Architecture, sedentism, and social complexity at Pre-Pottery Neolithic A WF16, Southern Jordan

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Recent excavations at Pre-Pottery Neolithic A (PPNA) WF16 in southern Jordan have revealed remarkable evidence of architectural developments in the early Neolithic. This sheds light on both special purpose structures and “domestic” settlement, allowing fresh insights into the development of increasingly sedentary communities and the social systems they supported. The development of sedentary communities is a central part of the Neolithic process in Southwest Asia. Architecture and ideas of homes and households have been important to the debate, although there has also been considerable discussion on the role of communal buildings and the organization of early sedentarizing communities since the discovery of the tower at Jericho. Recently, the focus has been on either northern Levantine PPNA sites, such as Jerf el Ahmar, or the emergence of ritual buildings in the Pre-Pottery Neolithic B of the southern Levant. Much of the debate revolves around a division between what is interpreted as domestic space, contrasted with “special purpose” buildings. Our recent evidence allows a fresh examination of the nature of early Neolithic communities.

forager-farmer transition | Near East

The Pre-Pottery Neolithic A (PPNA) is the earliest Neolithic in Southwest Asia (circa 11,600 to 10,200 y ago) situated between hunting and gathering and sedentary farming societies. It is generally considered as the key period in the shift to management and production of resources, wherein increasingly sedentary communities start to produce food to extend the period of occupation at a site, with one of the main economic developments in the PPNA being the cultivation of wild cereals. Social changes are as significant as economic ones, enabling communities to both increase in size and live together for longer periods, and, arguably, it is these social changes that drive the economic developments. Architecture is an important facet of the early Neolithic, providing evidence for an increasingly sedentary lifestyle; changing social structures; and, in the growth of communities, a motive for the development of food production.

Three basic assumptions tend to be made regarding PPNA settlements: (i) that the presence of stone or mud architecture indicates sedentism; (ii) that most buildings are domestic and can be described as houses forming small permanent villages; and (iii) that any buildings not fitting this pattern are “special,” with some communal function, frequently assumed to be ritual as opposed to a domestic norm, including the tower at Jericho (1), monumental stone-pillared structures at Göbekli Tepe (2), and communal buildings at Jerf el Ahmar and Mureybet (3). On the basis of our recent discoveries at WF16, we argue that these normative assumptions must be questioned. Can we really identify basic domestic structures in these early settlements, and do they exist in opposition to the nondomestic? This has profound implications for how we understand PPNA social organization.

Strong arguments have been made that the PPNA is part of a long, slow progress. There is evidence for architecture and sedentary behavior before the PPNA (ref. 4 and references therein), including in the southern Levant brushwood huts from Ohalo II

in the early Epipaleolithic and occasional stone architecture as at Neve David from the Geometric Kebaran, whereas the well-known architecture at Early Natufian sites (e.g., Mallaha, Wadi Hammeh 27) is combined with the development of a nontransportable heavy-duty tool kit, cemeteries, the appearance of commensals, and possibly storage. Although a general consensus exists for a sedentary way of life in the Early Natufian (5), serious doubts regarding the degree of sedentism have been raised by many scholars, including Edwards (6), Olszowski (7), Bar-Yosef and Belfer-Cohen (8), Valla (9), Hardy-Smith and Edwards (10), and Shewan (11). Bearing in mind that some 1,500 y elapse between the apparent decline in Early Natufian architectural practices and the start of the Neolithic, we believe that the rapid development of architecture in the PPNA has to be considered *sui generis* rather than as part of a smooth developmental curve and that even in the early Neolithic, we should recognize that the appearance of architecture will encompass a wide array of behavior.

WF16 lies at the head of the Wadi Faynan in southern Jordan (Fig. 1), placed at the ecotone between the steep mountains rising up to the Jordanian plateau and the arid land of the Wadi Araba. Although this location appears to be a classic hunter-gatherer base-camp site, placed to maximize the potential range of wild resources available from a single base-camp, WF16 lies at the start of the Neolithic process. Following an initial evaluative project (12), three seasons of large-area excavation were conducted between 2008 and 2010. One of our main research objectives has been to recover information on the nature of the architecture and community organization of a PPNA settlement.

Results

The excavations at WF16 have uncovered a substantial proportion of the PPNA settlement in a single 600-m² trench (40 × 15 m) (Fig. 2). Most of the exposed buildings are “typical” of the southern Levantine PPNA, being semisubterranean, subcircular structures. They were built by digging pits into the underlying material, which were then lined with pisé walls and mud-plaster floors. Despite this underlying architectural similarity, one of the most immediate characteristics of the settlement is the diversity of structures in terms of their size, presence and type of internal structural elements, material culture content, and infill process. Postexcavation analysis is currently in progress; here, we present summary information on three of the principal structures, O75, O45, and O12, which we believe challenge traditional interpretations of PPNA “village” life and community organization in the southern Levant.

