930. Potential mound features are highlighted by red arrows. EAMENA image reference: JORDAN_45B-SQN_JordanValley_Run-C_9977.

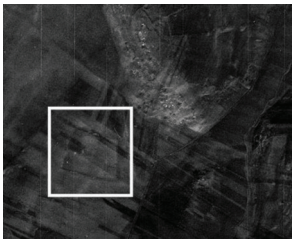
terms of understanding the modern urban heritage of the city. There is also the evidence of archaeological sites that have not been documented. An example of this can be seen south of Irbid, where a large, trapezoid-shaped enclosure can be seen beneath the agricultural system in place in 1930 (Fig. 4). Only the southern section of this feature is now visible on contemporary satellite imagery, possibly as a result the intensification of the agricultural regime in this area, and is unlikely to have been identified without the clarity of its visual signature as it appears in the historic aerial photograph.



3. An aerial photograph of Irbid from November or December 1930, when it was relatively small settlement, visible in the upper-right side of the image. Most of the information strip has been lost in the exposure. EAMENA image reference: JORDAN_45B-SQN_JordanValley_Run-G_2543.

Conclusion

The 1930 aerial survey of the east Jordan Valley have a clear potential for significantly developing our understanding of the historic landscapes of north-west Jordan, as well as informing what processes have led to the loss of heritage features in the region. Further detailed and systematic analysis of this photograph set is required, and to support that process these digitized image files will be uploaded on to the EAMENA database platform, where they will be available as an open-access resource for registered users.



4. A detail from an aerial photograph taken south of Irbid from November or December 1930. A trapezoidal enclosure can be seen as a cropmark, highlighted by the grey box. Note the possible features or pits visible on the rock outcrop, to the north-west of the of the enclosure. EAMENA image reference: JORDAN_45B-SQN_JordanValley_Run-G_2559.

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Retrofit Proposal for the Stylite Tower at Umm ar-Raṣāṣ

Abstract

On the basis of the stability and vulnerability analyses carried out on the Stylite Tower at the UNESCO World Heritage Site of Umm ar-Raṣāṣ, Jordan, a proposal for the seismic improvement of the structure is presented in this paper. The main intervention consists in the insertion of a cable or steel bar, connected to a new roof and the existing basement. The reinforcement is tensioned in order to apply a compression axial force on the tower structure. This guarantees a significant increment of the resistant bending moment of the masonry base section. Furthermore, the cable is connected to a central anchor of micro-pile that can guarantee a tension action between the basement and the ground. This would allow for increases to the bending resistance of the interface soil-foundation section.

Introduction

The choice of a suitable intervention on any historic structure should be based on a detailed knowledge of its static and dynamic behavior. Actually, several research studies are reported in the literature for masonry towers, based on both experimental analysis and modelling.

Among the experimental studies, it is worth mentioning the studies carried out on the Cochlid Columns in Rome (Bongiovanni *et al.* 2014; 2017a; 2021), which show the effect of past earthquakes, as well as on the Flaminio Obelisk (Bongiovanni *et al.* 1990), on the Lateran Obelisk (Buffarini *et al.* 2008; 2009), and on the Northern Wall of the Colosseum (Bongiovanni *et al* 2017b). Several experimental studies were also carried out on earthquake damaged towers and constructions (Clemente *et al.* 2002). A comprehensive presentation of the most interesting applications of Structural Health Monitoring in Italy was given by De Stefano *et al.* (2016). Finally, Clemente *et al.* (2015) analyzed the leaning minaret

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in Jam, Afghanistan, considering both soil and masonry collapses, under different distributions of static loads along the height, proportionally increasing to the collapse values.

The Stylite Tower at Umm ar-Raṣāṣ, Jordan, is the first known existent and architecturally intact example of this type of tower in the Middle East in this region (DoA 2002). Umm ar-Raṣāṣ has been a UNESCO World Heritage site since 2004. The structure presents damage related to aging and past earthquakes, which frequently affected the area (Sbeinati *et al.* 2005). The damage was first evaluated by means of a comprehensive study of the structure. Then stability and seismic vulnerability analyses were carried out. The results shown here confirm the present precarious condition of the tower and the necessity of urgent and adequate interventions for its structural preservation. Therefore, a retrofitting structural intervention is proposed in this paper. This consists in the insertion of a tensioned reinforcement (a cable or steel bar), connected to a new roof and the existing basement, that applies a compression axial force on the tower structure. Furthermore, the cable is connected to a central anchor of micro-pile that can guarantee a tension action between the basement and the ground. The effects of these interventions are evaluated and discussed.

Stylite Tower and Its Site

The Byzantine Stylite Tower is situated *ca.* 1.2 km NW from the core of the archaeological site of Umm ar-Raṣāṣ, at almost 735 m a.s.l. (Fig. 1). It is well known from historical sources (Brown 1974) that the Christian ascetic monks, called stylites, spent their lives in isolation at the top of a tower, preaching, fasting, and praying.

The geology of the area of Umm ar-Raṣāṣ is characterized by the presence of the al-Ḥasā Phosporite formation (Campanian-Maastrichtian), 55–65 m thick and composed by three different members (Bender 1974; Tarawneh 1985; Powell 1989; Sadaqah *et al.* 2000). The Bahiya coquina member is largely outcropping in the area. This formation, from few meters to 30 m thick, is mostly composed of fossiliferous limestone (rich in oyster shell, foraminifera, gasteropods, and bivalves). A first geotechnical campaign was performed in 2009, with boreholes and laboratory tests on rock materials (Uniaxial Compressive Strength, Point Load tests, rock specific gravity and absorption, chemical analysis; Azzam and Doukh 2009). The blocks of the tower, carved in a quarry close to the Stylite Tower, are of the same material that will be described in detail in section 3.1.

