THE 1999 TEST EXCAVATIONS AT KHIRBAT AL-ḤAMMĀM (WHS 149) WĀDĪ AL-ḤASĀ, JORDAN

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Abstract

From June 7-22, 1999 members of the Khirbat al-Ḥammām (خربة الحمّام) Archaeological Project undertook test excavations at a Pre-Pottery Neolithic site on the southwestern slope of Wādī al-Ḥasā (وادي الحسا). Our surface reconnaissance defined the horizontal extent of the site as well as the variety of modern, on-going disturbances that threaten the deposits. Excavators revealed deeply stratified Pre-Pottery Neolithic deposits containing well-preserved masonry architecture, a variety of material culture, and well preserved biological specimens. Results from the short testing season demonstrate that Khirbat al-Ḥammām (خربة الحمام) holds great potential for adding to our knowledge of Pre-Pottery Neolithic life ways in this region of the southern Levant. Ongoing destruction of the archaeological deposits provides a compelling incentive to continue excavation at the site in the near future.

Introduction

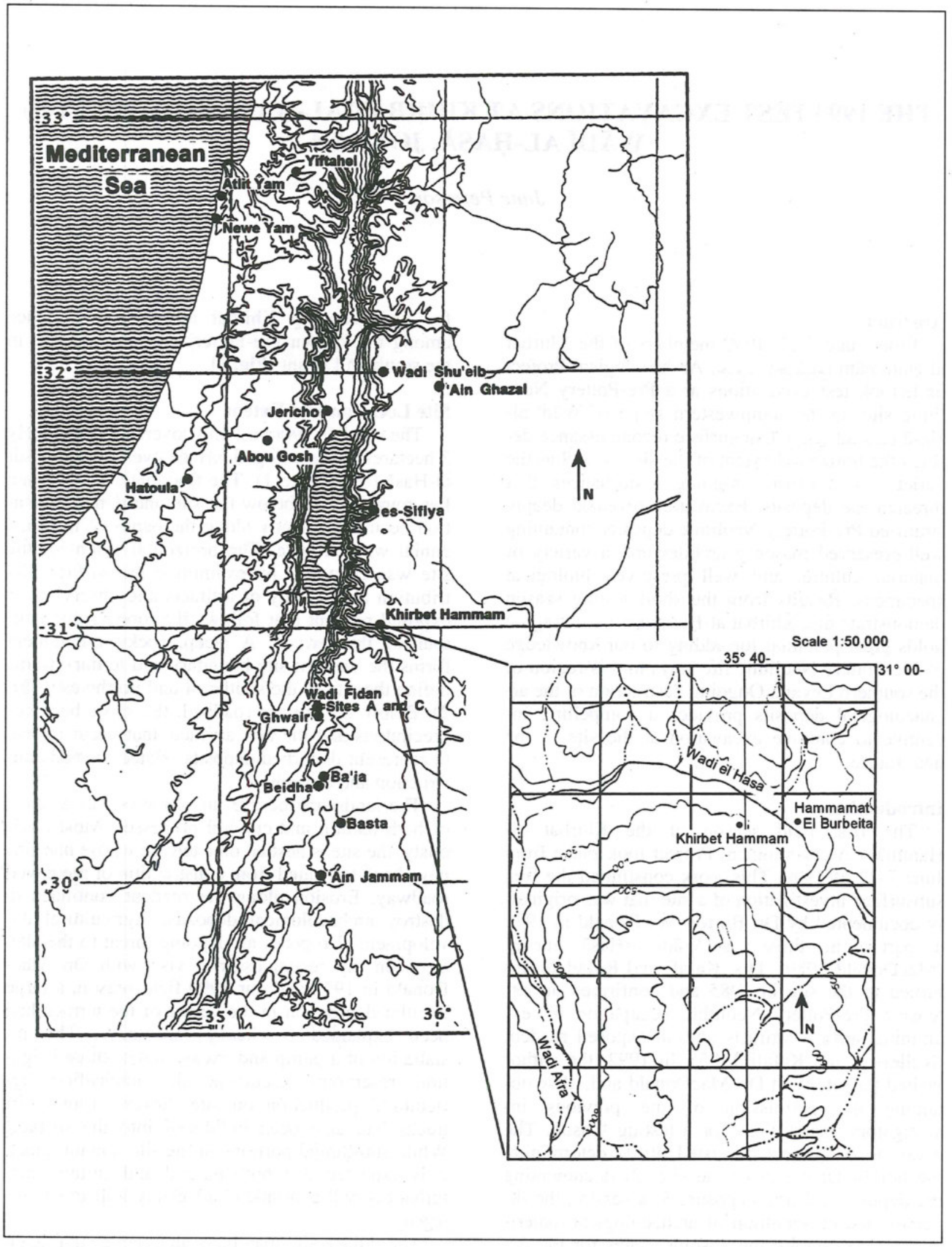
The first field season of the Khirbat al-Ḥammām Archaeological Project took place from June 7-22 of 1999. This work constituted the first subsurface investigation of a site that was originally documented by Dr. Burton MacDonald in 1979 as part of his three year Wādī al-Ḥasā Survey (MacDonald 1980). Drs. Kafafi and Rollefson returned to the site in 1985 and confirmed an extensive Pre-Pottery Neolithic occupation by examining surface artifacts and an exposed roadcut (Rollefson and Kafafi 1985). In 1992, the author visited the site with Dr. MacDonald and, after obtaining the permission of the previous investigators, made plans for a testing season. The goals of the project consisted of: 1) determining the horizontal extent of the site; 2) documenting the depth of cultural deposits; 3) assessing the diversity and preservation of archaeological materials; and 4) establishing absolute dates for the deposits. This information provides the foundation for understanding Khirbat al-Ḥammām's place among the known Pre-Pottery Neolithic (PPN) in the southern Levant **(Fig. 1)**.

