

Mushash 163: A Site of the 9th Millennium BCE in the Jordanian Badia. Results From the Investigations in 2016 and 2017

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The Neolithic site of Mushash 163 is located in the north-western part of the Jordanian desert steppe (*badia*) and about 40 km east of Amman (Fig. 1). It was discovered during a survey in the surroundings of the Islamic site of Qasr Mushash in 2012. Further archaeological investigations followed between 2014 and 2017. The aim of the work was to determine the stratigraphic sequence, as well as to obtain information about the built structures of this 0.25 ha large settlement.

The collected surface finds from the 2012 survey pointed to the site's occupation between the Early and Late Neolithic Period, *i.e.* between the 10th/9th and the 7th/6th millennium BCE. The former period is not well-

known in the north-western Badia, but it has been evidenced for example at Wadi Jilat, about 40 km south of Mushash 163 (Garrard *et al.* 1994).

The area surrounding Mushash 163 lacks perennial watercourses and springs. The only drainage today comes from winter precipitation that briefly causes flash floods in wadis and depressions, but that also collects in ground water reservoirs. Exploitation of the area's high groundwater table has until the present day therefore been a traditional way of getting access to the water in this region.

Today the area's landscape is that of a desert steppe deprived of its former vegetation. Its overexploitation

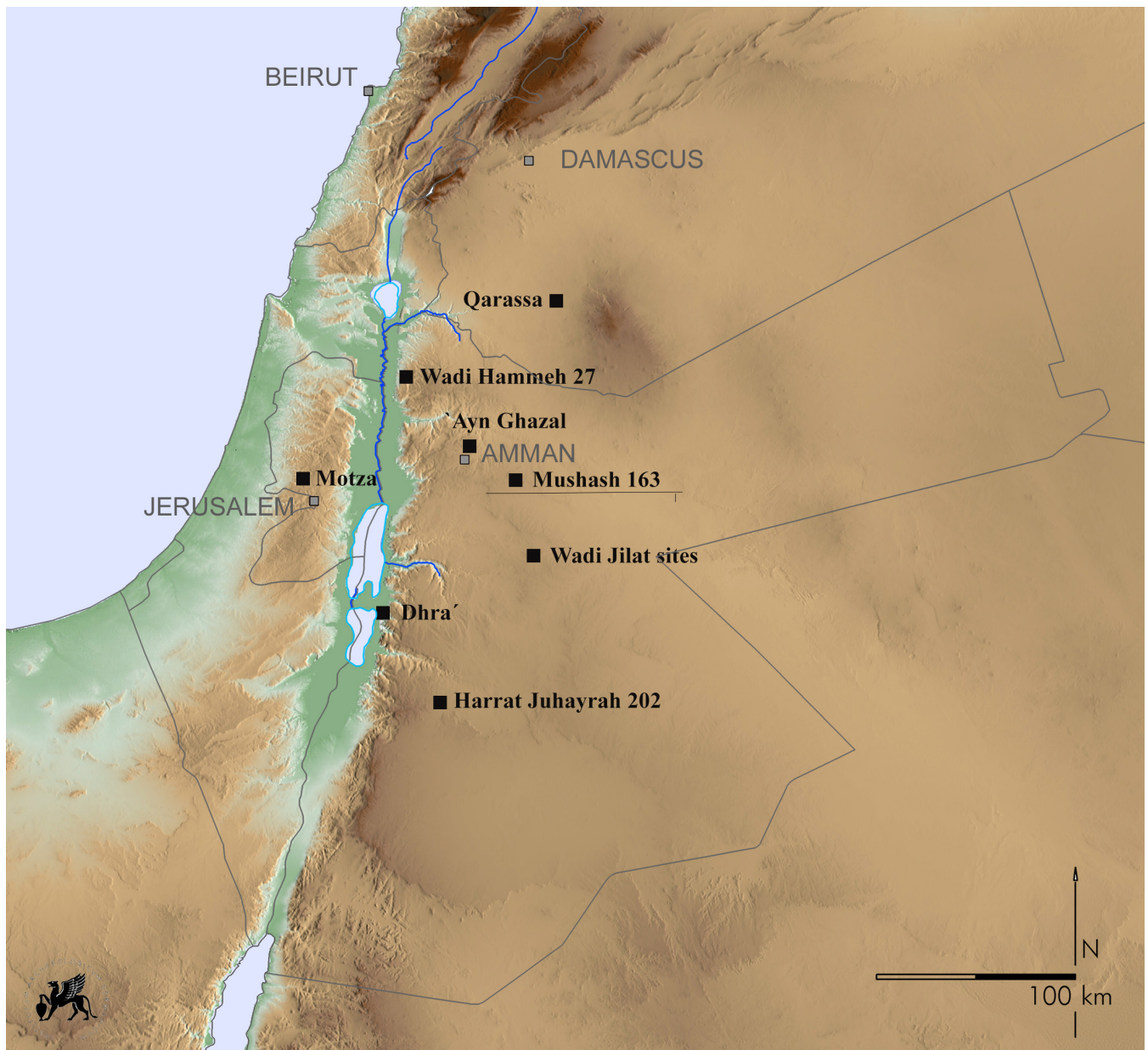


Fig. 1 Sites mentioned in the text. (Map: DAI Orient Department, K. Bartl)