The tower was built in the first half of the 6th c. AD and was originally surrounded by a wall. It is 13.5 m tall and has a square base cross-section with size b = 2.52 m. Externally, the structure presents 35 rows of trimmed local limestone blocks laid dry. Some of the external blocks are placed in order to guarantee a connection with the internal fill.

A small chamber is located at the basement, and remarkably reduces its effective cross-sections (section S2 in Fig. 2). Pilgrims could get into this chamber and communicate with the monk by means of a rectangular hole. This has a 30 × 40 cm size, is eccentrically placed, and continuous for most of its height. Another very small hole was created at the base of the tower for the physiological needs of the monk; its influence on the structural behavior is negligible.

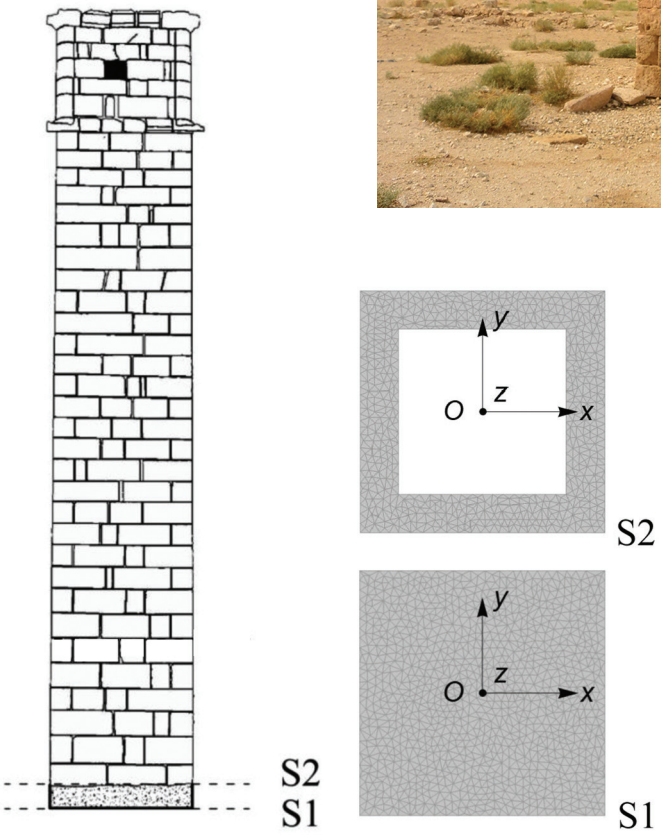
In the lower part of the tower, which can be seen from the base chamber, the fill is made of irregular blocks of similar material forming the tower. In the same lower part of the tower the presence of original mortar among the stones has been detected. The mortar could provide effective bond with the external rows, but the height of the fill and its characteristics are not known as

well as its contribution to the structural capacity.

Some of the stone blocks are cracked, especially those of the base layer whereas other blocks located at different heights show relative displacements. The space between the blocks has recently been filled with stone slabs. The limestone blocks are also affected by different natural exposures and degrees of weathering. Another chamber was originally placed at the top, and that chamber collapsed, along with the dome/vault, probably during a seismic event.



1. The Stylite Tower at Umm ar-Raṣāṣ.



2. Representative cross-sections of the tower.

The foundation is composed of a concrete slab. The slab is the same size as the tower base cross-section, is about 40 cm deep, and placed directedly on the bedrock. Its extrados is at the same level of the ground surface.

A strong earthquake, which occurred in AD 759, caused the collapse of the covering (dome and vaulted roof) and the upper part of the structure. The Jericho earthquake (Ml = 6.2), which occurred on 11 July 1927, is the most recent destructive seismic event that affected the area. This earthquake caused heavy damage in the close cities of as-Salṭ and ʿAmmān and probably also to the Stylite Tower (Avni 1999; Zohar and Marco 2012). The area is characterized by high seismicity with a Peak Ground Acceleration of 0.2 *g* and a shear waves velocity Vs = 760 ÷ 1500 *m/s*, typical of rigid soil (Menahem 1991; Thomas *et al.* 2007).

Previous Studies

A comprehensive experimental campaign was carried out on the tower and the ground in 2014 and 2015 (Clemente *et al.* 2019b). The Uniaxial Compressive Strength (UCS) of the tower's limestone material was assessed *in situ* by means of Schmidt-hammer tests on the stone blocks. Furthermore, 4 passive seismic measurements allowed a field evaluation of the dynamic resonances of the ground. Obviously, destructive mechanical tests on the limestone blocks of the tower were not performed because the Stylite Tower is protected by the Jordanian Antiquity Law.

The results obtained can be summarized as follows:

a) Most of the limestone blocks analyzed, specifically 29 out of 31, showed a medium-high strength (R3 or R4 class) and only very few were in R2 class. These results are consistent with the usual strength value of this material and with UCS values obtained from laboratory analysis for intact limestone blocks of al-Hasā Phosphorite formation (Naghoj *et al.* 2010). It is worth noting that the method used for the evaluation of the strength is based only on the external toughness of the blocks. Actually, the lower values of strength were related to the weathering conditions and the cracks. The latter affect the walls, especially in the NE corner. Anyway, a suitable reduction of the average value obtained experimentally has been considered in the structural analysis.

b) The passive seismic analysis revealed peaks in two ranges of frequency, [1.0, 2.5] Hz and [4.0, 6.0] Hz, respectively. Since the recording sites were very close to the tower, these resonance frequencies were likely induced by the structure and not related to the subsoil (Clemente *et al.* 2019a).

The global stability was also analyzed by referring to the interface section S1 between the ground and the concrete basement slab. The tower was supposed to be infinitely rigid but the section S1 between the ground and the basement was supposed to have an elastic–perfect plastic behavior with a compression strength f_t. On the basis of the experimental analysis of the local limestone described before, a value $f_t \geq 10$ MPa and the corresponding Young's modulus ^{3} 10000 MPa can be supposed (Fener *et al.* 2005; Dweirj *et al.* 2017). These values are also consistent with the characteristics of the concrete basement.