Site Location and Extent

The site lies 290m asl and covers approximately 3 hectares along a sloped terrace overlooking Wādī al-Ḥasā (see Figure 1). The floodplain of the wadi lies roughly 50m below the site and dense vegetation occurs frequently along the banks of this perennial water course. The horizontal extent of the site was estimated by examining the surface distribution and density of artifacts and observing an exposed roadcut that follows the topographic contour of the terrace. A steep, rocky escarpment forms the western site boundary and tertiary wadis define the site to the southeast and northwest **(Fig. 2)**. Below the current roadbed, the slope becomes precipitous and the few artifacts that occur appear to represent disturbed deposits related to road construction and erosion.

The landscape here is an active one as a result of both natural and cultural processes. Most obviously, the site is nestled on a terrace whose margins have been truncated from construction of the paved roadway. Erosion along the roadcut continues to destroy archaeological deposits. Agricultural development also poses an ongoing threat to the site. Between my reconnaissance visit with Dr. MacDonald in 1992 and our 1999 field season, a large circular depression in the center of the terrace had been expanded by heavy machinery. The installation of a pump and excavation of three irrigation reservoirs document the intensified agricultural production on site. Several rough dirt tracks had also been bulldozed into the surface. While substantial portions of the site remain intact, it is expected that both natural and cultural disturbances will continue to adversely impact site integrity.

The village site may have undergone significant modification in antiquity as well. Recent geo-



1. Locations of Neolithic Sites Discussed in Text.

2. View of Terrace and Site Looking East.

archaeological assessment indicates that during the PPN the Wādī al-Ḥasā floodplain was broad and stable. The deeply incised drainage that exists today appears to be the result of rapid downcutting resulting from both natural and anthropogenic forces (Hill 2001, 2002). The associated erosion may have destroyed portions of the site. At the same time, the rapid infilling of the site associated with the downcutting and erosion may well account for the excellent architectural preservation.

Dating

Two AMS dates from the 1999 season indicate that Neolithic villagers lived at Khirbat al-Ḥammām during the Late PPNB period **(Table 1)**. The Late PPNB typically ranges from 8,500 – 8,000bp. Both dates come from samples of wood charcoal. A date of 8370 ± 40bp comes from the cobble foundation layer underlying the plaster-lined structure or installation at 1.89m below ground surface. A more recent date of 8120 ± 60bp comes from fill above an intact plaster surface at 1.25m below ground surface. The approximate locations of the samples are indicated on the test unit profile (see **Fig. 3**).

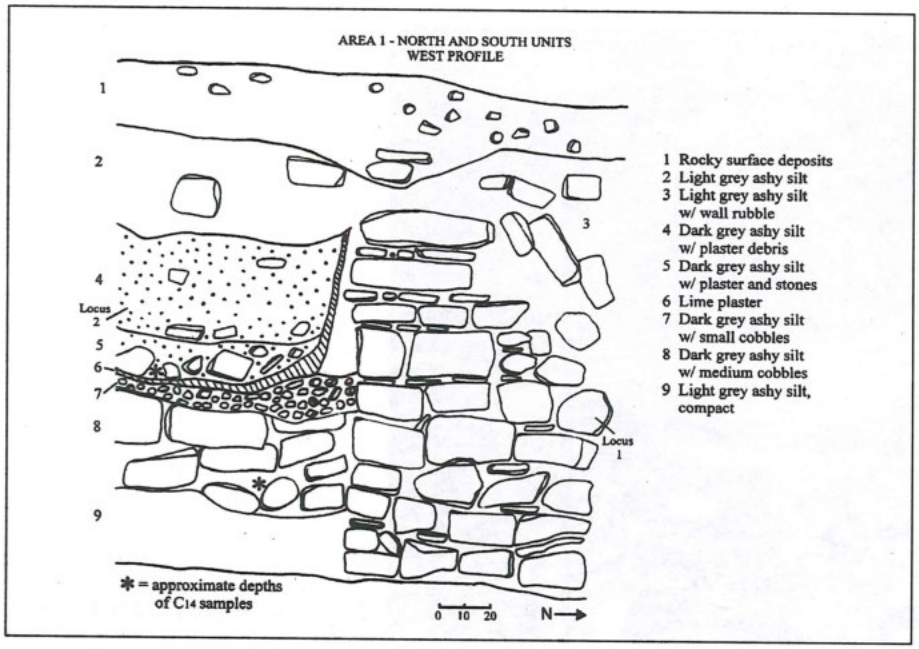
The dates indicate an extensive Late PPNB occupation at Khirbat al-Ḥammām. Given the amount of undated deposit both above and below these dated strata, it is certainly possible that both earlier and later components of Pre-Pottery Neolithic village life may also be represented. The lack of Neolithic ceramics from surface and excavated contexts suggests that the site was abandoned, or its use substantially modified, during the Late Neolithic.