Fig. 2 Mushash 163, Trench 1-south with Structures 2 (foreground) and 3 (background). (Photo: DAI Orient Department, Th. Urban)

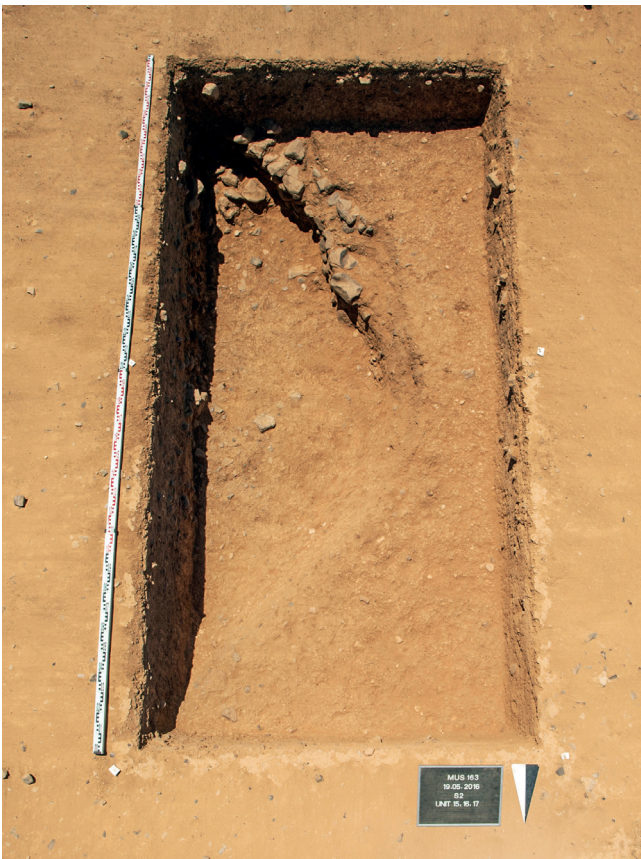


Fig. 3 Mushash 163, Trench 2 with Structure 4. (Photo: DAI Orient Department, Th. Urban)

has been persistent on over the millennia, for the most through intensive grazing. The natural environment in the Neolithic Period must hence have been characterised by a denser vegetation and accordingly, a richer wildlife. However, more data is needed for the reconstruction of the area's former natural environment.

Work in 2014 focused on the settlement's north-western area, where two small test trenches were cut (1-north and 1-south). The decision was underpinned by a beforehand geophysical prospection carried out in 2013 that had revealed a number of circular structures (Bartl *et al.* 2014: Fig. 11). The excavation grid was arranged in such a way that the wall structures plotted in the geomagnetic plan would coincide with the soundings' centres. As a consequence in each trench a building was cleared: Structure 1 in Trench 1-north, Structure 2 in Trench 1-south. In two short excavation campaigns in 2015, both test trenches were expanded what led to the discovery of another structure to the west of Structure 2 (= Structure 3). The latter was characterised by a complex interior layout displaying several upright standing stones. All radiocarbon dates obtained from the deposits in Structures 1-3 in the first two campaigns pointed to the first half of the 9th millennium BCE, in other words to the transition from the PPNA to the EPPNB (Lelek Tvetmarken and Bartl 2015).