The reference system *Oxyz* with the origin coincident with the center of gravity of the square base cross-section S1, the two axes *x* and *y* parallel to the sides, and the axis *z* vertical can also be assumed. The total weight was estimated as $W = 1800$ kN, including the basement, the fill up to the top, and the covering, once rebuilt. In this hypothesis, the center of gravity is at $z_w = 6.45$ m, while the eccentricity in the plane *xy* is very low; one can assume that the stress point under dead loads only coincides with the center of gravity of the cross-section.

Assuming a model of elastic half space

for the soil, the resulting stability factor was very high (Desideri *et al.* 1997), due to the very high value of the elastic modulus of the soil, apparently ensuring the global stability of the tower.

A push-over seismic analysis was carried out, using a single-model approach. The structure was modelled by means of finite solid elements. Masonry was characterized by an elastic-plastic behavior and a Drucker-Prager limit domain for three-dimensional stress states. 3-D load conditions were considered, using accelerations proportional to the first two modal shapes. Force-displacement capacity curves were obtained by incremental nonlinear static analysis using reasonable values of the cohesion and the friction. The curves show a very low capacity for the tower under seismic actions. Better results were obtained with higher values of the cohesion and with lower values of the friction coefficient, which correspond to more ductile behavior (Clemente *et al.* 2019b).

The Check after Masonry Improvement

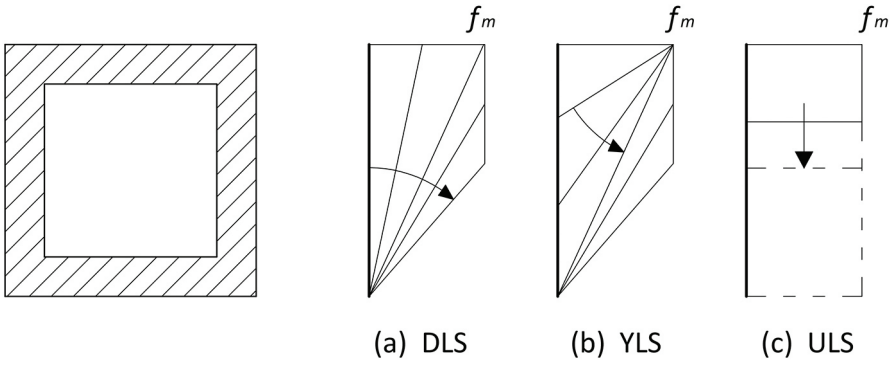
The analysis of the tower has been also carried out with reference to the structure after a suitable consolidation. This should consist of the improving of the external masonry, by means of mortar injection or another technique. This external portion of the structure will have higher stiffness and resistance with respect to the internal fill that could be lightened or even partially removed. Therefore, in order to evaluate both situations, two hypotheses were tested: the first considering the fill up to the top, the second with the fill placed only in the lower half of the tower.

In the following paragraph, a simplified model to analyze the nonlinear behavior of section S2 is assumed, in which: a) the fill is considered just for its weight, b) the fill contribution to the structural resistance is neglected, and c) the effective cross-section is a symmetric hollow squared section (Fig. 2). This simplification is justified by the results of a previous analysis in which the effective geometry of S2 was considered.

Then, the model of rigid tower supported by an elastic-plastic cushion that simulates the interaction between the masonry base section and the rigid concrete slab, is analyzed.

Limit Domains of the Base Masonry Cross-Section S2

The model refers to the aforementioned *Oxy* system, with the origin coincident with the center of gravity of the symmetric hollow squared cross-section S2 and the two axes parallel to the sides. The masonry is supposed to have an elastic–perfect



3. Stress distribution in the (a) DLS, (b) YLS, and (c) ULS.

plastic behavior in compression with a strength f_m, but no tension resistance. The effect of an axial load and bending moment around x axis is analyzed. Three limit states must be considered (Fig. 3), corresponding to the decompression, the initial yielding, and the ultimate conditions, respectively. The corresponding limit domains are represented in Fig. 4 in a non-dimensional way, in which:

$$N_0 = 4\,(B-t)\cdot f_m \quad M_0 = \frac{B^3-(B-2t)^3}{8}\cdot f_m \quad (1)$$

are the maximum values of the axial force N and bending moment M, respectively. So the curves are independent of strength f_m. They are also symmetric with respect to N/N_0 axis but for simplicity are plotted only for M > 0.

The cross-section is at its decompression limit state (DLS) if the compression stress is equal to zero at one edge (the lower one in Fig. 3a). The limit domain, in the N/N_0–M/M_0, is characterized by a linear law for $N/N_0 \le 0.5$, corresponding to the case in which the maximum compression stress at the opposite edge $\sigma \le f_m$. For $N/N_0 > 0.5$ the law is nonlinear and corresponds to the cases in which a portion of the cross-section is yielded.

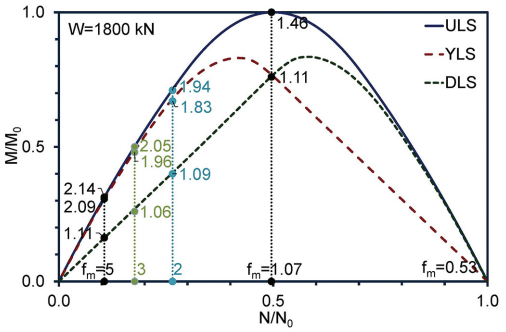
The cross-section is at its initial yielding limit state (YLS) if the compression stress is equal to f_m at one edge (the upper one in Fig. 3b). The limit domain is characterized by a nonlinear law for $N/N_0 \le 0.5$ corresponding to the case in which the cross-section is in a cracked stage (*i.e.*, a portion of the cross-section is not effective and subject to stress equal to zero). For $N/N_0 > 0.5$ the law is linear and corresponds to the cases in which all the section is compressed with the stress varying linearly.

