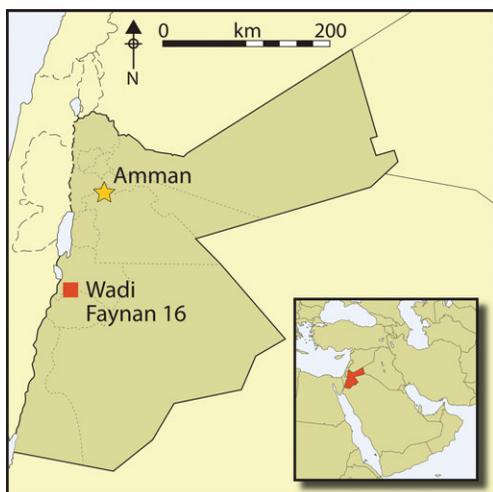


An 11 600 year-old communal structure from the Neolithic of southern Jordan

Steven J. Mithen¹, Bill Finlayson², Sam Smith³, Emma Jenkins⁴,
Mohammed Najjar⁵ & Darko Maričević¹



The authors present a new type of communal and monumental structure from the earliest Neolithic in western Asia. A complement to the decorated stone pillars erected at Göbekli Tepe in the north, 'Wadi Faynan 16 Structure O75' in the southern Levant is a ritualised gathering place of a different kind. It serves to define wider western Asia as an arena of social experiment in the tenth millennium BC, one in which community seems to take precedence over economy.

Keywords: Levant, Wadi Faynan, Neolithic, PPNA, monumentality, communal structures, complexity

Introduction

The Neolithic in south-west Asia marks the earliest transition in the world from mobile hunting and gathering to sedentary farming lifestyles (Mithen 2003). Once described as a 'revolution', this is now more often characterised as a process of gradual transition with complex inter-related changes in economy, social organisation, ideology and technology (Barker 2006). Our understanding of this process has been transformed by the discovery of early Neolithic sites in southern Turkey (Göbekli Tepe, Schmidt 2006) and northern Syria (Jerf el Ahmar, Stordeur *et al.* 1997), with architecture indicative of communal

¹ University of Reading, Whiteknights, P.O. Box 217, Reading, Berkshire RG6 6AH, UK
(Email: s.j.mithen@rdg.ac.uk)

² Council for British Research in the Levant, 10 Carlton House Terrace, London SW1Y 5AH, UK

³ Department of Anthropology and Geography, Oxford Brookes University, Headington Campus, Gypsy Lane, Oxford OX3 0BP, UK

⁴ School of Applied Sciences, Bournemouth University, Christchurch House, Talbot Campus, Poole, Dorset BH12 5BB, UK

⁵ The British Institute, P.O. Box 519, Jubaiha 11941, Amman, Jordan

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activity in its construction and/or use, some of which is monumental in scale. These sites suggest that changes in social organisation involving an increase in communal activity had occurred before the transition to agricultural economies. Here we describe a further large and architecturally complex structure, also dating to the earliest phase of the Neolithic but coming from the southern rather than the northern Levant.

This new discovery has been made at the early Neolithic site of WF16 (Finlayson & Mithen 2007) and is designated within the excavation as Structure O75. It is found in association with a dense cluster of mud-walled, semi-subterranean structures, some of which had been used as workshops, others for storage or grinding of foods and pigments. Structure O75 is of an unprecedented form in the Neolithic archaeological record. While the functional role of this structure remains unclear, it provides further evidence that changes in social organisation — notably the appearance of communal activity, collective labour and ideology manifest in art and architecture — preceded that of economic change within the Neolithic transition process. Moreover, contrary to recent proposals that the Neolithic ‘originated’ in a so-called ‘Golden Triangle’ of Upper Mesopotamia (Aurenche & Kozłowski 2001), this new discovery at WF16 indicates that socially-driven Neolithisation was widespread within south-west Asia at the very start of the Holocene.

The Pre-Pottery Neolithic A (PPNA)

The initial stages of the Neolithic transition in south-west Asia are denoted as the PPNA cultural phase (9750–8550 BC, Kuijt & Goring-Morris 2002), the start of which is coincident with the environmental changes that mark the end of the Pleistocene. PPNA settlements show significant similarities to those of the Epipalaeolithic in terms of having sub-circular structures and no traces of domesticated plants and animals. The PPNA is followed by the Pre-Pottery Neolithic B (PPNB) cultural phase (8750–6300 BC) when rectangular, two-storey buildings and domesticated sheep, goat and cereals are gradually developed and adopted (Kuijt & Goring-Morris 2002).

