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Abu Ghosh, Jasmine Street: A Pre-Ghassulian Site in the Judean Hills

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Introduction

A new Late Prehistoric site was excavated in 2009 within the village of Abu Ghosh, in the Judean Hills, approximately 12 km west of Jerusalem (Fig. 1).[1] The main part of the site is dated to the Pre-Ghassulian period, which falls chronologically between the end of the sixth millennium and the mid-fifth millenium BCE, in correlation with parallel southern Levantine assemblages. Taking into consideration the multiple and sometimes confusing terminologies applied to sites temporally located between occupations of the Wadi Rabah (Late Pottery Neolithic/Early Chalcolithic) and the Ghassulian Chalcolithic cultures, some clarification is necessary. For this timespan we use the term Pre-Ghassulian, following Gilead (2011), which includes what Gopher and Gophna (1993) referred to as variants of the Wadi Rabah culture, what Garfinkel (1999:153) termed the 'Middle Chalcolithic', Getzov (2009:68–72) called the latest phases of the Early Chalcolithic (in the northern part of the country), and what Gopher (2012: Fig. 41.1) has recently termed Post-Wadi Rabah–Pre-Ghassulian (PoWR–PG).

The excavation on Jasmine St. in Abu Ghosh offers insights into a number of unresolved issues relating to the material culture and subsistence of Pre-Ghassulian sites in general, and contributes to our understanding of the development of the Late Prehistoric periods in the Jerusalem region in particular. Following the presentation of the data unearthed in this excavation, we will compare the finds from

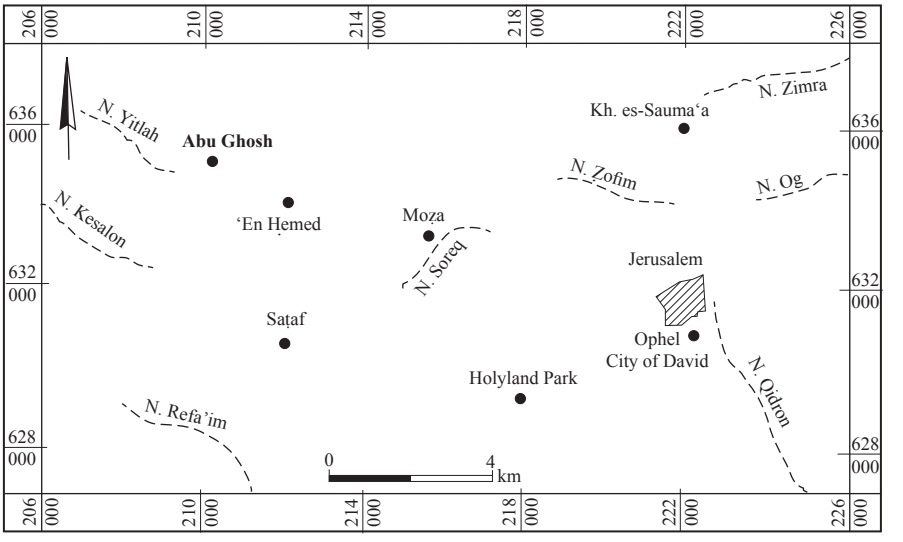
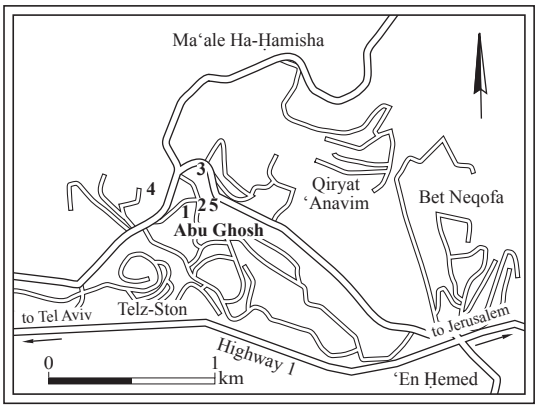


Fig. 1. Location map showing Abu Ghosh in relation to contemporary sites in the vicinity.

Abu Ghosh with known repertoires of the southern Levant, and discuss the significance of their dating and cultural ascription.