The cross-section is at its ultimate limit state (ULS) if the compression stress is equal to f_m in a portion of the cross-section (the upper one in Fig. 3c) while keeping equal to zero in the other part. The limit domain is characterized by a nonlinear law. When $N/N_0 = 1.0$, the cross-section is uniformly compressed with stress equal to f_m.

The ULS corresponds to a collapse limit state of the cross-section, which is fully yielded in its effective portion. Instead, DLS and YLS correspond to boundaries between different behaviors for the cross-section. It is worth pointing out that when M increases while N keeps constant, DLS occurs first if $N/N_0 \le 0.5$ and the resultant N is at the boundary of the cross-section core. If $N/N_0 < 0.5$ then YLS precedes DLS.

The non-dimensional representation of the limit domains is very useful to analyze the present stress status. This is represented in the diagrams by a point, whose position depends on f_m. It is on the abscissa axis, if the bending moment due to the permanent loads is zero.

The minimum allowable value of f_m is given by the uniform stress under the dead loads, *i.e.*, the ratio between the weight of the tower and the area of S2:



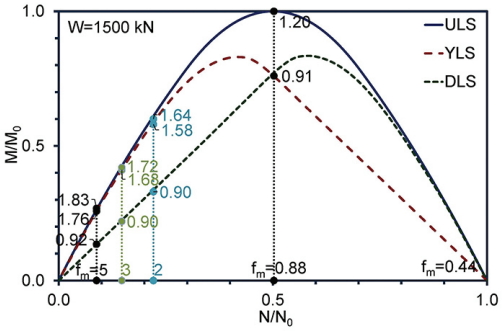
4. Limit domain corresponding to the three limit states and loading paths corresponding to several compression strength of masonry for W = 1800 kN. The labels are the values of the bending moments (MNm).

$$f_{m,\min} = \frac{W}{A} = \frac{1.8}{3.39} = 0.53 \text{ MPa} \qquad (2)$$

If $f_m = 2 \cdot f_{m,min} = 1.07$ MPa, then $N/N_0 = 0.5$.

The limestone blocks are characterized by very dispersed strength values, as pointed out by the experimental analysis. Therefore, a compression strength very close to the lower experimental values was assumed for the stone. Obviously, the strength of a masonry made of these stones is even lower. In the specific case, the absence of the mortar and its bad quality, when present, as well as the irregularity of the joints and the absence of transversal connections or their non-effectiveness must be taken into account. Consequently, the strength is likely in the range 5.0 ÷ 10.0 MPa, and a corresponding Young's modulus between 5000 and 10000 MPa (Naghoj *et al.* 2010). The lower limit values were considered in this study. For $f_m = 5.0$ MPa, it is: $N_0 = 16.96$ MN, $M_0 = 6.82$ MNm and $N/N_0 = W/N_0 = 0.133$.

If the fill will be removed in the upper half portion of the tower, then the total weight will be W = 1500 kN and the stress points will be those in Fig. 5 for the different values of the compression strength f_m.



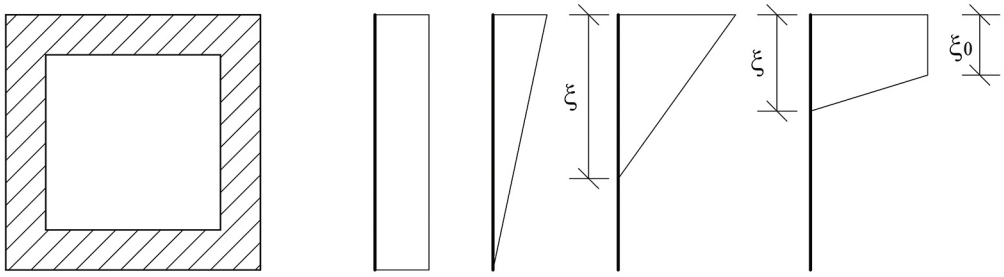
5. Limit domain corresponding to the three limit states and loading paths corresponding to several compression strength of masonry for W = 1500 kN. The labels are the values of the bending moments (MNm).

Nonlinear Analysis

If $N = W$ is fixed and its eccentricity e increases along y, in the plane N/N_0–M/M_0 the loading path is represented by a straight line starting from $(W/N_0, 0)$ and orthogonal to N/N_0 axis. The loading paths relative to different values of f_m are also shown in Fig. 4 for W = 1800 kN and in Fig. 5 for W = 1500 kN. In both cases, the labels reported are the values of the bending moments (MN×m). In Fig. 6 some of the corresponding stress distributions are represented.

The cross-section is entirely effective up to the DLS, when the stress $\sigma = 0$ is at the lower edge (Fig. 6a). From the DLS to YLS the cross-section is in a cracked stage and the stress distribution is still linear with maximum value $\sigma \le f_m$ at the upper edge (Fig. 6b). The relation between the two unknown σ and the depth of the neutral axis ξ is the following:

$$\left[\left(1-\frac{t}{2\xi}\right)(B-2t)+\xi\right] t \cdot \sigma = W \qquad (3)$$



6. Stress distributions corresponding to stress points on the loading path.

From eq. (3), for any value of ξ the corresponding value of σ can be deduced.