Chronologically, Khirbat al-Ḥammām is contemporaneous with a number of sites throughout Jordan, including Tall Rakān (تل راكـــان) (Banning and Najjar 1999), Wādī Shu'ayb (وادي شعيب) (Simmons *et al.* 2001), Al-Baṣṭa (البـــسطة) (Nissen *et al.* 1987; 1991), 'Ayn al-Jammām (عـين الجـمـام) (Waheeb and Fino 1997), al-Ḥimmah (الحمة) (Rollefson 1999), aṣ-

***Table 1**: Radiocarbon Dates from 1999 Testing Season (Geochron Laboratories).*

Date	$^{13}C_{PDB}$	Material	Depth	Context
8370 ± 40* BP Sample #: GX-26147-AMS	-23.9%	Wood charcoal	1.89 m above datum	Cobble foundation layer underlying plaster-lined structure or installation South unit
8120 ± 60* BP Sample #: GX-26146-AMS	-25.5%	Wood charcoal	1.25 m above datum	5 cm above plaster floor South Unit

* corrected for ^{13}C



3. East Profile of North and South Test Units.

Ṣifayy (الصّفي) (Mahasneh 1997), and Ba'ja (بعجة) (Gebel and Bienert 1997).

Stratigraphy and Architecture

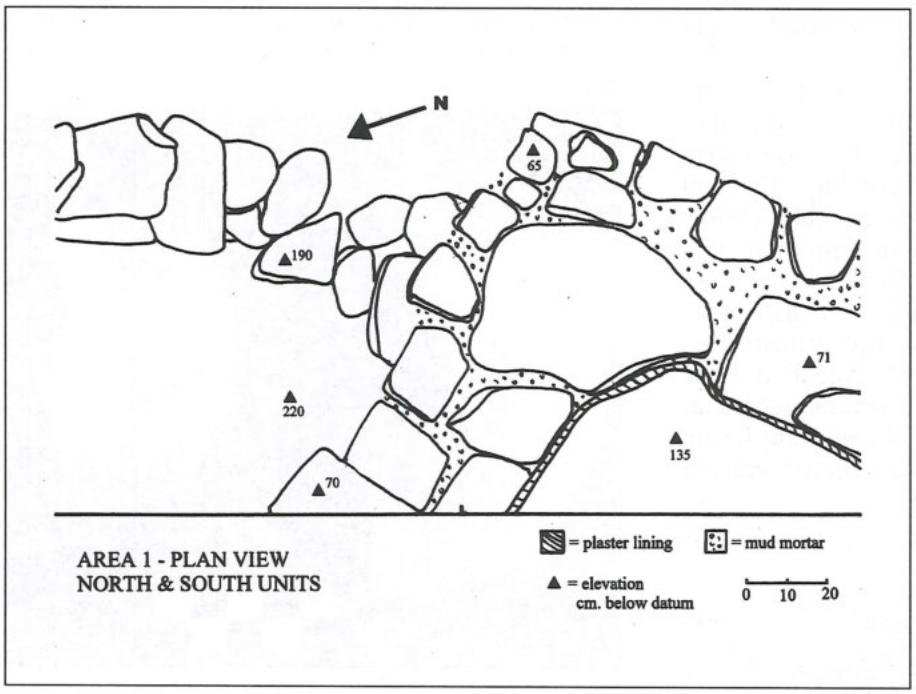
A team of three people spent most of the 1999 season excavating a 2.0m test trench along the southern edge of the roadcut. The test area was chosen because the exposed profile indicated that wall stone courses, organic deposits, and burned material were present. At the ground surface the test trench measured 2.0 x 0.5m. At the bottom of our 2.3m of vertical excavation, it had widened to 2.0 x 1.0m due to the slope of the intact deposits. In order to maintain horizontal provenience, the length of the trench was excavated in two 1.0m units, labeled North unit and South unit.

Excavations proceeded in arbitrary 10cm levels in the absence of observable natural stratigraphic divisions. The fill throughout the unit consisted of ashy, fine-grained silt (10YR 6/2-6/3). As various loci were identified, cultural deposits in and around them were removed separately. All soil was sieved through 4mm mesh screen and artifacts from the various levels and loci were bagged separately. Loci were photographed and mapped as appropriate. The soil consistency, materials present, and orientations of artifacts suggest that the deposits represent secondary refuse disposal, filling in abandoned structures and features. The only exception to this excavation protocol occurred in the South unit. After systematic excavation of 1.5 meters of fill from the South unit, a vandal(s) dug a 50cm hole along one side of the unit. The disturbed fill was removed as a single level. The area of the South unit that was not disturbed was excavated following the protocol previously described.

Our permitted field time ran out before we reached the bottom of the prehistoric deposit. However, the 2.3m of vertical excavation substantially increased the known depth of cultural deposits identified from surface and roadcut observations. Furthermore, the trench profile reveals multiple phases of interrelated architecture.