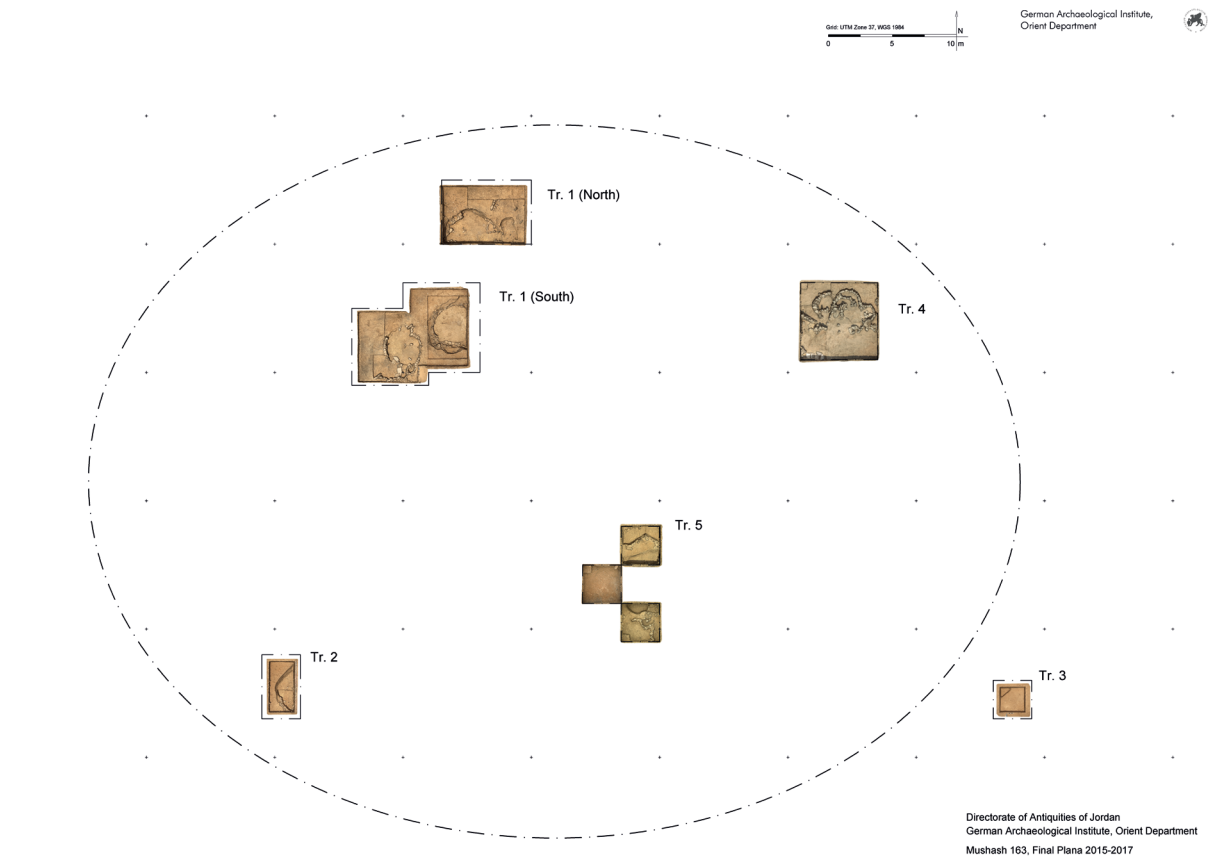


Fig. 4 Mushash 163, site map with excavation areas. (Map: DAI Orient Department, Th. Urban)