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Fig. 1. Location of PPNA sites mentioned in the text.

Structure O75. Structure O75 (Fig. 3) is an impressive 22×19 -m structure consisting of a mud-plaster floor with multiple surfaces surrounded by a bench over 1 m deep and 0.5 m high, part of which has a second tier of similar dimensions. Some parts have been eroded, and others are concealed by a later PPNA building, but the overall form appears clear. There is a general bilateral symmetry to the structure along an axis formed by a deep trough, also lined with mud plaster, circa 0.75 m wide and 1.2 m deep where fully excavated. At the northwest end of the trough, a pit below the most recent floor surface is lined with burnt plaster and contains broken stone bowls. On each side of this are cup-hole mortars, typical of

the PPNA, set into slightly raised platforms on the floor. Three pairs of parallel “gullies,” smooth ridges with a central channel, are molded into the floor, running from the edge of the benches to the central trough in a herringbone pattern. Each gully has a small pit at its midway point from which it appears a large post has been removed, leaving a ragged hole. Although the gullies initially appeared to have been designed to carry liquids, they bow down in the center of their course and the mud plaster is not stable when damp. Two of them are simply smooth ridges in the plaster floor, whereas the channel in a third has been deliberately filled with plaster, and the posts would also have blocked any flow.

The surrounding benches comprise a series of platforms above the main floor area, producing an amphitheater form. The face of the lower bench on the southern side of the monument has been decorated with a wave pattern (Fig. 4). There were multiple replastering events, indicating repair and modification of the structure. One of these covered the northwest end of the trough, leaving a part exposed but filled with rubble, and a set of capra horns attached to a crania before a hearth was melted in the floor, into which a further set of capra horns was placed.

Massive postholes are located in the structure’s surrounding wall, cutting the second tier bench. Combined with those in the gullies, these suggest that at least part of the structure was covered, although the overall scale makes it unlikely this would have been by a solid roof. It is possible that the posts did not support a roof and that the holes mark the location of “totem-pole”-like features.

This structure was sealed by deposits containing charcoal radiocarbon dated to 11,700 to 10,422 calibrated years B.P. (Table 1). The stratigraphic sequence is entirely PPNA, comprising an initial buildup of occupation debris; a secondary floor associated with the building of a freestanding PPNA building; and an organic-rich deposit full of faunal remains, shattered rock fragments, flints, and a wide range of other PPNA artifacts.

Structure O45. Building O45 (Fig. 5) is an elliptical structure sized 5.5×4.5 m, comprising a pisé-lined pit extended upward by pisé walls rising above ground level. It was burnt down in a major fire, oxidizing the wall faces, with collapsed burnt material filling the structure and preserving much architectural information. It contained a smaller elliptical structure sized 3.8×2.2 m, which was made of relatively delicate pisé walls built off-center in the larger structure, leaving most internal space to one side with only a narrow passage separating it from the outer-structure wall on the other side. The excavation revealed that the mass of burnt structural material was the collapsed roof, which was supported by a latticework of timber rafters supporting a brushwood mat that held a thick layer of mud. Sections of surviving rooftop surfaces were found with flint debitage, suggesting that the flat roof may have been used for knapping.

Below the collapsed roof were mixed deposits of unburnt pisé rubble and silt among which several stone slabs were found. These slabs were notched at one end; thus, when positioned upright, they provided rests for floor timbers spanning the space between the inner face of the main wall and the outer face of the interior structure. Only two were found in situ; others were scattered, but sockets for some could be identified. Some may have simply rested on an earlier solid mud-plaster floor. They are identical to those identified at Dhra’ (13), and it appears that they supported a floor suspended on timbers resting in the notches. The level of the floor corresponds well with the line of burning on the inside face of the outer wall and the outer face of the internal structure.

The internal pisé structure had a mud-plaster floor directly below the collapsed burnt rubble. The floor had molded, raised, low mud-plaster ridges that divided the internal space into several compartments. Neither the surface of the floor nor the interior mud-plaster lining of the walls of the internal structure were burnt, suggesting that the fire did not start here, and there was no

Fig. 2. Schematic plan of excavation at WF16 showing pisé architecture (gray) and highlighting principal buildings discussed in this paper (black).

Fig. 3. Photograph of structure O75.

evidence for firing taking place inside it before the collapse of the building. The floor within the internal structure was at a lower level than the suspended floor in the main building.

The internal compartmentalization and evidence for a suspended floor lead us to a provisional interpretation of this building as a storage structure. Its scale and central location within the site suggest a role as a communal store.