1 The excavation
2 Benedictine Monastery
3 PPNB site
4 Tel Qiryat Ye'arim
5 Roman–Mamluk periods

Fig. 2. Locations map of archaeological sites in Abu Ghosh.

THE EXCAVATION

In 2009, a short salvage excavation was conducted on Jasmine St. in Abu Ghosh, on behalf of the Israel Antiquities Authority (IAA), prior to construction of a house. The site (Fig. 2:1) is situated on the slope of a hill, approximately 700 m asl, 160 m west of the natural spring of Abu Ghosh, where the Benedictine Monastery and a mosque are located (Fig. 2:2). The hillside is covered by agricultural terraces (Fig. 3) constructed on natural bedrock. The terrace surfaces and the bedrock slope southeast toward a wadi that leads to the spring. This perennial water source probably attracted settlers to this particular area of the Judean Hills and indeed, a large number of archaeological sites have been found in Abu Ghosh, spanning prehistoric to recent periods. About 500 m to the northeast of the Jasmine St. site lies a Pre-Pottery Neolithic B and Pottery Neolithic site (Fig. 2:3; Perrot 1952; Lechevallier 1978; Khalaily and Marder

Fig. 3. The site, general view to the south.

2003b).[2] Some 250 m to the northwest, at Tel Qiryat Ye'arim (Fig. 2:4), next to the Notre Dame Church, an Early Bronze Age I settlement was revealed in a small salvage excavation carried out in 1995 by Gabriel Barkay (unpublished). Later historical periods—Roman, Byzantine, Abassid, Crusader and Mamluk—were also revealed near the present site (Fig. 2:2, 5; de Vaux 1945; de Vaux and Stève 1950; Zilberbod 2007).

Aim and Methodology

The aim of the salvage excavation was to record as much of the remains as possible prior to construction work that would partially or totally damage the archaeological record.

Prior to the excavation, two long trenches (Trench 1 in the north and Trench 2 in the south) were opened by mechanical means by Ya'aqov Billig, on behalf of the IAA (Plan 1). Between them, a row of three squares (4 × 4 m each) was excavated to a depth of 1.2–1.5 m, reaching bedrock (see below). The squares were labeled 1 to 3, from west to east. Within each square, four subsquares or quadrants (2 × 2 m) were defined: *a* in the northwest, *b* in the northeast, *c* in the southwest, and *d* in the southeast. Layers were labeled in Roman numerals, I to III, with phases defined by small letters (a, b) whenever possible. Architectural units were labeled with capital letters, from A to J.

Recovery methods included dry sieving with a 10 mm mesh for all the loci related to the fills of rooms, surfaces, and sediments from the top of the walls down to the fill above bedrock. Baskets were the minimal units within the loci; excavation spits were kept at a maximum of 20 cm where possible. A list of loci and walls detailing location, layer, and the nature of each locus, is provided in Appendix 1.

Stratigraphy and Architecture

Three archaeological–sedimentary layers were identified at the site: Layer I—topsoil, Layer II—possibly EB I and Layer III—Pre-Ghassulian. Due to the poor state of preservation, phases could not always be recognized, although some clear stratigraphic divisions could be made. As in almost all excavations, some loci could not be attributed to a specific layer and were labeled as unclear loci or unclear contexts. The layers and their phases will be described from bottom to top.