Locus 1 was the exterior façade of a thirteen-course (1.8m) wall constructed from shaped and faced stones **(Fig. 3)**. A small, exploratory sounding at the base of our trench revealed that the wall continued for at least an additional 25cm. The corner of a second, later, stone feature (Locus 2) abutted this wall. The interior floor and wall surfaces of Locus 2 were lined with lime plaster **(Fig. 4)**. Plaster was preserved on the walls to a height of over 30cm. Fragments of plaster from the fill indicate that some of the structure's plasterwork had been painted with red ochre. Because the trench exposed only a small corner of Locus 2, it is difficult to determine the function of this feature. A contiguous room or a storage facility are two possibilities. A layer of rounded cobbles had been laid down to provide a level foundation for construction of Locus 2. A possible subfloor channel was identified beneath the cobble layer. Similar features were found at Basṭa and eṣ-Ṣifayy (Mahasneh 1997; Nissen *et al.* 1987; 1991).

Domestic architecture took one of several forms during the PPNB in the southern Levant. A typical Middle PPNB (circa approximately 9,200 –



4. Plane View of Plastered Stone Feature.

8,500bp) house at 'Ayn Ghazāl, Jericho, or Yiftahel was a free-standing structure, characterized by large open rooms (Braun 1984; 1997; Garstang and Garstang 1940; Kenyon 1981; Rollefson 1997). By the Late PPNB a number of villagers began to build interconnected, pueblo-style room blocks. Room blocks typically consist of central rooms, of various shapes and sizes, surrounded by smaller rooms. The multi-room domestic units are contiguous to one another, so that neighbors share walls. Evidence indicates that some domestic units had second stories extending over a portion of the ground floor rooms. Examples of this type of interconnected village architecture can be found at al-Basṭa, Ba'ja, aṣ-Ṣifayy, 'Ayn Jammām, and al-Basīṭ (البسيط) (Gebel and Bienert 1997; Nissen *et al.* 1987; 1991; Rollefson 1997; Waheeb and Fino 1997). The limited archaeological evidence from Khirbat al-Ḥammām suggests that multi-room domestic units are present, although further horizontal excavation is needed to confirm this hypothesis.

The excellent architectural preservation at Khirbat al-Ḥammām is one of many exciting discoveries from the testing phase. Current models used to interpret Late PPNB architecture identify a number of critical social variables that structure the built environment. Future research at the site may well provide glimpses into Neolithic family size and structure, the organization of domestic labor, and functional differentiation of rooms and spaces within structures.

Artifacts

Stone and bone tools were collected during the course of the test excavations. A small number of ornamental objects were also discovered. In general the suite of artifact types is reminiscent of PPN material remains elsewhere. One general observation that applies to both chipped stone tools and grinding stones is that the technology, in general, can be described as expedient. The details upon which this observation is based are provided below.

Ground Stone Tools

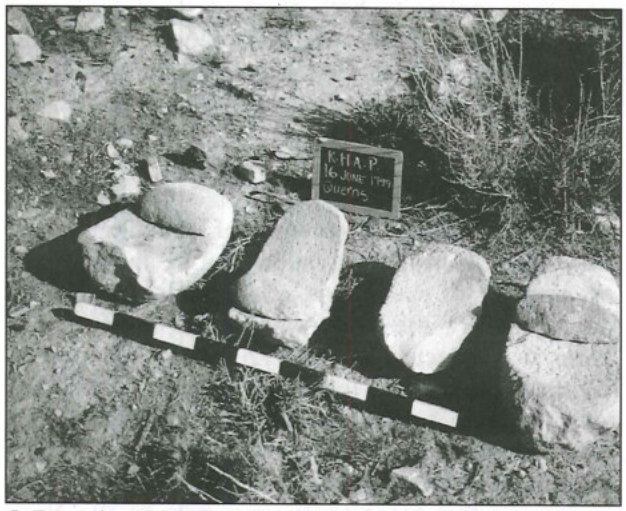
Several broken fragments of grinding stones were found during excavation. But by far the largest number of specimens was found scattered on the surface of the site. A grab sample of twenty items was selected and analyzed from the surface context. In selecting the items to record, an effort was made to include a range of morphological types. Given the lack of surface indication for post-PPN occupation at the site, it was considered safe to assume that these tools were part of the Neolithic tool kit. The standardized descriptive categories proposed by Wright (1992) were used in this analysis. Looking around the site, there is a wealth of appropriate stone raw material available in the immediate, boulder-strewn hill slopes and wadi beds. In selecting the raw material for tool production, craftspeople appear to have relied heavily on these local sandstone resources (**Table 2**). Basalt is only used in small proportions. However, observations made in the wadi bed adjacent

to the site indicate that cobbles of basalt occur there.

The majority of items were grinding tools: consisting of querns, hand stones, mortars and pestles (**Table 2**). The exterior surfaces of these tools were largely unshaped by flaking or grinding. Many of the hand stones appear to have been cobbles chosen from the wadi because they had an appropriate size and shape to be useful without further labor input. Only use has modified their shape. Similarly, many of the querns were boulders shaped primarily by the actions of grinding (**Fig. 5**). Negative flake scars on the bottoms and sides of several querns indicate that some, informal tool shaping did occur, perhaps to provide balance or a symmetrical use