From YLS to ULS the stress law is divided into two portions (Fig. 6c): it is constant and equal to f_m for a depth ξ_0 from the upper edge and then decreases linearly to the neutral axis at ξ. In this case, the relation between the two unknowns ξ and ξ_0 is:

$$\frac{Bf_m}{2} \cdot (\xi_0 + \xi) = W \tag{4}$$

If the increment of the bending moment *M* is related to a horizontal seismic acceleration *a(z)* acting in *y* direction, then the resultant force is:

$$F = \int_0^H m(z) \cdot a(z) \cdot z dz \tag{5}$$

It is applied at the height:

$$z_F = \frac{\int_0^H m(z) \cdot a(z) \cdot z dz}{\int_0^H m(z) \cdot a(z) \cdot dz} \tag{6}$$

It is $z_F = 2H/3$ in the hypothesis of mass constant along the height.

From the equilibrium condition one can deduce the relation between *F/W* and the rotation α at the base (where the eccentricity *e* is a function of the rotation α):

$$F = \frac{1}{z_F} (e - z_w \cdot a) \tag{7}$$

The generalized displacement *d* is deduced as ratio between the work *L* of the external load and the force *F*:

$$D = \frac{L}{F} = \frac{\int_0^H m(z) \cdot a(z) \cdot d(z) \cdot dz}{\int_0^H m(z) \cdot a(z) \cdot dz} \tag{8}$$

Retrofit Intervention

The proposed intervention consists of:

a) improvement of the external masonry, in order reach at least the considered value f_m = 5.0MPa
b) reconstruction of the covering structure in steel or wood
c) insertion of a cable or steel element to apply compression in the tower, without adding mass
d) foundation anchor or pile to anchor the cable or steel element to the soil and so the tower

Alternatively, a new sub-foundation could be built, wider than the existing one, connected to it and composed of 4 micro-piles at its corners. Furthermore, the hypothesis of reduction of the fill was also considered.

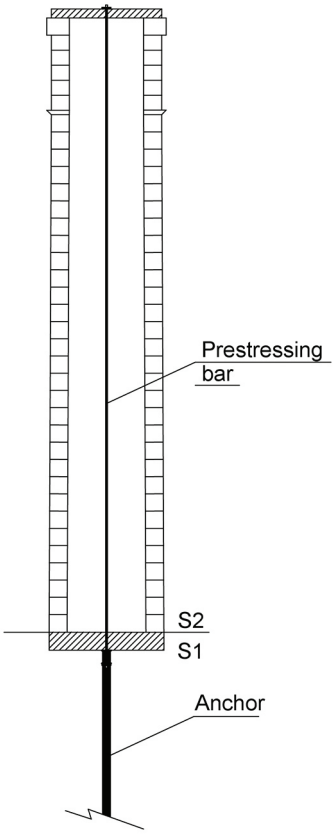
Masonry Improving

Points a) and b) will determine the final weight of the tower, which should be not much higher than the present one, and new stress points with the associated loading path. The already described non-dimensional domains are still valid.

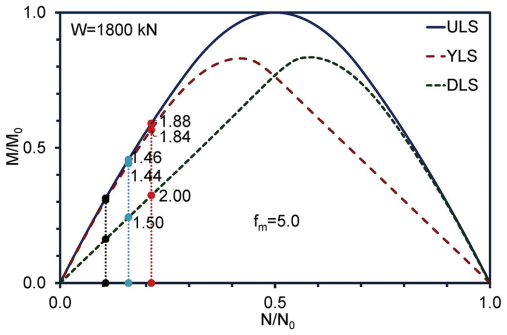
Point c) consists of the insertion of a cable or steel element (Fig. 7). The cable will be fixed to a new roof at the top of the tower and the concrete basement, and then pre-tensioned. With reference to the case of f_m = 5.0MPa, increases of the axial force by 1.5 and 2.0 were considered.

In Fig. 8, the corresponding loading paths due to an increase of the bending moment are plotted. The values reported as labels at the intersection points with the limit domains, are the ratios between the bending moment at each point and the corresponding one obtained for N = W. These are exactly equal to the increase of the axial force up to the DLS, but are lower for the other limit states. Anyway, the efficiency of the intervention is apparent.

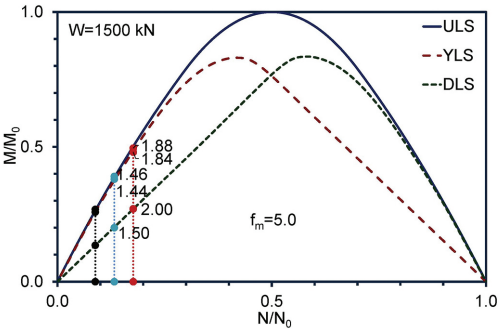
Analogously, the stress points and the corresponding loading paths for W = 1500 kN are plotted in Fig. 9. The increments of



7. Retrofitting intervention with a single central anchor element.



8. Limit domain corresponding to the three limit states and loading paths corresponding to difference axial forces N = W = 1800 kN, N = 1.5 W, N = 2.0 W (f_m = 5.0 MPa). The labels are the ratios between the bending moments and those for N = W.



9. Limit domain corresponding to the three limit states and loading paths corresponding to difference axial forces N = W = 1500 kN, N = 1.5 W, N = 2.0 W (f_m = 5.0 MPa). The labels are the ratios between the bending moments and those for N = W.

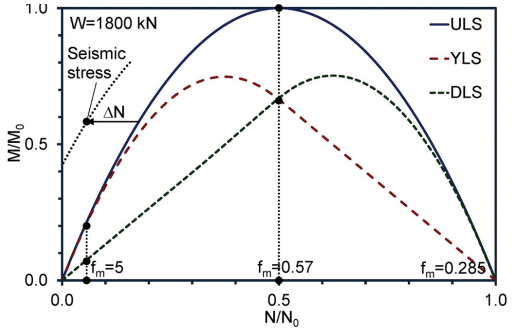
the bending moment, reported as labels, are obviously independent of the total weight W of the tower.