Structure O12. Structure O12 (Fig. 5) was also elliptical (the excavated part measuring 5.0×3.3 m), preserved as a subterranean building over 2 m deep. Within it was a straight, well-built, free-standing pisé wall, dividing the structure into two uneven parts. Notches in one wall may indicate how the building was entered, either to assist simply climbing down the wall face or, conceivably, to hold a ladder. The floor of the main compartment was of solid mud plaster but contains two upright notched stones in alignment, suggesting that this structure also once had a suspended floor.

Fig. 4. Photograph of decorated wall of structure O75.

Unlike structure O75, which was infilled with a complex sequence of occupation debris, later structures, and a midden deposit, or the burnt fill of structure O45, this structure appears to have been intentionally filled with mud without further floor layers being built or occupation horizons accumulating. The evidence for a previous suspended floor suggests that the structure served as a store and then underwent a major change of function, finally being intentionally and rapidly filled to ground level.

Settlement Context. A common problem in early Neolithic sites is demonstrating exact contemporaneity. Except where buildings can be shown to have clear stratigraphic relationships with one another, it is hard to determine which ones were simultaneously in use. The density of occupation on many PPNA sites seems to have been such that there was empty space between buildings, making clear-cut relationships relatively rare. Furthermore, because many of these semisubterranean sites have complicated use histories, with sequences of floor and occupation horizons as well as periods of midden deposition, there is an additional difficulty in determining which internal function was contemporary with the use of nearby architectural spaces. Having expressed this major caveat, at present, we believe that the structures described above and in Fig. 2 are broadly contemporary because they do not intercut. In addition, their general context within the settlement framework (e.g., central, marginal) remains the same regardless of their precise chronological position. These three structures lie within a cluster of other well-preserved semisubterranean pisé-walled dwellings, workshops, and storage areas covering the 1-ha area of the knoll. They vary substantially in size, presence and form of internal partitions, occupation and postoccupation fills, and assumed function. Structure O75 is partially surrounded by a series of particularly small buildings, including one that appears to have been a bead workshop (structure O56). Structure O75 is located on the settlement edge, whereas structure O45 lies in the middle of a cluster of buildings, including at least one other burnt building.

its location at the margin of the site (note that the tower at Jericho shares this position), its bilateral symmetry, the presence of benches of a similar depth and height, the decoration of the face of the benches, and the presence of partitions. Faunal data have not yet been quantified at WF16, but auroch bones were noted from the fill of structure O75 and were extremely rare elsewhere. The question remains as to how we interpret such rich and spectacular remains.

Despite the investigation of a number of PPNA sites in the southern Levant, except for Jericho, none of these have been reported to contain ritual buildings, with the only special function recently attributed to a PPNA structure being the interpretation of one style of building at Dhra' as communal stores (13). At Dhra', it appears that several of these highly visible freestanding buildings would have been in use at any one time. If we accept that such buildings with suspended floors are granaries, we appear to have evidence that several of these had existed at WF16, although the overall form of the buildings is quite different, and indeed varies within WF16. In the north, there is little or no evidence for storage, except in public buildings (26), and Bogaard et al. (27) have questioned the common assumption of grain storage without direct evidence. At Tell 'Abr (28), public building M1 contained a clean grain store found with a podium structure with bones encased in clay, which was then burnt down and buried in a repeated phenomenon, one which suggests that grain storage was accompanied by considerable ritual practice.

Structures O75 and O45 both confirm this suggestion. Structure O75 appears to represent a major communal effort in terms of its scale involving all, or a considerable proportion of, the community, an effort that is routinely repeated in replastering events. The presence of the benches suggests some performative role, although the benches are wide enough to have been used for work. The positioning of two built-in cup-hole mortars within the central floor area on raised platforms at one end of the symmetrical axis of the structure suggests that the processing using these mortars was focal to the activities being witnessed in the open space.

Structure O75 presents very clear evidence of large-scale collective labor, and the important communal activity of crop processing is a plausible interpretation, based on the positioning of the mortars, for at least part of what is represented. The presence of broken bowls in a pit immediately adjacent to the mortars may reflect associated feasting. The processing of crops will have been a seasonal activity of relatively short duration. One possibility is that such ritualized communal activity may have been important in assembling the work force needed for harvesting and that the presence of this large structure does not, of itself, imply long-term sedentism.

The interpretation of structure O45 as a storage building indicates that a separation of storage and processing had already occurred. Structure O45 is unusual in WF16 in that it has no cup-hole mortar in its floor; the suspended floor would have made such an installation impossible. This trait is shared at Dhra', where the granaries have no built-in food processing installations but are surrounded by buildings that are centered around mortars and cutting slabs. The burning of structure O45 is reminiscent of EA 30 at Jerf el Ahmar, and the difficulty in burning a largely mud-based structure suggests intentional firing.