Table 2: Ground Stone Tool Sample from Surface of al-Ḥammām

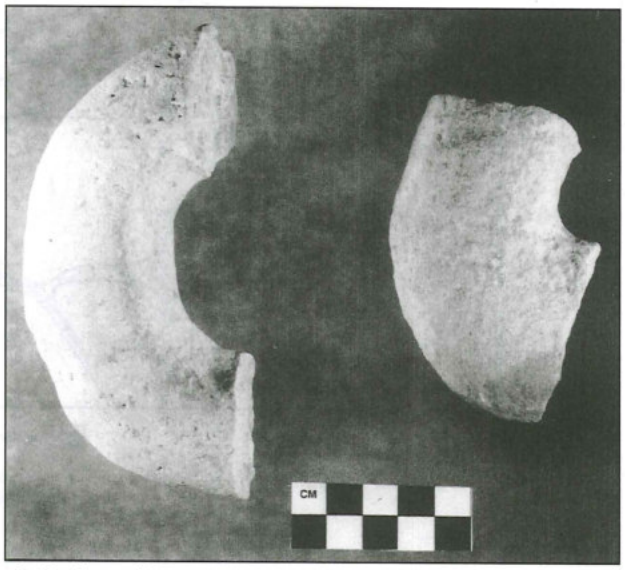
Type/Shape	Count	Raw Material	Count
Quern – slab	3	Sandstone	14
Quern – boulder	4	Fossiliferous sandstone	2
Bowl mortar	1	Basalt – fine-grained	1
Handstone - planoconvex	3	Basalt – porphyritic	2
Handstone - wedge	4	Limestone	1
Handstone – triangular	1		
Handstone/Pestle	1		
Pestle - cylindrical	1		
Perforated discs	2		
TOTAL	**20**		**20**



5. Examples of Grinding Tools from Surface Collection.

surface. The excavated deposits produced no debris from the shaping of sandstone grinding tools.

There are several exceptions to the pattern of minimal reduction. Several of the basalt hand stones were very symmetrical and had obviously been shaped. So too, extensive shaping through both flaking and grinding would have been necessary to form the bowl mortar. The perforated stone discs also exhibited more formal shaping in their production (**Fig. 6**). The discs average 16cm. in diameter and 8cm. in height and, presumably, represent weights.



6. Perforated Stone Objects from Surface Collection.

The heavy, informal character of the grinding tools suggests both settlement permanence and the easy access to appropriate raw materials. Both archaeological and ethnographic research clearly show that in addition to grinding plant foods, grinding stones can have a number of uses such as grinding pigments, sharpening and abrading tools, etc. (Peterson 1999). Nonetheless, evidence for lateral grinding of slab querns and the sheer number of querns on the surface suggest a heavy reliance on ground plant foods. Of the PPN ground stone assemblages that have been described, Khirbat al-Ḥammām resembles al-Bayḍā (البيضا) most closely (Wright 1992).

Chipped Stone

Over 2,000 pieces of chipped stone were analyzed from the 1999 season at Khirbat al-Ḥammām (**Table 3**). Like the ground stone finds, the chipped stone assemblage can be described as 'expedient' in several respects. Many of the tools are informal, exhibiting little investment in systematic retouch or formalization of design (Andrefsky 1998). Poor quality raw materials from the immediate site environs were used extensively, despite the availability of better materials in the general vicinity. Core preparation is limited and naviform core-and-blade technology scarce. Comparing flake and blade frequencies, flakes make up a large portion of debitage. Furthermore, knapping debris makes up a large proportion of the assemblage. Sedentary groups with readily available raw material might

produce assemblages that share this suite of characteristics as they make, use, and discard tools according to the needs of the moment (Andrefsky

Table 3: *Chipped stone articrafts from Khirbat al-Óammåm test excavations.*

	CLASS	n	%	%
TOOLS	all	121	6.1	
DEBRIS	all	876	44.1	
DEBITAGE	blades	101	5.1	10.2
	bladelets	154	7.7	15.5
	flakes	493	24.8	49.8
	core trimming elements	26	1.3	2.6
	cores	19	0.9	1.9
	burin spalls	4	0.2	0.4
	microflakes	194	9.8	19.6
TOTAL		2025	100.0	100.0

[1] includes debitage classes only (n=991)

1998; Parry and Kelly 1987).

Turning first to the tools, **Table 4** clearly illustrates the preponderance of informal tools classified here as retouched and utilized specimens – nearly 70%. Of the remaining tools, an agricultural component is represented. Several sickle blades could be identified based on their morphology and the presence of gloss/sheen **(Fig. 7: a-d)**. Utilized edges on the sickles were not retouched. The implements tended to be made on high quality raw material, and several of the blades can be identified as naviform based on platform preparation and flake scar orientation. Agricultural activity is also suggested by the presence of heavy bifacial tools. They may well have been used to clear and till fields **(Figure 7: e-f)**. In general, the agricultural implements show the most evidence for formalization.

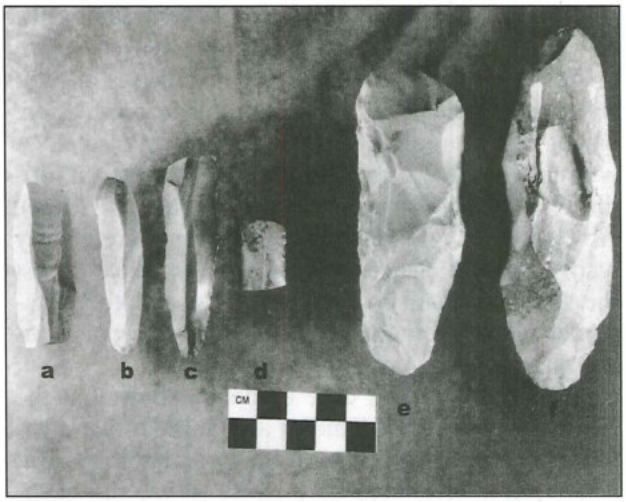
The projectile points are typically made on bladelets **(Fig. 8)**. Typologically, most closely they resemble Byblos points. Like other examples of Byblos points, they vary in terms of symmetry, amount of retouch, and invasiveness of retouch (Gopher 1994). Most retouch is unifacial. Examples of burins, scrapers, piercing tools and notched tools also occur in low frequencies. The relative frequencies of the various tool classes is probably not too informative at this point given the small sample and limited excavations.