Foundation Improving

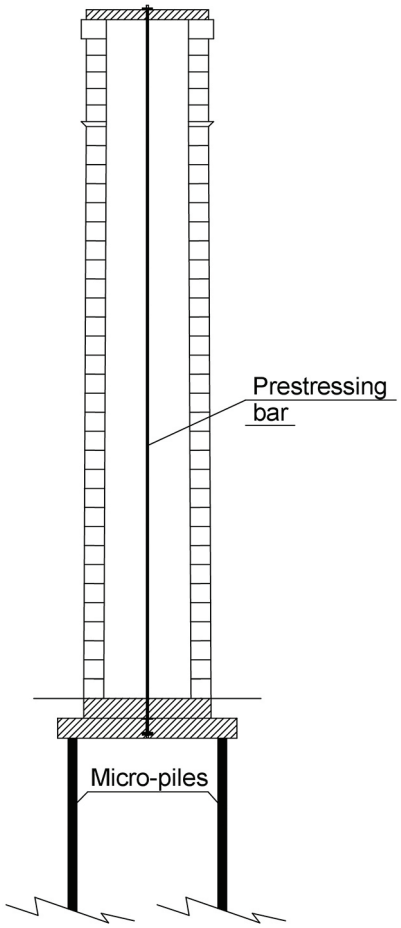
Point d) consists of the insertion of a central anchor or micro-pile, built along the same straight line of the cable, which will anchor the tower to the ground (Fig. 7). The anchor will be not active, but put in action only under a bending moment that determines traction at the base interface between the tower and the ground.

In Fig. 10 the limit domains of the squared base section S1 are plotted. For example, the stress points relative to f_m = 5.0 are considered. Furthermore, the stress point relative to a seismic acceleration equal to 0.3 *g* is plotted.

If completely yielded, the anchor introduces an axial force but no bending moment with reference to the gravity center of the cross-section S1. Therefore, the limit domain translates to the left



10. Limit domain corresponding to the three limit states of S1, with loading path for f_m = 5.0 MPa for W = 1800 kN; seismic stress point and translated domain (dotted line).



11. Retrofitting intervention with a sub foundation with four micro-piles.

side. The horizontal distance between the limit domain of the cross-section without anchor and the seismic stress point gives the characteristics of the anchor element (Raithel 1982).

Obviously, an anchor element with a certain eccentricity will be more effective, although in this case at least 4 anchor elements (preferably micro-piles) will be necessary (Fig. 11).

Conclusions

Starting from previous studies carried out by the authors on the stability and seismic vulnerability of the Stylite Tower at Umm ar-Raṣāṣ, a possible retrofitting intervention for the tower has been presented in this paper. The intervention consists of the insertion of a pre-tensioned cable or steel bar, connected to a new roof at the top and to the existing basement, in order to apply a compression axial force on the tower structure. Furthermore, the cable will be connected to a central anchor of micro-pile that can guarantee a tension action between the basement and the ground.

The preliminary analysis has demonstrated that an increment of the axial force of 50 or 100% will significantly increase the resistant bending moment of the masonry base section S2. The limit analysis of the section S1 revealed the limited resistance to bending moments in its present configuration. A preliminary evaluation of the needed strength of the central anchor of micro-pile has also been done.

Acknowledgements

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Zīzyā' Pottery Factory, al-Jīzā, Jordan: Continuity and Change

Abstract

This study examines interconnected elements within a modern industrialized ceramic manufacturing context: artisans, technology, scale of production, and spatial organization. Modern quantitative data and six years of on-site observations contribute ideas to interpret partial archaeological evidence from ancient pottery workshops. Influences are identified that promoted continuity of the Zīzyā' system and forces of recent changes.

Introduction

The Zīzyā' Pottery Factory is managed by the Salem family who emigrated from Hebron to Jordan several generations earlier. They reestablished their factory on land rented from the Khadeer family, members of the local Askoor Bedouin tribe, who were given vast lands in this area by King Abdullah I. At Zīzyā', the same family continues to supervise manufacture and marketing of water jars. The clay body is formulated with salt temper to produce vessels with white surfaces in the modern Hebron tradition (ʿAmr 1992: 222).

For nearly four decades, scholars and students were welcome visitors to Zīzyā' Pottery Factory. Ceramic specialists, H.J. Franken (1986), G. London and M. Sinclair (1991), and M.L. Sidoroff (2015) recorded spatial and technological continuity at an industrial ceramic workshop. H.J. Franken (1986) documented the early factory layout and technological sequences similar to later reports, but he believed "traditional pot making was finished in Jordan and belonged in the past (1986: 146)."

London and Sinclair (1991: 421–5) examined manufacturing issues within the context of a survey of potters in Jordan for information useful to archaeologists. At the time of their visit, Zīzyā' was still a small scale industry with continuity in a salt infused clay body, manufacturing a variety