Layer III

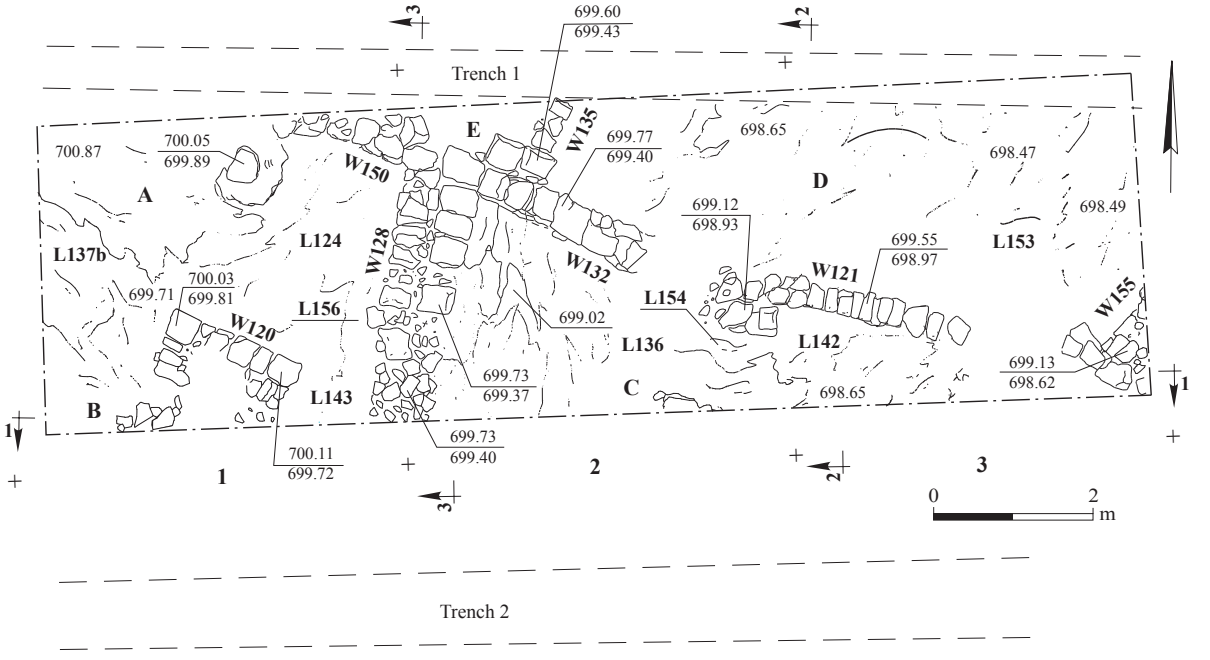
This layer is divided into two phases: IIIb (early) and IIIa (late).

Phase IIIb (Plan 1).— Rectilinear foundation walls, comprising one or two rows of fieldstones, with no bonding between them, characterize this phase. The foundations were one course high, built upon yellowish brown soil above bedrock. The size of the fieldstones ranges from 0.30 × 0.20 × 0.15 m to 0.35 × 0.30 × 0.20 m. Wall 128 (see below) is noteworthy. Its lowest preserved course, attributed to Phase IIIb, is made of large, evenly-laid, rectangular slabs, while its upper course, of Phase IIIa (preserved only in the western row), was made of medium-sized, randomly placed, irregular stones.

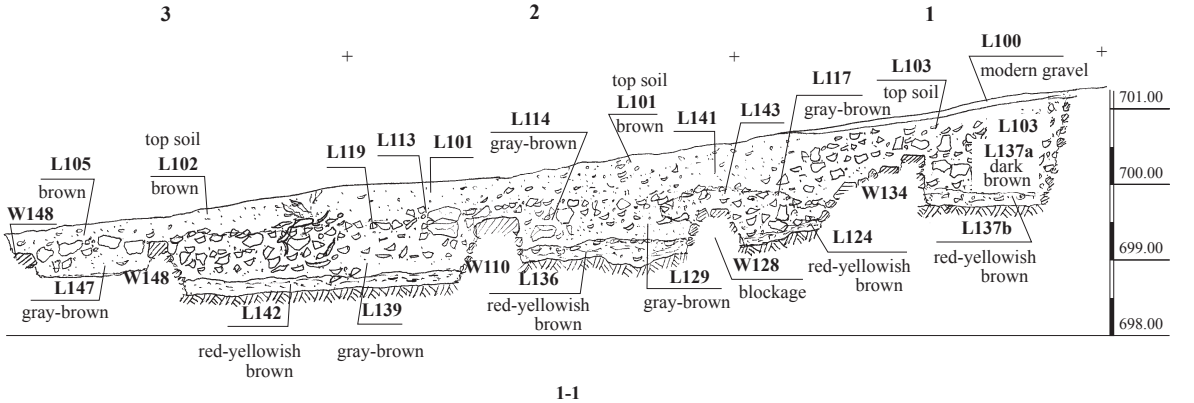
Several rectangular rooms or units were defined. Their walls slope southeast, toward the wadi. This is despite the fact that in Sqs 2 and 3 the yellowish-brown fills are thicker than in Sq 1, probably intended to level the ground prior to construction. These fills contained animal bones, as well as pottery sherds and flint items characteristic of the Pre-Ghassulian period (see below). The architectural features and units are described from Sq 1 to Sq 3.