Prior to the 1990s, and apart from Nahal Oren (Noy *et al.* 1973) and Hatoula (Lechevallier & Ronen 1994), most of the key sites dating to the PPNA in the southern Levant were clustered on the western side of the Jordan Valley, notably Jericho (where the Neolithic architecture included a tower, Kenyon & Holland 1981), Netiv Hagdud (Bar-Yosef & Gopher 1997), Gesher (Garfinkel 1989) and Gilgal (Bar-Yosef *et al.* 2010). This locality was assumed to be the core area for the emergence of the Neolithic (Figure 1). That view has been challenged as sites with spectacular and complex architecture and artworks have been discovered in northern Syria and southern Turkey, notably at Jerf el Ahmar (Stordeur *et al.* 1997), Göbekli Tepe (Schmidt 2006) and Tell ‘Abr 3 (Yartah 2004).

At Göbekli Tepe, numerous large (10–30m diameter, Schmidt 2002) structures with ‘T’-shaped pillars are found, which are generally believed to have had a ceremonial or ritual role. At Jerf el Ahmar there are substantial structures, up to 7.5m in internal diameter (Stordeur *et al.* 2000), described by Watkins (2010) as ‘monumental’ in scale. These have been interpreted as multi-function communal buildings that developed into single-purpose communal structures with a possible cultic role (Stordeur *et al.* 2000). As a consequence of these discoveries, recent research has proposed that cognitive, social and cultural factors were

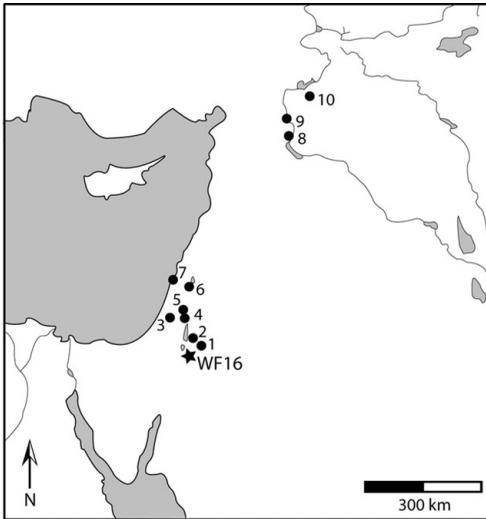


Figure 1. South-west Asia showing the location of WF16 and other PPNA settlements mentioned in the text: 1) el-Hemmeh; 2) Dhra' & ZAD 2; 3) Hatoula; 4) Jericho; 5) Netiv Hagdud & Gilgal; 6) Gesher; 7) Nahal Oren; 8) Jerf al Ahmar; 9) Tell Ábr 3; 10) Göbekli Tepe.

the drivers of the Neolithic transition, with a focus on developments in Upper Mesopotamia (Aurenche & Kozłowski 2001; Mithen 2003; Watkins 2010).

While Göbekli Tepe and Jerf el Ahmar were being excavated and their implications for Neolithisation first considered, three new PPNA sites were discovered on the eastern side of the Wadi Araba, south of the Dead Sea: Zaharat Adh-Dhra' 2 (ZAD 2, Edwards *et al.* 2002), El Hemme (Makarewicz *et al.* 2006) and WF16 (Finlayson & Mithen 2007). Renewed excavations were also undertaken at the previously known PPNA site of Dhra' (Finlayson *et al.* 2003). While each of these sites have produced valuable new evidence about the PPNA period in semi-arid southern Jordan, the findings from WF16 are particularly striking because they include an unprecedented type of large

structure (O75) with complex internal architecture. The function of this structure remains unclear but its size and form implies communal activity in both its construction and use in a similar manner to the early Neolithic sites in the northern Levant.

Evaluation and excavation at WF16

WF16 is located on two adjacent knolls in Wadi Faynan, Jordan, at the base of the escarpment leading to the Jordanian plateau (36R 3390442N 0739824E; 300m asl, Figure 1). It is *c.* 500m from the PPNB settlement of Ghuwayr 1 (Simmons & Najjar 2000) and 2km from the Pottery Neolithic site of Tell Wadi Feinan (Simmons & Najjar 2002; Figure 2). Following its original discovery as a surface artefact scatter in 1996, evaluation by test-pitting, trial trenching and geophysical survey between 1997 and 2003, demonstrated that occupation had occurred throughout the period of the PPNA (Finlayson & Mithen 2007). The site was shown to have stratification more than 2m deep, good preservation and a rich cultural inventory. Several sub-circular stone and pisé walled structures containing domestic debris, grinding stones and human burials were exposed while geophysical survey indicated the presence of structures across the entire western knoll (0.6ha), including some of a particularly large size — approximately 15m in diameter (Astin & Mansfield 2007). Stone and bone artefacts with incised designs were recovered, along with anthropomorphic figurines and a diverse range of stone and shell beads (Cerón-Carrasco 2007; Critchley 2007; Finlayson 2007; Shaffrey 2007). The animal fauna came primarily from *Capra* sp., but included *Bos primigenius*, *Gazella* sp., *Equus* sp., *Vulpes vulpes*, *Lepus capensis* and *Felis*