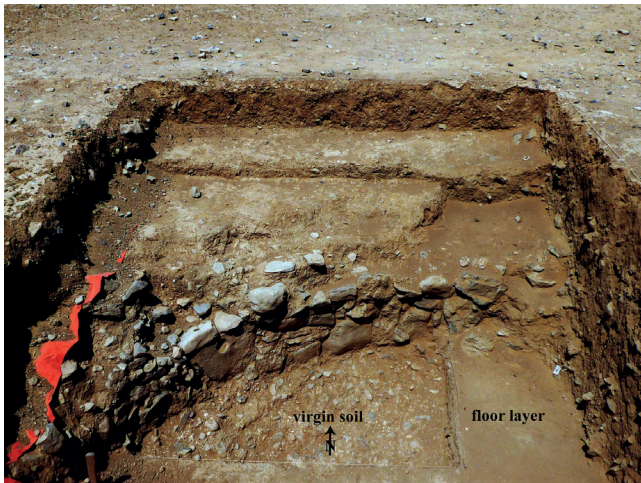


Fig. 5 Mushash 163, Trench 1-south, Structure 2, deep sounding. (Photo: DAI Orient Department, Th. Urban)



Fig. 6 Mushash 163, Trench 1-south, Structure 2, cattle bone in the inner façade of the building. (Photo: DAI Orient Department, Th. Urban)

Trenches 1-south, 2 and 3

Three short excavation campaigns were carried out in 2016 and 2017 (Bartl 2017; Bartl and Rokitta-Krumnow 2017). The aim was to investigate more architectural features, also at the site's margins. In addition to the finishing fieldwork on Structure 3 in spring 2016, by which the building's southern end (Fig. 2) was cleared, new investigations in the SW and SE of the settlement were initiated. Trench 2 was opened 25 m southwest

of trench 1-south, where another circular building (Structure 4) was found. As with Structures 1 and 2, the upper edge of the outer wall was only reached at about 0.80 m below the actual surface. The preserved parts of the wall concentrated in the southern part of the trench, whereas the northern part of the wall had been lost. Structure 4 was like 1 and 2 a semi-subterranean house, whose outer wall and floor had been lowered into the surrounding terrain (Fig. 3). Trench 3 was opened at the site's outermost edge, 55 m east of Trench 2. However,



Fig. 7 Mushash 163, Trench 4, Structures 5 and 6. (Photo and montage: DAI Orient Department, Th. Urban)

no structures were recorded here, except for a small pit in the north-western corner.

The 2017 spring campaign focused on re-investigating Structure 2 excavated in Trench 1-south in 2014-2016, as well as on work in the new Soundings 4 and 5 at two other locations in the settlement's north-eastern and south-western areas (Fig. 4). Here again, the choice of the excavation areas was based on the geophysical data, which indicated massive building structures at these locations.

The supplementary investigations at Structure 2 in Trench 1-south were aimed at verifying the nature of the virgin soil below the floor level that had been reached in 2016, and hence at shedding light on doubts as to the presence of possible earlier layers below this building.

Through excavating below the building's western floor, an approximately 0.20 m thick sequence of anthropogenic soil and ash deposits could be confirmed (Fig. 5).

The deposits directly superseded the virgin soil which is composed of pebbles and reddish clay mixed with white lime inclusions. A sample extracted from the culture deposits, which also contained charcoal fragments, was recovered for micro-morphologic analysis. A radiocarbon sample of the charcoal deriving from short-lived *Chenopodiaceae* pointed to the interval 9560 ± 50 BP/ 8970 ± 130 BCE, *i.e.* the so far earliest date from Mushash 163. The site's foundation may therefore go back to the PPNA (9800-8600 BCE). The discovery of a naviform flint core inside this earliest deposit above the virgin soil evidences the existence of



Fig. 8 Mushash 163, Trench 4, Structures 5 (background) and 6 (foreground). (Photo: DAI Orient Department, Th. Urban)

the therewith connected technology, which in the subsequent development proliferated as a typical marker for the PPNB (8600-7000 BCE). A unique find was made during investigation and cleaning work inside Structure 2. In the lower section of the western interior face, a large cattle bone (N. Benecke, pers. comm.) was recovered that had been placed between several large stones, perhaps as an intentional deposit (Fig. 6).

Trench 4 was dug at the north-eastern edge of the site, 25 m east of Trench 1-south. It revealed a complex building (Structure 5) covering a surface of approximately 5.00 m E-W by 3.50 m N-S, but whose southern walls were not preserved.