In Sq 1, Unit A is bordered by W150, W128 and W120 (Fig. 4). A rounded stone, resembling a pillar base, was located near W150, almost upon bedrock. Loci 124 and 137b represent the fills above bedrock associated with the foundations of the walls. Unit B is located southwest of W120. As W120 was only partially preserved on the west, its plan cannot be reconstructed. Walls 128 and 132 (Sq 2) form a rectangular space (Unit C). The lower course of W121 may have

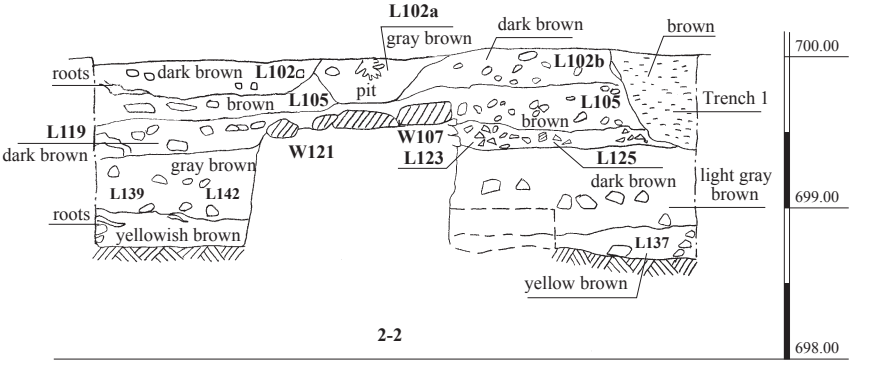
Fig. 4. Phase IIIb, Unit A, looking northwest; pillar base in the background (W134 belongs to Phase IIIa).



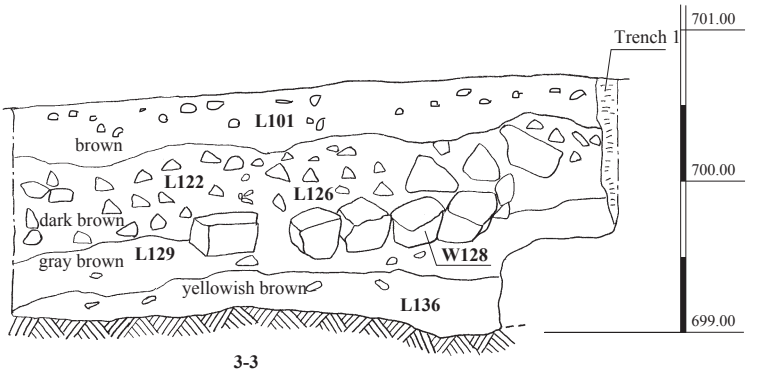
Plan 1. Phase IIIb, plan and sections (on opposite page).


3
2
1
L100
modern gravel
L103
top soil
L117
gray-brown
top soil
L101
brown
L114
gray-brown
L141
L143
L119
L113
L101
top soil
L102
brown
L105
brown
W148
W148
L147
gray-brown
L142
L139
red-yellowish brown
gray-brown
W110
L136
red-yellowish brown
L129
gray-brown
W128
blockage
L124
red-yellowish brown
W134
L103
L137a
dark brown
L137b
red-yellowish brown
701.00
700.00
699.00
698.00

1-1


L102a
gray brown
dark brown
brown
L102b
roots
dark brown
L102
pit
brown
L105
L105
Trench 1
L119
dark brown
W107
L123
brown
W121
L125
gray brown
dark brown
light gray brown
L139
L142
roots
yellowish brown
L137
yellow brown
700.00
699.00
698.00

2-2


Trench 1
701.00
L101
brown
700.00
L122
L126
dark brown
gray brown
L129
W128
yellowish brown
L136
699.00