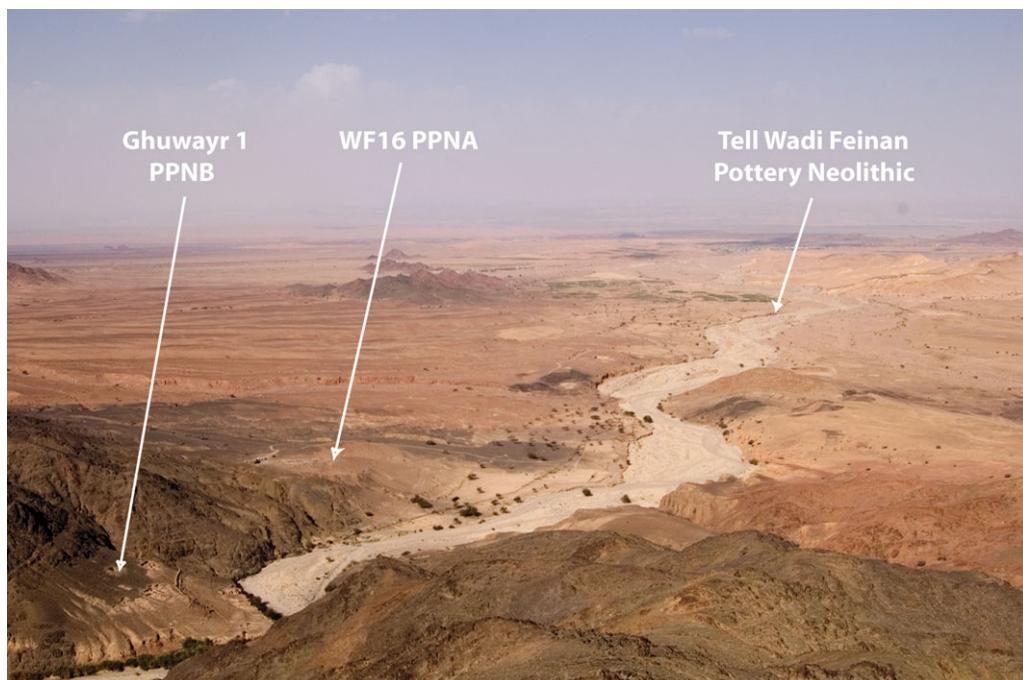


Figure 2. Wadi Faynan, southern Jordan, looking west towards the Wadi Araba. Three Neolithic sites from the successive phases of the Neolithic are shown: WF16 (PPNA, 9750–8550 BC), Ghuwayr 1 (PPNB, 8550–6300 BC) and Tell Wadi Feinan (Pottery Neolithic and Chalcolithic 6300–3500 BC). The latter site is the first to be positioned in the floodplain of the Wadi, which is suggestive of the rising importance of arable cultivation.

sp., with no signs of domestication — although herding of wild *Capra* sp. remained a possibility (Carruthers & Dennis 2007). The quantity of mortars, grinding stones, pestles and pounders (Shaffrey 2007) indicated intensive exploitation of wild flora which included *Hordeum spontaneum*, *Pistacia* sp., *Ficus carica* and *Bromus* sp. (Kennedy 2007). The plant and animal remains, along with climatic and hydrological modelling (Smith *et al.* 2011), indicated that when occupied the site was adjacent to a perennial water course with ready access to juniper woodland, evergreen oak woodland, steppe, riparian woodland and desert communities (Mithen *et al.* 2007).

On the basis of the potential significance of WF16 for addressing the origins of sedentism and farming (Mithen & Finlayson 2007a), three seasons of excavations were undertaken (2008, 2009 and 2010) to expose a continuous area of 40 × 15m — the largest single exposure for a PPNA site in the southern Levant (Mithen *et al.* 2010). While the post-excavation analysis of finds has commenced, the majority of this research will be conducted once the detailed analysis of the stratigraphy and architectural evidence has been completed in order to provide the contextual information necessary for an integrated analysis and interpretation of the material recovered during excavation. Here we simply wish to report the discovery of an unprecedented type of Neolithic structure: Structure O75.