The house's room structures group like cloverleaves around a central area measuring 1.20 x 1.20 m. A corridor-like appendix formed by two crescent-shaped stone alignments were recorded at the house's north side. In the east was a semi-circular niche of 1.00 x 0.60 m, and in the south another, partially preserved semi-circle. The house's preservation was better on the west side, where an oval structure (Unit 22/28) of 1.00 x 0.80 m, had survived to a height of c. 1.00 m, consisting of ten stone courses (which may have formed the original core of the building).

Noteworthy were several upright stones in an E-W alignment (Fig. 7). The one furthestmost west (Unit 55) had the shape of a pillar and a roughly square section. It had been placed directly on the mud floor where it had survived to a height of approximately 0.80 m. The stones may have served as bases for wooden posts supporting a roof construction. A function as a device for bearing a raised wooden floor that warranted for ventilation below as with storage purposes seems however unlikely, given the reduced dimensions of the walls,

which then would have been completely covered.¹ Indications for ritual purposes suggested by recent findings from sites like 'Ayn Ghazal are still indistinct (Kafafi 2011).

The entire area north of Structure 5 yielded numerous, highly fragmented animal bones contained in partly ashy and powdery soil. This approx. 40 cm thick waste layer extended over a wide area immediately next to the building.

The investigations of the architecture in Trench 4 were continued and completed for the time being in autumn 2017. The so far L-shaped trench was extended to a square of 6 x 6 m, and the area in structure 5 was fully excavated down to virgin soil. As in Structure 2, the latter consisted of reddish clay with white lime inclusions. The areas of the main structure are less well preserved than the western area with Unit 22/28. The walls here were considerably taller and may therefore represent later additions or extensions.

In the western area of Trench 4 various stone structures and agglomerations were cleared, of which Structure 6 was particularly remarkable. It was excavated immediately southwest of Structure 5 and its northern wall (Unit 32) displays the thus far best preservation of all cleared structures. The existing wall remains suggest a rectangular building, of which, however, the greater part still is in the unexcavated settlement area further west. The north wall of the house was preserved to a height of 1.20 m in twelve stone courses. The eastern wall (Unit 87) was only partially preserved, whereas the one in the south (Unit 78) was traced over a very short distance only. It continued into the west section in an area displaying substantial combustion traces that persisted south-west of the wall. However, most



Fig. 9 Mushash 163, Trench 4, Burial/Unit 82 with stone cover. (Photo: DAI Orient Department, Th. Urban)



Fig. 10 Mushash 163, Trench 4, pit of Burial/Unit 82. (Photo: DAI Orient Department, Th. Urban)

of this burnt area to the west of Trench 4 awaits excavation yet. In the northeast a short stone wall (Unit 77) was recorded next to the house's north wall, although without a bond at its corner. The floor of the associated room was not reached, at least in the area of Unit 32. The north-eastern room corner displayed a circular stone installation. Immediately east of it was a large pestle of 50 cm length (Fig. 8).

A radiocarbon sample from the northeast corner of Structure 5 points to a date of around 9170 ± 80 BP/ 8393 ± 69 BCE, thus the end of the EPPNB (8600-8200 BCE).

Trench 4: A Burial of the Roman Period

An unexpected burial of the Roman period was found immediately south-east of Structure 6. The initial suspicion that the burial dated to the Neolithic period was eventually refuted by two radiocarbon probes on the bones. Both analyses were carried out independently in different laboratories and resulted to dates in the 2nd/3rd centuries AD, thus attributing the burial to a Roman Period intrusion into Neolithic deposits. Similar burials in stone cists with capstones are known from slightly later contexts (3rd/4th centuries AD), as



Fig. 11 Mushash 163, Trench 4, basalt beakers found near Burial/Unit 82. (photo: DAI Orient Department, K. Bartl)

in the desert region near Ma'an (al-Salameen and Falahat 2009).