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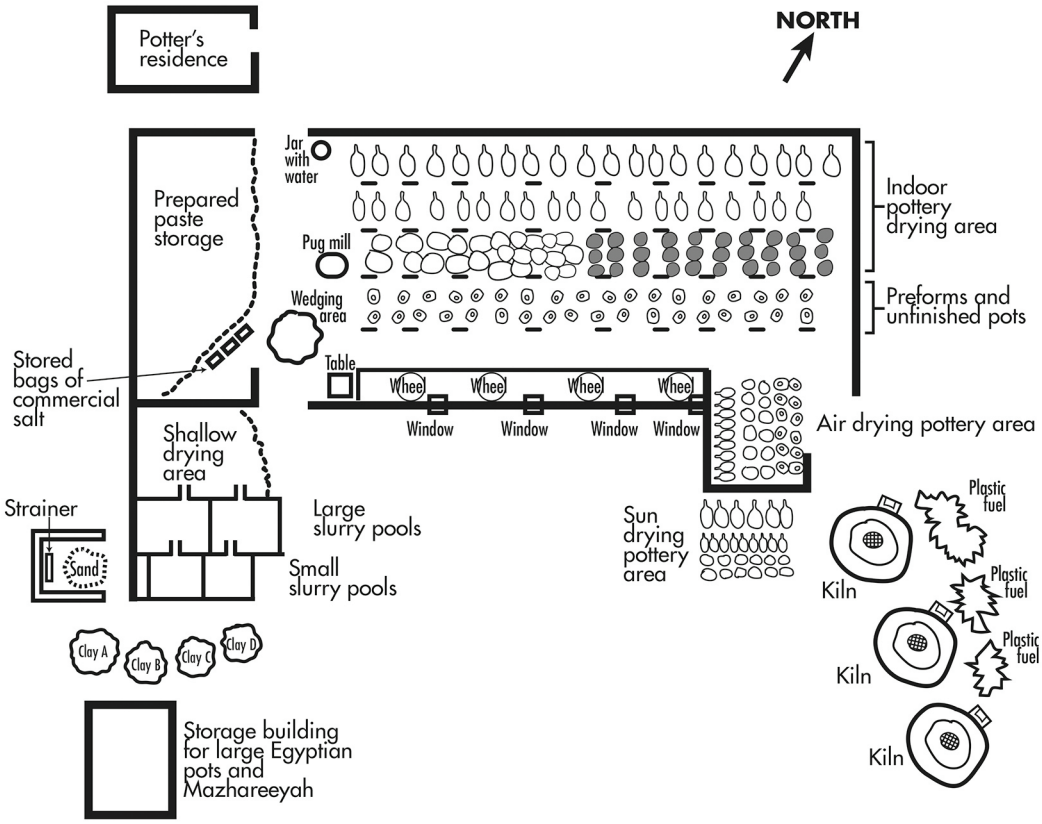

1. Layout of Zīzyā' factory grounds (Sidoroff 2015: fig. 1).

of vessel types on the potters' wheel, and firing in an updraft kiln.

Thirty years later, the next scholar to visit Zīzyā' had the opportunity to observe a factory transformed into a highly intensive operation (Sidoroff 2015). The new enlarged covered structure was filled with clay vessels in different stages of slow drying. Two of the three updraft kilns were firing an expanded production of large and small water jars, cooking pots, and decorative vases.

The layout of the grounds and the *chaîne opératoire* of pottery manufacture remained generally unchanged from earlier reports (Fig. 1). The factory footprint was still about 1,500 m^2 but half the property was taken over by the new enlarged covered structure, 30 m long and 24 m wide, with a clay floor. This slightly damp space was important because it offered protection from sun and wind for masses of prepared clay, thousands of vessels in various stages of slow drying, a diesel-powered pug mill, and workstations for four potters.

Large water jars, an important product at Zīzyā', are favored among populations in hot climates (Arnold 1985:23). Water jars require special treatment: many days in the roofed structure before they can be safely set outside in the sun for final drying before firing in the kiln. Through time, Amman remained the center of free resource acquisition for Zīzyā', where clay from construction sites and garbage for fuel were opportunistically collected.

To formulate the factory clay body, four different types of dry clay plus locally purchased sand and salt temper are mixed

with water. Temper, either naturally included or added by the potter, modifies working, drying, and/or firing properties of a clay body. At Zīzyā', the addition of sand temper controls shrinkage as the vessel dries. Commercial salt temper interacts with calcareous clay during firing to produce the desired white exterior surfaces on vessels.

Tests conducted in the field lab assessed the attributes of each clay type in the dry, wet, and fired state (Sidoroff 2015: Table 1). Dry clay was moistened to form small (5 × 5 × 0.15 cm) test bowls, which were fired in charcoal to about 650 C°. No temper was mixed with clay samples for testing.

Dry Clay A was pale yellow (2.5 YR 7/3) and crumbly, with good plasticity when moist, and fired to reddish brown (5 YR 5/4). Dry Clay B was composed of large laminated pale yellow (2.5 YR 7/3) chunks, very sticky when moist with good plasticity, and fired to reddish brown (5 YR 5/4). Dry Clay C was yellowish red (5 YR 5/6) and very crumbly in dry state, poor plasticity, and fired to reddish brown (5 YR 5/4). Dry Clay D was light gray (2.5 YR 7/2) and very compacted when dry, poor plasticity when moist, and fired to reddish brown (5 YR 5/4). The Zīzyā' clay body formula contained double the amounts of Clay D than all other clays combined. The dense character of Clay D suggests calcareous clay possibly deposited in a past geological era during the regression of the Tethys Sea (Bender 1975: 11).

Clay body preparation at Zīzyā' begins with hosing water from a tank truck into one of two matching hydrating pools (L 1.5 × W 1.5 × D 1.3 m). Quantities of dry clay, measured with traditional archaeological field buckets (*guffahs*), are tossed into the hydrating pool. The final mix contains: 46 buckets of four different dry clay types, 20 of fine (0.25 mm) sand, and five 25 kilo bags of commercial salt. There is twice as much Clay D as the three other clay types combined (Sidoroff 2015: Table 1).

The watery clay slurry is strained from the hydrating pool into a shallow settling pond, where the slurry is left uncovered for a few days as water evaporates and the clay stiffens. Slightly dried clay from the settling pond is foot wedged to improve plasticity, blend the clay materials, and eliminate air bubbles, lumps, and pockets of salt. During foot wedging, two more bags (25 kilos each) of salt are incorporated into Zīzyā' clay body, and then the clay body is stored in the covered shed.

The quantity of commercial salt, 15 to 20% in the Zīzyā' clay body, is exceptional when compared with other of salt-tempered clay bodies (Rye 1976: 133; Rye and Evans 1976: 39). One might ask: Why would potters add salt temper to their clay? It has been assumed that salt creates the white post-fired appearance of salt-tempered vessels (London and Sinclair 1991; 'Amr 1992: 223; Rye 1976).