3-3

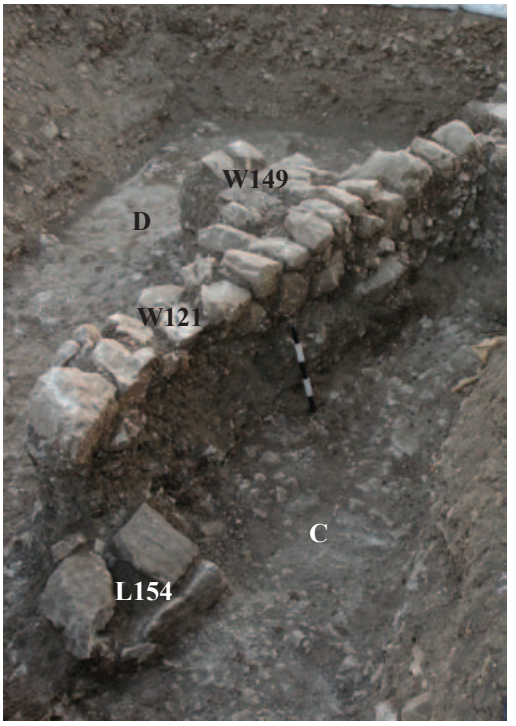


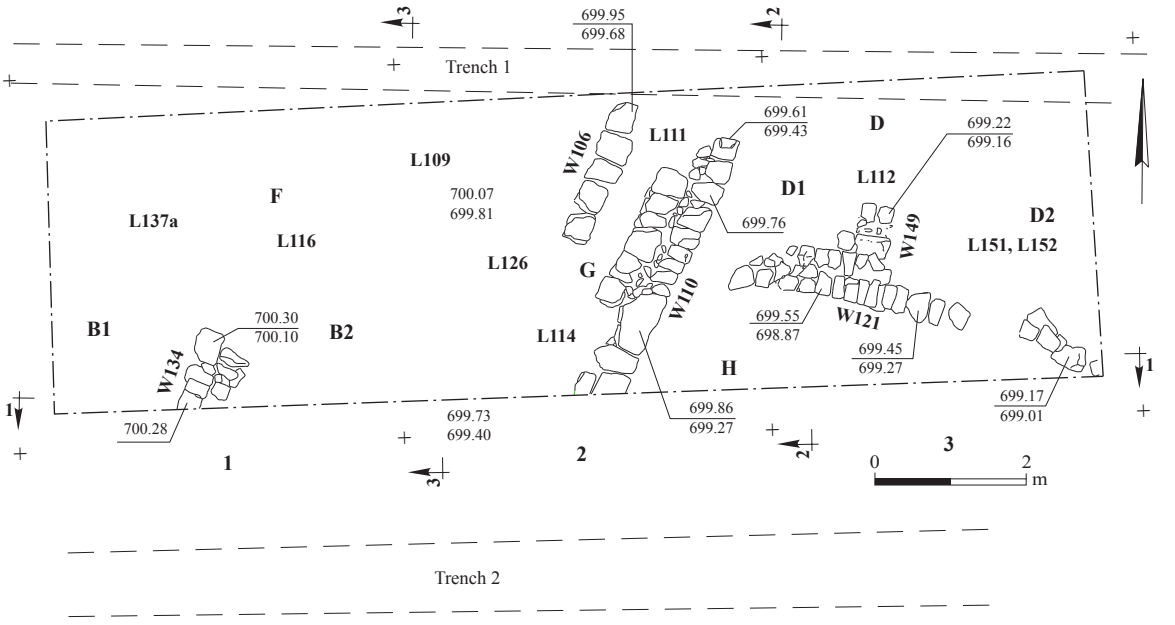
Fig. 5. Phase IIIb, Units C and D, looking northeast; threshold steps L154 in foreground.

continued W132 (and perhaps Unit C) into Sq 3, although it had a slightly different orientation. Loci 136 and 142 are yellowish-brown fills between the bedrock and the foundations of the walls. While no floor surfaces were discerned in these loci, they yielded numerous pottery sherds, flint items, animal bones and several groundstone objects.

Near the western end of the lower course of W121 were two rectangular stones, one above the other (L154; Fig. 5), perhaps comprising stairs or a threshold between Units C and D.

Unit D is a large space north of W132 and W121, east of W135, and west of W155, containing pottery sherds and flints. Locus 153 is a gray-brown occupation level in this space. The corner of Unit E, formed by W135 and W150/132, is located west of Unit D.