Although there is a general division between ordinary and special purpose buildings, Stordeur (29) notes that the architectural forms at Jerf el Ahmar become highly varied over time, possibly reflecting functional variation, and that "public" buildings appear at the same time as internally divided and rectilinear ones. At WF16, we have no rectilinear buildings, but the apparently specialized nature of much of the architecture, ranging from storage in structure O45 to workshops like structure O56, and the absence of any readily apparent standard domestic structures suggest that much, if not all, of the architecture is communal, and communal construction is not limited to the large-scale architecture like structure O75. There is some evidence for

simultaneous rebuilding of structure O45 with adjacent buildings (e.g., structures O53 and O85 and possibly others), and such simultaneous rebuilding would have approached the amount of effort needed to build one very large structure. Even if the separate buildings identified as being for storage belong to subsets of the community, the social implications of such a group approach to building in both functional and constructional terms break down the association of individual buildings with individual family units and stress the communal project as the predominant agency driving PPNA construction.

It appears that at WF16 (and possibly at Jerf el Ahmar), easily identified communal architecture is, in fact, surrounded by other equally special purpose and possibly communal buildings. It becomes harder to identify the "ordinary" domestic structure. At Dhra', although no obvious communal buildings have as yet been identified, the buildings excavated all appear to have very specific purposes, storage or processing, which does not suggest a neat division between domestic and special purposes (13).

The infilling of special buildings is interesting. The very large ones at Gobekli Tepe and structure O75 at WF16 have been infilled with refuse deposits. Arguments that this might represent a ritual end of the use of a building are complicated by the way the fills appear to have accumulated in stages rather than as a single dumping event and were not cleared out between such events. At WF16, the final stage of the infill of structure O75 is composed of organic-rich midden deposits. The quantities of bone and massive quantities of fire-cracked stones might both provide further evidence supporting feasting, but this fill occurs well after the primary surfaces of structure O75 have been buried by occupation fills and a secondary surface, and it is also accompanied by much other waste, including significant quantities of flint, suggesting that this waste may be the cumulative rubbish from many varied activities.

Conclusions

Role of Architecture in Settlements. A great deal of the discussion of architecture in the aceramic Neolithic revolves around the ideas of home, domestication, and sedentism, with the assumption that structures mean houses, mean households, mean homes. In fact, there is considerable variation in architecture and lack of a standard form of domestic architecture at many PPNA sites. The range of special buildings is broad, with many apparently being unique to individual sites. Their proposed purposes, ranging from communal storage to ritual, rely on a binary division between domestic or special and mundane or ritual, whereas the actual range of variability suggests that such a division is highly unlikely. There is also little reason to assume that an early Neolithic society would have had such a clear separation between ritual and domestic. We argue that the role of architecture in community organization is in its communal role, ranging from plant processing to storage and ceremonial activities. The public/private dichotomy, and indeed household architecture, may not arise until during the PPNB, as has been argued by Flannery (30), who has noted that most PPNA structures are too small for family units. At both Jerf el Ahmar and WF16, substantial communal buildings are not surrounded by ordinary houses but by highly diverse buildings; at WF16, there are also apparently "special purpose" buildings suggestive of communal workshops and storage. These settlements appear to be all about community and not about emerging households. Even where the household may begin to emerge, to suggest that this is based on the nuclear family is simply hypothesis. Banning (31) has argued that the large structures at PPNA Göbekli may have been domestic and may have been houses but of larger coresidential groups than nuclear families. Although dispersed in separate structures that are not houses, such larger coresidential units may have provided the framework for social organization at WF16.

Performance in social life is vital to the construction of community (32). Watkins (33) has observed that architecture may be the solid expression of community but that human performances make it function. He assumes the driving force is the social form of the “the permanently co-resident community of relatively large numbers of people” (ref. 33, p. 651) that appears in the late Epipaleolithic and Early Neolithic. We argue that the permanence, and also scale, of community is not only debatable in the Natufian but into the PPN, and certainly the PPNA. The final public building at Jerf el Ahmar loses its storage function but maintains its association with harvest through artifact association, particularly with sickle blades being built into it. There is a remarkable parallel with structure O75 at WF16 with the wavy line decoration and continuous bench; however, whereas structure O75 appears to have an overt connection to food processing, it is not associated

with storage, which appears to have a different architectural trajectory in the southern Levant.

There is little evidence of any special clustering of PPNA symbolic artifacts in the primary contexts of these buildings at WF16, and we have focused on their role in terms of community, performance, and celebration. Ritual probably imbued many aspects of PPNA life, not all of them public. PPNA architecture appears to relate to a dimension of public and communal activity, and structure O75 provides dramatic evidence for this facet of early settlement building.

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