A large structure at WF16 indicative of communal activity

The 2008–10 excavation exposed more than 30 well-preserved semi-subterranean, pisé-walled structures (Figure 3). Some of these structures were relatively small, such as Structure O56, which measured $2.15 \times 1.30\text{m}$ internally, while a few were substantially larger, such as Structure O45, which measured $5.5 \times 4.2\text{m}$ in its internal extent (Figure 3; see also Figure 10). They formed a dense cluster of conjoined structural spaces, which flanked an elliptical $22 \times 19\text{m}$ structure constructed of pisé designated as Structure O75 (Figure 4). This large structure consists of a mud-plaster floor with multiple surfaces surrounded by a 0.5m high bench on at least half of its circumference, part of which has a second tier (Figure 5). Although some parts have been eroded, and others are concealed by a later PPNA building, there is a general symmetry to the structure along an axis formed by a deep trough, also lined with mud-plaster, *c.* 0.75m wide and 1.2m deep. Towards the north-west end of the trough, a pit below the most recent floor surface is lined with burnt plaster and contained fragments of large broken stone bowls. Two cup-hole mortars, typical of the PPNA, are set into slightly raised platforms on the floor on either side of the trough. Three pairs of parallel ‘gullies’ – smooth ridges with a central ‘channel’ – are moulded into the floor, running from the edge of the benches to the central trough in a herringbone pattern. Each gully has a pit at its midway point from which it appears a large post has been removed, leaving a ragged hole in the plaster (Figure 6). Although the gullies initially appear as if they were designed to carry liquids, they dip down in the centre of their course and the mud-plaster is not stable when damp. Indeed, two of these features are simply smooth ridges in the plaster floor, while the channel in a third has been deliberately filled with plaster. Their main purpose may have been to partition the internal area. The floor surface is marked with numerous small stakeholes, as well as pits and hearths.

The surrounding benches are over 1m wide and effectively comprise a double tier of platforms above the main floor. The face of the lower bench on the southern side of the monument has been partially decorated with a wave pattern in its mud-plaster coating (Figure 7). The pattern is similar to that found on stone artefacts from WF16 and elsewhere in the PPNA (Figure 8). In some places the decoration appears to have been deliberately concealed by later plastering events. Massive postholes are moulded into the fabric of the pisé wall that surrounds the structure. Combined with those in the gullies, these suggest that at least part of the structure had been covered. That would indeed have been essential because the mud mortar would not have survived rain.

The stratigraphy of the internal features and fills indicates multiple replastering events, episodes of repair and modification of the structure. The walls appear to have been significantly burnt, unlike the floor, suggesting that there was a burning event before the main excavated floor surface was laid. The mud-plaster decoration on the walls has been placed over the scorched surface. In the earliest phase so far excavated, the trough, gullies and mud-plastered pit had been in contemporary use, appearing to have been elements of a single functional design. Part of the trough was then covered with a new mud-plaster surface; the remainder was left exposed but filled with rubble and a goat/ibex cranial fragment with its horn-cores attached (faunal identifications have yet to be completed). A central hearth was then moulded into the floor, into which a further set of goat or ibex horn-cores was