Patterns of raw material utilization are dichotomous. Formal tools were often made from fine-grained, homogeneous raw materials that ranged in color from dark brown to tan to gray. The cortex on several cores suggests a tabular or flat nodular source for at least some of this material. A limited survey of the immediate site area did not identify a source. Yet work elsewhere in Wādī

Table 3: *Tool classes from Khirbat al-Ḥammām test excavations.*

CLASS	n	%	%
projectile point	5	4.1	13.2
sickle blade	4	3.3	10.5
burin	3	2.5	7.9
truncation	2	1.7	5.3
endscraper	2	1.7	5.3
sidescraper	1	0.8	2.6
notch	7	5.8	18.4
piercing tools (awls, drills, borers)	5	4.1	13.2
large bifacial tools (axes, adzes, picks, chisels)	7	5.8	18.4
composite tool	1	0.8	2.6
microlith	1	0.8	2.6
retouched flake/blade/bladelet	25	20.7	
utilized flake/blade/bladelet	55	45.4	
unclassified	3	2.5	
TOTAL	121	100.0	100.0

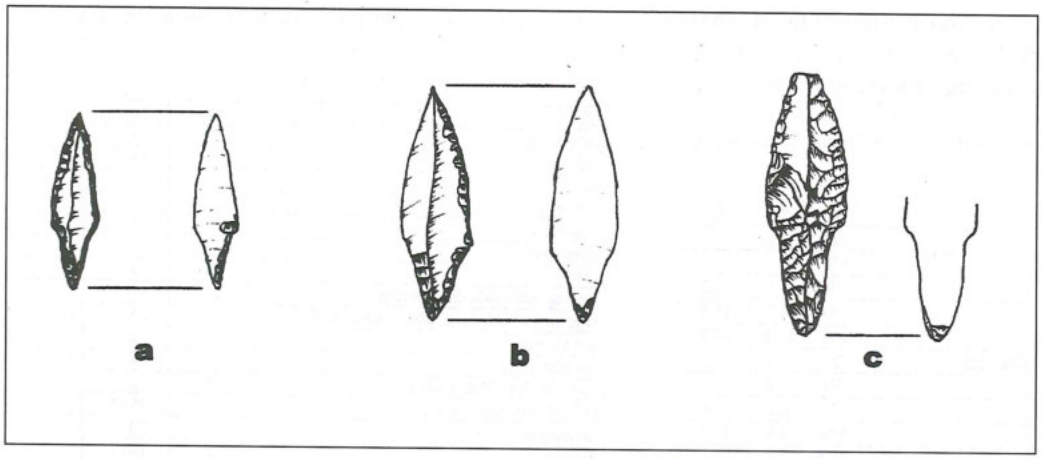
[1] provides percentages for formal tool classes only, exluding retouched, utilized, and unclassified pieces (n =38)



7. Agricultural Implements (a-c sickles; d-e bifacial tools).

al-Ḥasā suggests that large amounts of high quality stone is available at many locales throughout the drainage (Olszewski *et al.* 2000). Many other tools and utilized pieces at Khirbat al-Ḥammām were fashioned from lower quality, coarse-grained parent materials that would have made knapping less predictable. Cores with rounded, water-worn cortex suggest that this material was collected from the wadi beds around the site. Despite its inferior quality, this local material was considered sufficient for a number of tool needs. Similar, dichotomous patterns of lithic raw material utilization are reported from aṣ-Ṣifayy (Mahasneh 1997) suggesting that LPPNB farmers in the Wādī al-Mūjib region came up with a similar solution to their technological needs.

The relatively poor quality of the local wadi pebbles is reflected in the large amount of debris present in the assemblage (44%). This is sub-



8. Projectile Points (from original drawings by M. Neeley).

stantially greater than at LPPNB Wādī Shu'ayb (14.7%) and LPPNB 'Ayn Ghazāl (13%) (Rollefson *et al.* 1992; Simons *et al.* 2001).

A variety of core forms were present among the nineteen specimens collected. Two naviform cores and three bladelet cores represent examples of platform preparation and systematic blade production. Many of the remaining cores are less formal. A number of them are flake cores: some multidirectional (n=6), some unidirectional (n=4). Among the single platform cores, some are clearly wadi pebbles that were struck once or twice to test the internal quality of the material and then discarded. The remainder of the cores was unidentifiable fragments.