However, it is not the salt alone but the reaction between the salt and the calcareous clay that creates a permanent white skin. The white surface of Zīzyā' pottery is not a glaze or slip applied by the potter but develops through the addition of large quantities of salt to a calcareous clay body. At high temperatures over 1000 C°, calcite migrates to the vessel surface to form a "white firing skin" (Freestone 1997: 136).

Although there is no salty flavor to liquids or food stored in salt tempered vessels, the use of salt in formulating a clay body for water jars may be more than technological. There is a belief in the ability of salt to purify water through antibacterial qualities in the clay body and to keep it fresh tasting for a long time (Annis 1985a: 48).

During periods of intense production at Zīzyā', there were four migrant potters from Egypt, three full-time and one part-time, a Fire Master, one assistant to the potters, and a market in Saudi Arabia to accommodate the expanded production. The manager made all business decisions while seven



2. Master Potter Farouk throwing water jars.



3. Round updraft kiln during a reduction firing.

male potters met factory demands with minimum labor investment in the products. The men worked for cash in a context away from their homes, were paid in cash, and were not involved in distribution of the vessels which were standardized in size and shape.

The young Egyptian potter, Mohammed Farouk, photographed at the wheel by H.J. Franken (1986: 148), developed into a Master Potter who can throw a large water jar in one minute, about 90 standardized vessels each day (Sidoroff 2015: 99; Fig. 2). To keep the momentum during working hours, an assistant delivered fresh clay and removed finished vessels from Farouk's workstation so he need not stop working at his wheel. The entire floor of the protected shed was covered with drying vessels. From March 1 through the end of October, four potters produced about 14,000 vessels including large and small water jars, vases, and cooking pots. Standardization in vessel morphology varied less than 3% (Sidoroff 2015: 101).

The three active top loading round updraft kilns were similar in form to those found in antiquity (Zayadine 1982; Melkawi *et al.* 1994). The Zīzyā' kilns, built with concrete blocks, are set upon an elevated section of the property surrounded by wide flat spaces to place vessels before and after firing. During the reduction phase of firing, Fire Master Hamada shoveled industrial waste through the stoke hole leading to the combustion chamber of the kiln (Fig. 3).

In times of production intensity, three firings were conducted each week. On the day before a firing, the kiln was loaded through the top opening. A typical load would be about 180 large water jars and 400 smaller spouted water jars. The firing begins on the following day and consists of three phases over a 12-hour period. The first phase is the very important slow warming phase which serves to drive off water. Clay contains two types of water: capillary-bound water that partially evaporates during air drying and continues to be released during this first phase, and chemically-bound water that will be drawn off by the heat of firing at temperatures over 600 C° (1100 F°). Next, the combustion chamber was packed with fuel and set alight, the door was closed, and the pottery was slowly warmed in a reduction atmosphere from 7:00 am to 8:00 am During one firing, observations made through an opening at the top of the heating chamber confirmed all vessels within were black.

The next phase continued until 4:00 pm, as the temperature is raised with large



4. Cross-section of a water jar fragment.

pieces of fuel that maintain an oxidizing atmosphere within the kiln. This draws off the chemically-bound water in the clay body and all the pottery turns red, reflecting the presence of iron in the clay body. In the final phase, an oxidizing atmosphere is maintained until about 7:00 pm. This raises the kiln temperature to about 1200 C°. No thermocouples were available to confirm temperatures. At the end of this phase, the stoke hole is blocked until the kiln is opened the next day to ensure no cold air enters as the pottery cools down overnight. In a very successful firing most vessels have nearly white exteriors (2.5Y 8/3) with no spalls and few defects. However, from less successful firings, there are piles of wasters stacked at a distance from the kilns.

In a cross-section of a Zīzyā' fragment, the fabric shows the firing sequence (Fig. 4). The core has faint gray remains of the reduction phase when the vessel was completely black. The gray is sandwiched between yellowish red (5YR 6/8) layers from the oxidation phase when the vessel turned terracotta. On outer edges of the cross section is a fine white layer, which occurs when highest temperatures forced calcite to the surface. There are few defects and no spalls on the pottery when firing is complete but there was a pile of wasters on the factory grounds at a distance from the kilns.

A link in the Zīzyā' *chaîne opératoire* was broken in 2018. Protective attitudes in Jordanian society regarding the environment influenced a change in firing strategy. No longer could the pollution be ignored that was generated by the old kiln firings with industrial waste fuel. The government set a deadline. The factory would be closed down in 2018 unless the old kilns were replaced with environmentally friendly kilns. Hamada, Fire Master at Zīzyā' for twenty-five years, built two smaller kilns fueled with free recycled diesel fuel collected in Amman (Fig. 5).



5. New kilns fueled with recycled diesel fuel for oxidation firing only.

Due to changes with social, environmental, and technological roots, once again it seemed to be the end of pottery making at Zīzyā'. In July 2018 only Master Potter and Fire Master remained, Saudi Arabia is no longer the factory's strongest market, and demand in Jordan for traditional clay vessels declined.

Conclusions

Zīzyā' factory provided a rare opportunity to conduct ethnoarchaeological research over six years in an industrial ceramic workshop. The resulting data showed how social and cultural forces impacted continuity and change. Survival of the factory depended on the ingenuity of the family manager to access free resources, maintain a steady work force, and seek out markets. Recent change from a high intensity production mode to a diminished operation was influenced by attitudes toward environmental pollution in Jordan. This forced the factory to adopt a new firing strategy at the same time as markets abroad closed down. Whether or not there is a future for Zīzyā', there are 40 years of observations by scholars to provide data to interpret the partial remains of ancient pottery workshops.

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