The burial was orientated in East-West direction and displayed a cover of five undressed stone slabs in a N-S orientation that sealed an oval burial pit of 0.40 m depth, 1.30 m length, and 0.50 m width. Smaller stones had been wedged in-between the slabs in order to fill the gaps. The large stone at the row's eastern extremity had an E-W orientation and may therefore have slipped out of its original position (Fig. 9). The burial pit had been lowered down into the surrounding soil, but the stone slabs had simply been laid onto the ground.

The individual had been buried in a crouching position, its eyes facing north (Fig. 10). A relatively large limestone bead was recorded near the feet. Two pierced cone snails from the 300 km distant Red Sea (N. Bencke, pers. comm.) were recovered from the fill. The skeleton's state of preservation was poor, its bones being relatively brittle with all body parts present but in a highly fragmented condition (J. Gresky, pers. comm.). The skeleton was covered with a 5-10 cm thick layer of soil that apparently had been deliberately applied onto it. An 'Amuq type point was recovered from its top surface. There was a gap of about 3 cm between this layer and the slab cover.

Some objects recorded to the west of the grave's capstone cover (Fig. 11) are of special interest. They consist of a pestle and two small, cup-like vessels made from basalt. They were recovered immediately adjacent to the westernmost capstone, near the location of the skull. The objects were found at an equal level with the surface next to the grave pit. The area immediately west of the objects consisted of black ashes, which according to the western trench section seemed to continue into the unexcavated deposits further west (see above).

The mentioned pestle was made of a coarse porous basalt and displayed chipped areas at both extremities. Both vessels were almost intact and consisted of a rel-



Fig. 12 Mushash 163, Trench 4, western part of the Burial/Unit 82 and objects beside the grave. (Photo: DAI Orient Department, Th. Urban)

atively light-coloured basalt with fine pores. They are of similar but not identical shape and size, and each has a short stem (Fig. 12). They had probably been used for drinking or pouring purposes. There were no visible traces of what they may have contained. Both artefact groups are known from other areas of Mushash 163. Basalt cups are, however, known almost exclusively from Epi-Palaeolithic contexts, as for from Wadi Hammeh 27, where they were classified as mortars according to the find contexts (Edwards 2013: 215, Fig. 5.26).

This burial, which is about 70 cm below the modern surface, raises several questions for instance pertaining to the visibility of the Neolithic ruins in Roman times, but also to the identity of the buried individual. The latter may have some connection with the neighbouring Early Islamic site of Qasr Mushash. Since the foundation of the fortification there was dated by its pottery to the Roman Period, probably the 3rd but possibly even the 2nd century AD, there may be a link between both (Bartl *et al.* 2014).

Trench 5

Another excavation area, no. 5, is located about 15 meters southeast of Trench 1 and 18 meters southwest of Trench 4. Here, the geophysical data revealed a major anomaly, indicating a large circular structure. However, the excavations only displayed a so-to-speak 'negative impression' in the form of a large, oval to round depression filled with ashes and lowered into the virgin soil (Structure 8). It seems therefore likely that a former lining wall had been dismantled and its stones used for other purposes. This removed construction layer was superseded by a layer with multiple curvilinear walls, which had been erected onto the ground and were not embedded into natural soil (Structure 7). Just like House 5 in Trench 4, this structure's layout was characterised by relatively small room units. A



Fig. 13 Mushash 163, Trench 5, part of Structure 7, skull-like limestone and limestone pestle in the interior of the semicircular structure. (Photo: DAI Orient Department, K. Bartl)

semi-circular feature containing an oval stone with shallow depressions at the surface was an unusual discovery (Fig. 13). The stone's anthropoid shape may have had a symbolic significance.

The now available twenty radiocarbon dates from all soundings at Mushash 163 point to a settlement period between 8900/8800 and 8200 BCE. They thus prove a period, which has so far been detected

relatively rarely in the southern Levant, but has been increasingly documented in recent times, as *e.g.* at Motza (Khalaily *et al.* 2007), Harrat Juhayrah 202 (Fujii *in press*), and Qarassa (Ibáñez *et al.* 2010). In other words, there is now a greater database for the controversial discussion about the initial stages of the PPNB in the southern Levant (Finlayson *et al.* 2014; Edwards 2016).