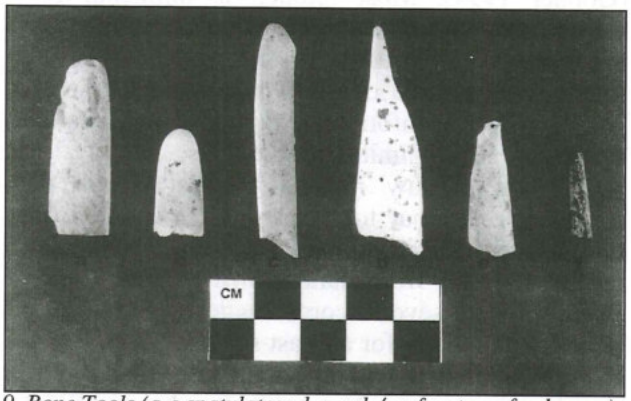
Both the tool and core evidence show that the lithic craftspeople at Khirbat al-Ḥammām were capable of naviform core-and-blade technology. But it is equally clear that they chose to use this technology in a limited way. A regional pattern is beginning to emerge that suggests a limited use of naviform technology at several LPPNB sites in southern Jordan. Surface collections from al-Ḥimmah, also in Wādī al-Ḥasā and less than 5km east of Khirbat al-Ḥammām, produced no naviform cores (Rollefson 1999). Gebel and Bienert (1997) report few naviform cores from the site of Ba'ja, just north of Petra. Some *loci* at al-Basṭa contained examples of naviform, bladelet, and flake cores (Nissen *et al.* 1987).

A decrease in standardized production of stone tools using naviform cores has also been noted for the Pottery Neolithic (Quintero and Wilke 1995). The authors link the stone tool changes to economic changes. Pre-Pottery village populations dispersed from villages into smaller hamlets, practiced nonintensive farming, and relied more heavily on nomadic pastoralism. In this context informal flake tools made on low quality raw materials were a reasonable technological choice to changing economic demands (Quintero and Wilke 1995).

Khirbat al-Ḥammām's chipped and ground stone assemblages have important parallels with other LPPNB sites in the southern Levant. Yet patterns among these artifact classes also remain somewhat distinctive. Despite the expedient and informal characterization of both chipped and ground stone tools, some examples of more formal, labor-intensive items exist – that do not appear to be recycled or scavenged. Perhaps this technological mix site represents a regional variant of the PPN that fits less neatly into pre-existing descriptions of lithic technology and its changes over time. Future work at the site will focus on clarifying these technological issues.

Bone Tools

The seven bone tool fragments from the excavation can be broadly divided into two categories. There are three examples of parallel-sided, spatulate tools made of ovicaprid-sized rib fragments **(Fig. 9: a-c)**. The remaining tools are pointed implements including two awls/perforators **(Figure 9: d-e)**, which could have been used to pierce hide or

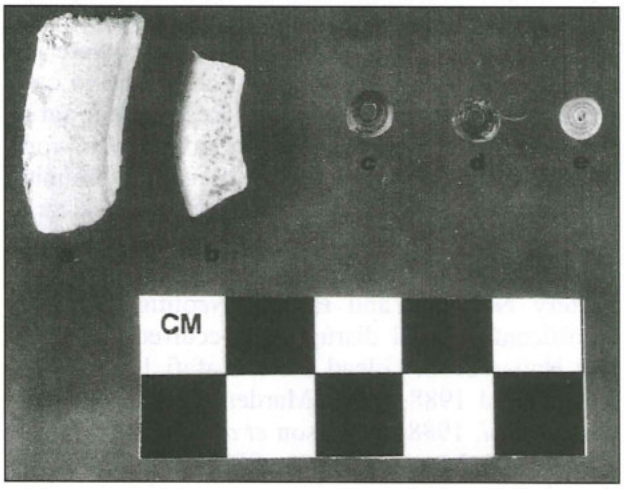


9. Bone Tools (a-c spatulates; d-e awls/perforators; f unknown).

make coiled basketry. The final tool is a medial fragment of a pointed tool that was discolored by burning. Abrasion marks from shaping the tool points are still visible in several cases **(Figure 9: d, f)**. The remaining piercing tool has been burnished to a degree that no evidence of production technique remains.

Ornaments

Two polished stone ring "bracelet" fragments were found **(Fig. 10: a-b)**. They appear to be made of sandstone and are devoid of any pigment or other surface decoration. Three shell beads were also retrieved **(Fig. 10: c-e)**. They closely resemble the worked Conidae beads from al-Basṭa (Nissen *et al.* 1987: fig. 18: d-e). Both surfaces have been abrad-



10. Ornaments (a-b stone ring fragments; c-e shell beads).

ed to form a small, flat bead. Presumably these were strung in groups and worn as ornament. Species of *Conus* are found in both the Mediterranean and Red Seas. Evidence for possible bone ornament production comes from a small mammal shaft element that was incised with seven parallel lines (Reese n.d.).

Biological Specimens

Fauna

The faunal material from Khirbat al-Ḥammām went through a two-stage analysis. A general inventory was produced first by Matthew Warwick, University of Wisconsin, Milwaukee. The information in Warwick's analysis included element identifications, laterality, as well as the presence of certain cultural modifications such as burning and cut marks. David Reese of the Peabody Museum of Natural History at Yale University then re-examined the assemblage to provide more detailed taxonomic data, as well as age and sex information. Dr. Reese also provided additional information about patterns of burning, bone working, and butchery.

The bone from Khirbat al-Ḥammām varies a bit in the degree and type of weathering. Rodent gnawing was present on a small number of bones.