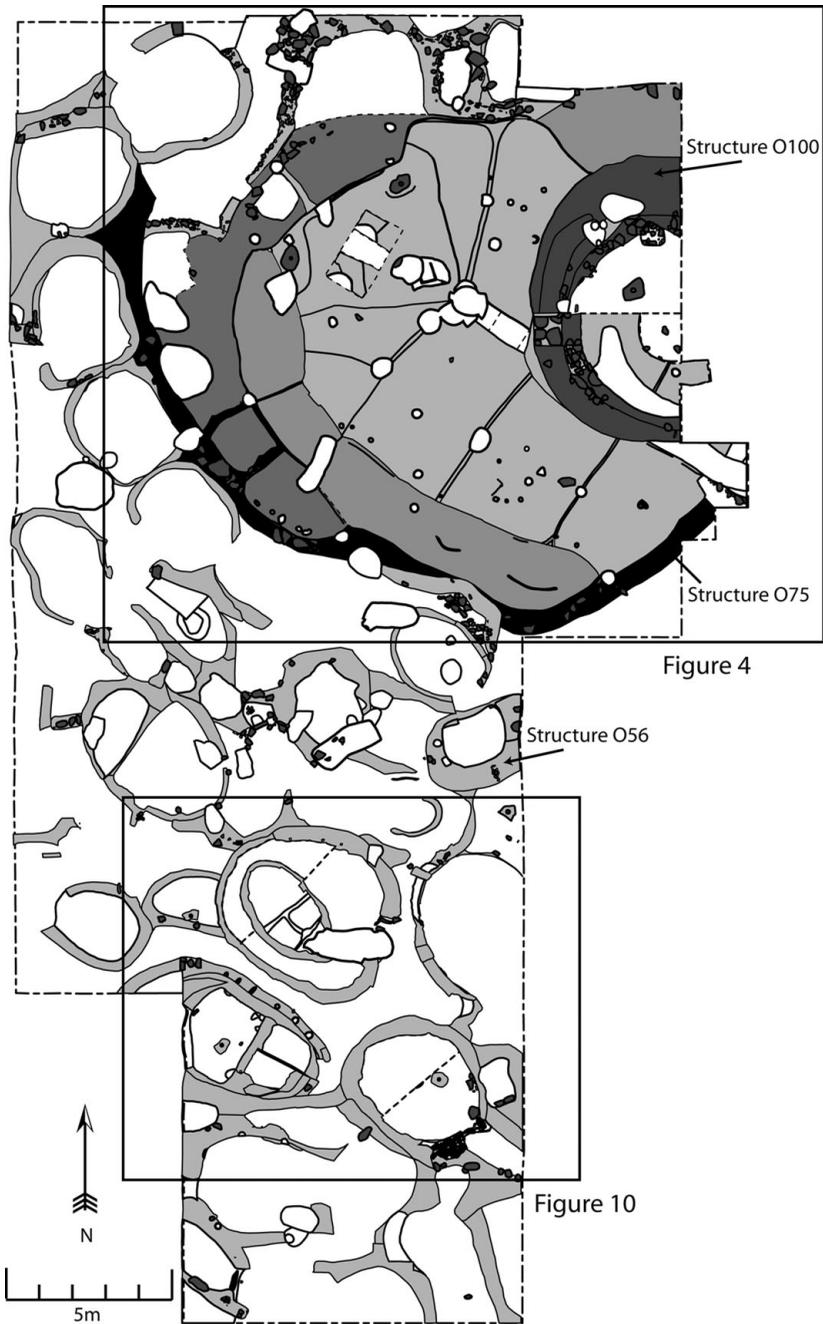


Figure 3. Schematic plan of structures exposed at WF16 by the 2008–10 excavations. Structure O75 is shown with its interior and two bench tiers in shades of grey, with the main external wall of the structure in black. Structure O100 overlies Structure O75, but where the interior of Structure O100 has been excavated, part of the interior of O75 with a gully is visible. The limited extent to which other walls (coloured grey) intercut each other suggests that a significant number of the exposed structures were contemporaneous. Variations in architecture, size and associated finds suggest some had been used as workshops and others for storage or domestic activities. All appear to have been semi-subterranean, the lower floor levels of some structures being up to 2m below current ground surface.