Fig. 14 Mushash 163, grinding plate of basalt (photo: DAI Orient Department, K. Bartl)

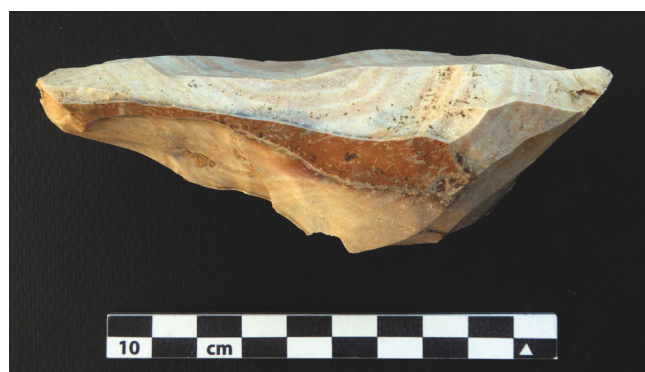


Fig. 15 Mushash 163, Trench 1-south, Structure 2, naviform core from the deep sounding, situated immediately above virgin soil. (Photo: DAI Orient Department, K. Bartl)

Finds

The finds mainly comprise chipped stones but also grinding equipment, including grinding plates (Fig. 14) as well as grinding stones from basalt and limestone pestles. Surprisingly, the chipped stone industry counts a large number of naviform cores in all stages of processing, which may indicate that manufacture had been in excess of local demands (D. Rokitta-Krumnow, pers. comm.) (Fig. 15). The projectile points include both early types such as Khiam, Helwan, Aswad points as well as late forms like Jericho, Amuq, and Byblos points (Rokitta-Krumnow in press). Among the surface finds were two retouched flint daggers that, like the mentioned later points, hint to LPPNB as well as PPNC occupation phases of the 8th/7th mill. BCE (Rokitta-Krumnow 2017). Further noteworthy is the gaping absence of bone tools, whilst the mentioned basalt cups are rare artefacts witnessing to an advanced know-how in stone processing techniques.

Subsistence Strategies

The investigations at Mushash 163 also included floatation of soil samples from selected find contexts. Despite the rather poor conservation of the botanical samples, different species could be detected, including *Fabaceae*, *Pistacia*, *Tamarix*, *Hordeum* sp. There were no indications concerning cultivated varieties (R. Neef, pers. comm.).

The animal bones stem almost exclusively from wild fauna. The most common species are gazelle, wild ass, camel, deer, and cattle, and also smaller animals like hare and hedgehog (N. Benecke, pers. comm.). The only domesticated species is the dog.

Summary

Mushash 163 is among the relatively few sites in the southern Levant that witness the transition from the PPNA to the PPNB. The excavations at this multi-phased site have traced the presence of both round and oval structures of various types, as well as at least one rectangular building from the later occupation phase in the second half of the EPPNB.

The results from Mushash 163 so far raise questions relating to the type of this settlement. The site's reduced size suggests a relatively small community, and the comparatively elaborate architecture may be an indication for a long-term or even permanent occupation, whose durable subsistence was made possible by the resources of the local habitat.

The duration of the settlement's occupation is unknown. Thus far, the excavated architecture has fallen short of matching the youngest lithic evidence from the

site's surface (G. O. Rollefson, pers. comm.). Therefore, the question arises whether after the main settlement phase in the 9th millennium BCE the site remained permanently occupied in the 8th and 7th millennia BCE with a permanent architecture at possibly other, yet unexcavated locations at the site, or whether it was occupied merely on a temporary basis during this period, with structures made from perishable materials. It is also conceivable that during its recent phases the site was only used as a meeting place for settling hunting matters, without there being any settlement at all.

The likelihood that the location of Mushash 163 may have had a special attraction, possibly within a hunting context, is sustained by its long-lasting occupation as verified by the tool typology covering more than 2000 years.

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Endnote

¹ A corresponding reconstruction was proposed for the PPNA site at Dhra', in which the upright stones inside a round building served as support for the floor beams, hence suggesting the building's use as storage facility (Kujit and Finlayson 2009: Figs. 2-5; Finlayson et al. 2011: Fig. 5).

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