***Table 5:** Faunal remains fromKhirbat al-Ḥammām.*[1]

Identification	n
Ovicaprid	608
Bos	2
Bos ?	3
carnivore	2
bird	1
small mammal	4
large mammal	17

[1] Total assemblage consists of 982 pieces of bone/1300 gran

Overall, the assemblage is generally well preserved with surface texture and features discernible. The assemblage contained 982 pieces of bone (1300 grams). Some level of taxonomic identification was possible on approximately 65% of the assemblage (n=637) **(Table 5)**.

The village residents clearly derived the bulk of their meat diet from ovicaprids (NISP=608). No assertions can be made concerning the domestication of the ovicaprids at the present time. Metrical analysis is still underway and may shed light on this in the future (Reese n.d.). Cattle (*Bos*) is also present, but in very small amounts. Bird and carnivore are also represented, but none of the specimens can be unequivocally described as 'food' since the bones are neither burned nor contain cutmarks. The dietary use of sheep/goat and cattle during the PPNB and PPNC is well documented across a range of sites, including 'Ayn Ghazāl, Jericho, Beisamoun and Abu Gosh (Bar-Yosef 1995). However, the faunal assemblage differs from these sites in one important respect as well. Khirbat al-Ḥammām is the only site, which lacks evidence for the continued, albeit reduced, consumption of gazelle (*Gazella* sp).

Most elements of the ovicaprid skeleton are represented, suggesting whole carcass butchery (Warwick n.d.). Fragmentation of the limb elements may suggest marrow processing. Cut marks were identified on a small subset of the bones. Cuts on the axis vertebra are consistent with removing the head. Cuts on the astragalus are consistent with removing non-meaty food elements from the lower limbs. Roughly, seven percent of the assemblage shows burning. Most of the burning occurs on ovicaprid elements, although several large mammal elements

also show burning (Reese n.d.; Warwick n.d.).

Shell

Reese also provided information about a small assemblage of shells that were uncovered during excavation. The common, local fresh-water gastropod, *Melanopsis*, occurs most frequently throughout the deposits. A small amount of marine shell was also present: single examples of both *Cerastoderm* and *Conus* came from the cobble layer (Locus 2) in Level 10 of the South unit. One piece of worked *Conus* had a finely drilled hole at its apex (Reese n.d.).

Botanicals

Three soil samples, measuring approximately two liters each, were processed by Pat Crawford. Two came from contexts that appeared to be midden deposits, based on amount of faunal material and lithic debitage present. The third sample was taken from a floor contact context directly above the plaster floor of Locus 2– the house or storage feature.

Preliminary observations indicated that all samples were soft, fine, powdery soils. Pre-flotation sieving through a 5mm dry sieve produced gastropod shell fragments, bone fragments, and microdebitage. The heavy fraction from the midden samples contained additional mammalian bone and gastropod fragments, possible fish bone, and possible lizard bone. The sample from the feature floor contained plaster flakes, but no shell or bone. The light fraction from the midden samples consisted of fine silt. Little identifiable carbonized material was retrieved. Most of what did occur was highly fragmented or charcoal 'dust'. The only intact carbonized seed found came from a midden sample, and belongs to the Fabaceae Family. It may represent a clover-like wild legume (Crawford n.d.).

To summarize the results of the soil and botanical analysis, the samples submitted contained little identifiable carbonized material. However, it does appear that some carbonized material is well-preserved at the site. This conclusion is further supported by the wood charcoal fragments that were submitted for radiocarbon dating.

Human Skeletal

Before excavation of the test units began, the roadcut was explored to gain information about the density, distribution, and preservation of archaeological materials and features at Khirbat al-Ḥammām. During this initial investigation, two bone fragments were found protruding from the exposed road bank. The first impression was that they were human, so they were collected in order to confirm this field identification using comparative skeletal material. The fragments have now been identified as medial shaft fragments from the left radius and left ulna of a human. The materials were found in proximity to a thin plaster layer, which in profile appeared to be a house floor. So preliminary evidence indicates that intramural human burials are present at the site. This is significant for future research plans that will include comprehensive demographic, pathological, and possibly genetic analysis of human skeletal remains.

Summary and Discussion

Dramatic social changes certainly accompanied the economic changes as humans developed lifestyles dependent on farming and animal husbandry. Populations came together in larger, complex villages. New daily and seasonal schedules were required to tend and process plant crops and to care for herds of domestic animals. Researchers agree that how these 'first farmers' organized their work and their relationships with family and community members were crucial to the success of these early agricultural villages. It is becoming equally clear that in the southern Levant, between the Late Pre-Pottery Neolithic and Pottery Neolithic periods, significant cultural disruptions occurred (Banning and Najjar 1999; Gilead 1990; Kafafi 1988, 1998; MacDonald 1988, 1992; Marder *et al.* 1996; Muheisen *et al.* 1988; Rollefson *et al.* 1992; Simmons *et al.* 2001). Many large Late PPN sites were abandoned. Sites with continuous occupation into the Pottery periods significantly 'downsized'. This suggests that populations became more dispersed on the landscape, and perhaps, in some cases, more mobile.

The test excavations at Late PPNB Khirbat al-Ḥammām provide some provocative glimpses into the crucial period of prehistoric development in the southern Levant. Continued excavation and analysis of the wealth of material culture and well-preserved biological specimens have the potential to add substantially to future discussions of Pre-Pottery Neolithic technology, economy, and social organization.

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