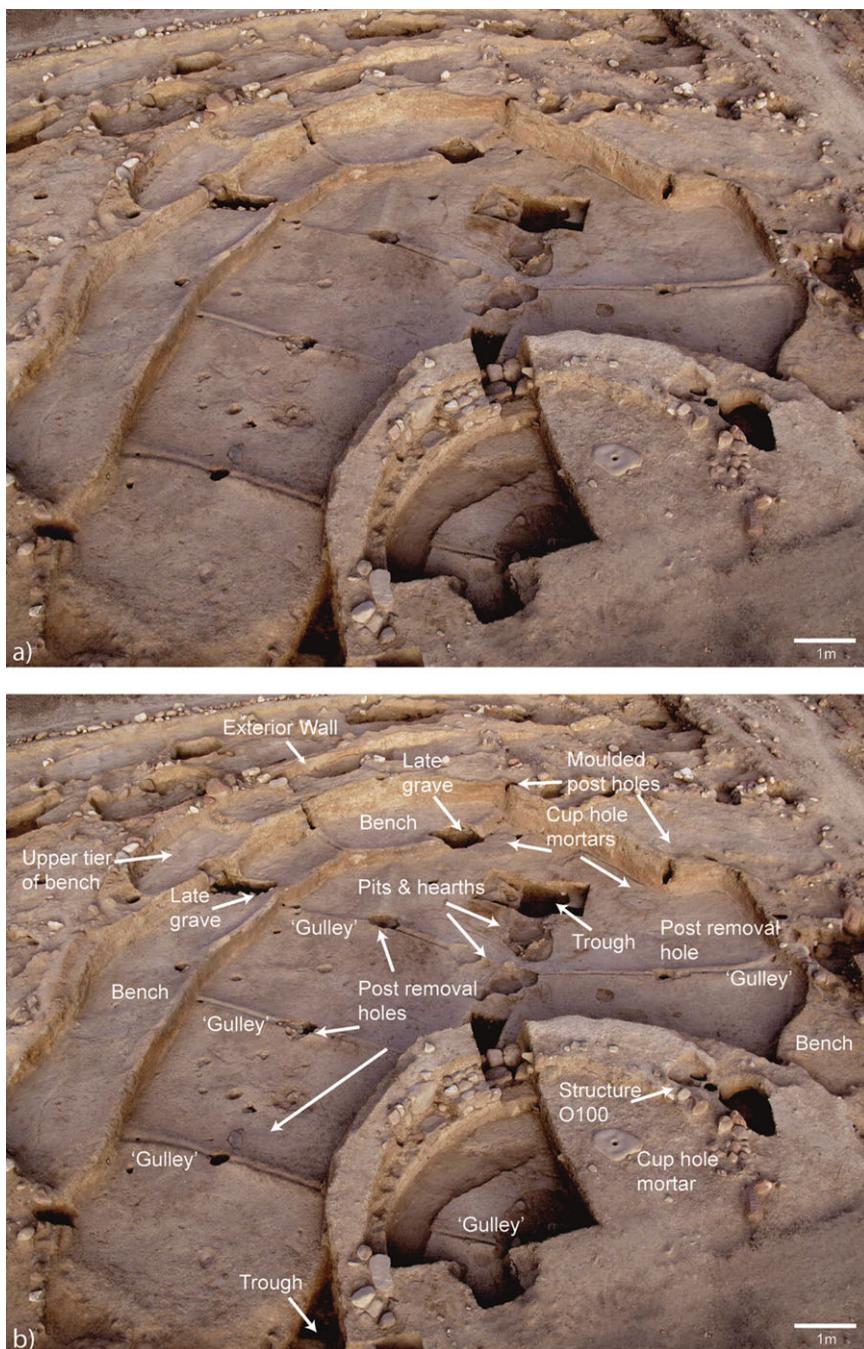


Figure 4. a) Structure O75 at WF16 located in the north-east area of the Neolithic settlement of WF16, looking from the east. A later, but still PPNA, circular structure (Structure O100) with massive walls is in the foreground, its floors having been excavated on the southern side of its interior to expose remnants of the floor and 'gully' of Structure O75 into which it had been placed. The central trough of Structure O75 has only been partially excavated but has been shown to entirely bisect the floor of the structure; b) Structure O75 with annotation showing main architectural features.



Figure 5. Excavation of Structure O75 looking towards the south-east showing the two-tier benches and moulded postholes on the southern side of the structure.

placed. After this the main floor went out of use. Sediment accumulated within the structure to a depth of *c.* 0.25m, at which point a substantial freestanding, oval pisé and stone-walled building with mud-plaster floors was constructed in the interior of the structure towards its eastern side (Structure O100). This construction is stratigraphically congruent with the creation of a later phase of flooring across the interior of Structure O75. Structure O100 was subsequently modified by the construction of an inner stone wall and new floor layers containing massive stone cup-hole mortars (Figure 9). Outside of its now *c.* 1m-thick wall, dense midden deposits accumulated within the walls of Structure O75, containing fragmented animal bone, PPNA stone artefacts, charcoal and plant macrofossils. Apart from two probably Nabatean burials which truncate this midden infill, the stratigraphic sequence within Structure O75 remains entirely contained within the PPNA. Radiocarbon dates from deposits sealing its initial floor fall between 9578 and 8472 cal BC (Table 1). A total of 15 radiocarbon dates have so far been acquired from the 2008–10 excavation, the calibrated values of which all fall between 10 078 and 8220 BC, concurring with the 27 radiocarbon dates acquired during the evaluation (Mithen & Finlayson 2007b).

The large communal structure (O75) and oval structure (O100) with free-standing walls and massive cup-hole mortars are associated with a dense cluster of at least 30 semi-subterranean, pisé-walled structures (Figures 3 & 10). These are all similar in their semi-subterranean construction but they vary considerably in size and internal design, having different combinations of structural features and furnishings. These include pisé-moulded hearths, large and small wall niches and shelves, cup-holed mortars, stonework-benches,

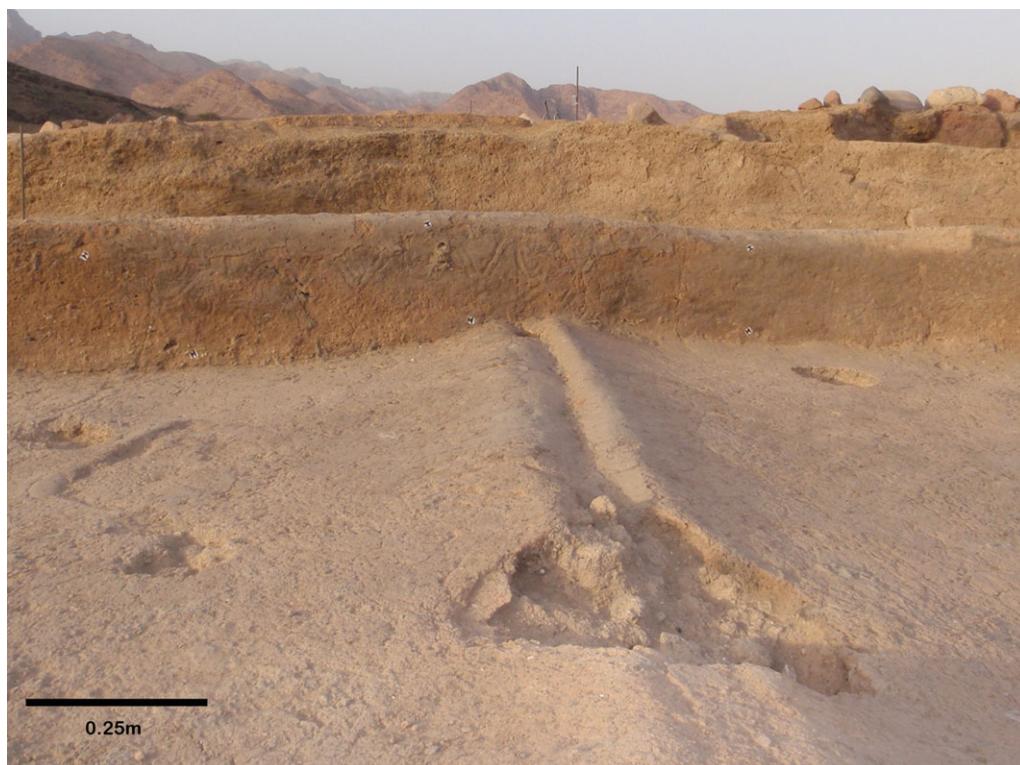


Figure 6. Detail of one of the raised 'gullies' radiating from the central 'trough' within Structure O75 showing the centrally placed post removal hole, looking south towards the bench face that carries the wave pattern.

Table 1. Radiocarbon dates from contexts within the fill of Structure O75.

Lab no.	Context	Specimen	¹⁴ C years BP	Calibrated years BC*	¹³ C/ ¹² C
Beta 271681	(757) Fill of basal posthole in Structure O75	Unidentified twig	9940±60	9739–9280	–26.9‰
Beta 271680†	(747) Fill of hearth cut into secondary floor surface within Structure O75	Twig, cf. <i>Salicaceae</i>	9380±50	8807–8472	–11.6‰
Beta 253739	(340) Fill of hearth within midden accumulated in Structure O75	Twig, tamarix	9660±70	9260–8822	–25.9‰
Beta 253738	(340) Fill of hearth within midden accumulated in Structure O75	Twig, tamarix	9950±70	9758–9277	–25.6‰

* (IntCal 09, 95.4%).

† We recognise that the low ¹³C/¹²C ratio for Beta 271680 suggests that this date may be unreliable.



Figure 7. Incised wave decoration on the pisé-face of the 'bench' located on the south-west side of Structure O75. The foreground shows one of the 'gullies' formed within a convex moulding of the pisé-floor of the structure.



Figure 8. A sample of decorated stone items illustrating the predominant range of imagery at WF16. While such abstract designs dominate the WF16 artwork, animal and anthropomorphic imagery is also present.



Figure 9. Large stone mortar installations set into the floor of Structure O100.

internal partitioning walls and, in at least one case, an entire sub-structure constructed within its interior (O45, Figure 10). Some of these appear to have been used as workshops for making stone artefacts and beads or for the preparation and storing of food; others might have been ‘dwellings’ — although we are cautious about the use of this ill-defined term. The excavation has demonstrated that several of the structures had been rebuilt by re-using the same structural footprint, often more than once. In certain cases several adjoining structures were redeveloped at the same time. This resulted in a prolonged life for the general honeycomb pattern of structures on the site, many of which are likely to have been co-existent. Others had been part of an earlier settlement arrangement and were either left open allowing sediment to accumulate or were deliberately back-filled before they were dug into by construction cuts for new structures. Numerous of them contain human burials, the site providing the largest collection of PPNA skeletal remains from the southern Levant.

Large-scale architecture and its function in the PPNA

Architecture indicative of communal activity and sometimes of a monumental nature is known from the PPNA: a tower and wall were discovered at Jericho in the 1950s (Kenyon & Holland 1981) and more recently carved stone pillars within enclosures were found at Göbekli Tepe in southern Turkey dated to 9130–8650 BC (Kromer & Schmidt 1998; Schmidt 2005). Although not as dramatic as Göbekli Tepe, Structure O75 at WF16 provides further evidence for communal activity with regard to both the construction and use of

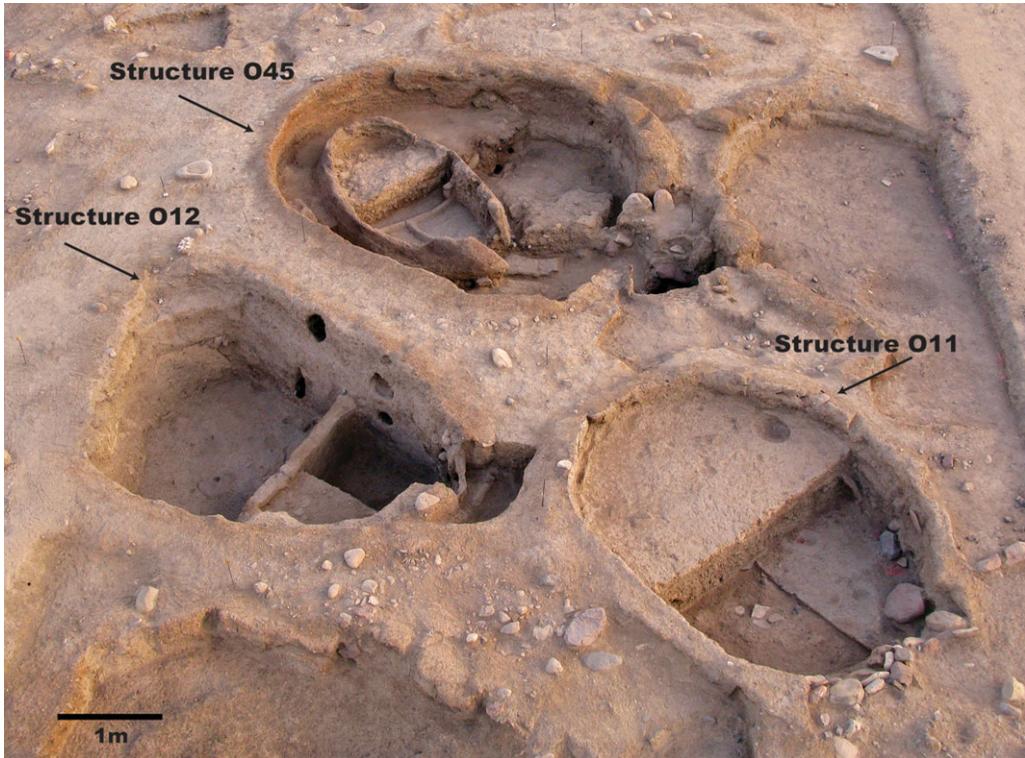


Figure 10. Detail of three of the semi-subterranean structures with pisé-lined walls located in the southern area of the 2008–10 excavation. Structure O12 shows the presence of an internal, mud-wall partition and has floors with embedded stone mortars 2m below the present day surface. Structure O45 has an internal pisé-walled structure, within which low internal partitions had been constructed. Charred timbers and vegetation-impressions on burnt lumps of pisé were found, suggesting the nature of the superstructure.

Neolithic architecture in the earliest phase of the PPNA prior to the domestication of plants and animals. The floor of the WF16 structure covers more than six times that of the so-called ‘monumental’ buildings (Watkins 2010) at Jerf el Ahmar (Syria) dated to 9650–8610 BC (Stordeur & Abbes 2002). These are equivalent in size to Structure O100 and several other buildings at WF16. Similarities with the Jerf el Ahmar buildings are found in the intentional deposition of animal skulls and decorated benches, the latter having been previously cited as an uniquely Upper Mesopotamian PPNA phenomenon (Aurenche & Kozłowski 2001). Although the ubiquity of naturalistic animal motifs at Jerf el Ahmar and Göbekli Tepe is not replicated at WF16, animal imagery is present, as illustrated in Figure 11. This is rare, however, the dominant symbols being primarily abstract and anthropomorphic in nature (Figure 8).

The function of Structure O75 at WF16 remains unclear. Whatever it had been used for, its size and form suggests communal activity for its construction, use and repair. The two cup-hole mortars set within the floor suggest the collective grinding of plants or some other material; the deposition of broken stone bowls and goat/ibex bones suggests feasting, while its scale, decoration and tiered benches imply ritual or at least performance activities. It is



Figure 11. Fragment of zoomorphic sculpture from WF16, showing the head of an animal.

securely dated to *c.* 9650 BC, with the date of a preceding phase of architecture still to be determined. While being quite different in form to those at Jerf el Ahmar, Göbekli Tepe and Jericho, Structure O75 and its associated structures demonstrate that new forms of social organisation, manifest in architecture and settlement design, occurred in a significantly wider region than Upper Mesopotamia at the start of the transition to the Neolithic.

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