Phase IIIa (Plan 2).— This phase is represented by five walls (from west to east: W134, W106, W110, the upper course of W121, W149). They are built of fieldstones with no bonding material

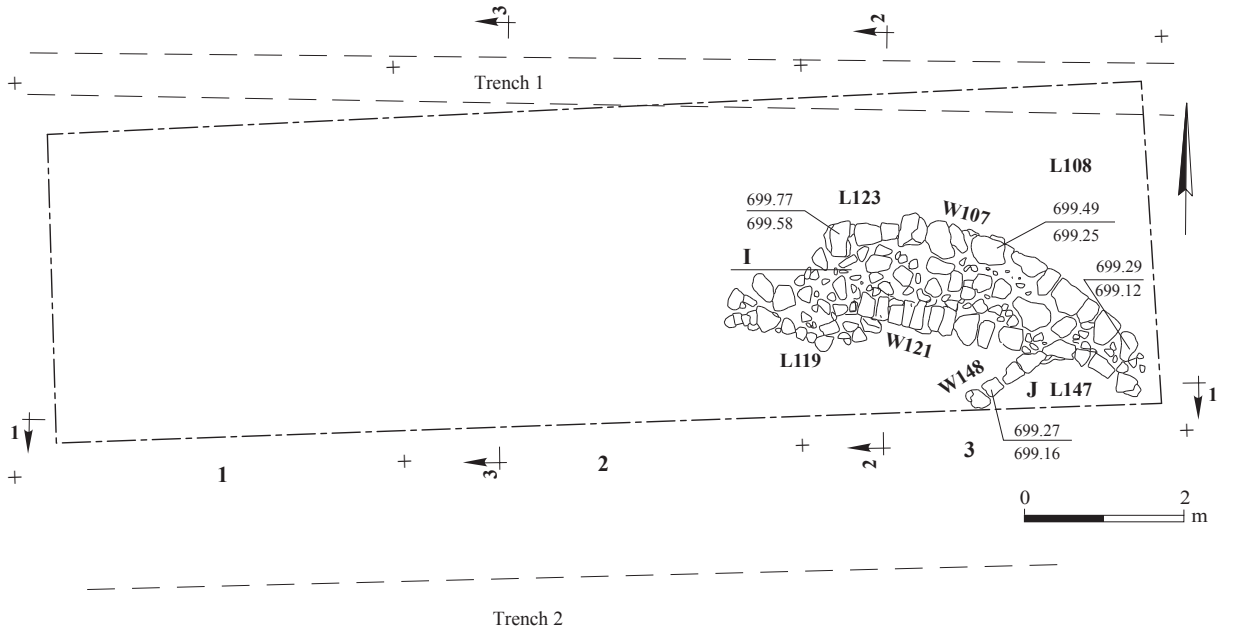


Plan 2. Phase IIIa (for sections, see Plan 1).

Fig. 6. Phase IIIa, Unit G, looking south.

between them, and are oriented northeast–southwest and parallel to each other, except for W121, which is almost perpendicular to W110. Walls 134, 110, 121 and 149 are two rows wide and preserved to a height of two courses (the lower course of W121 belongs to Phase IIIb). The fieldstones of W134, built above the remains of W120 from Phase IIIb (see above), range in size from 0.30 × 0.30 × 0.25 to 0.50 × 0.50 × 0.35 m. Wall 106 consists of only one row of stones (0.50 × 0.40 × 0.25 m) preserved one course high. Between this wall and the underlying W132 of Phase IIIb is a gray-brown sediment (L129, a fill between Phases IIIa and IIIb; Plan 1: Sections 1–1, 3–3); W110 was built on the same sediment (Plan 1: Section 1–1).

Unit F (Sqs 1, 2) is a large space west of W106 and north of W134; its original shape is unclear. Wall 134 was a partition wall between two subunits labeled B1 and B2. Between W106 and W110 is a narrow space of 0.5 m (Unit G), probably a corridor (Fig. 6). To the east, W121 divided the area into Unit D to the north and Unit H to the south (Sqs 2, 3). A short wall segment (W149) was preserved perpendicular to W121, dividing Unit D into two subunits, D1 and D2. In Layer II, part of W121 was integrated into a stone surface (see below), which cut its southeastern end. An ashy layer, probably part of a living surface, was preserved in Subunit D2 (L151, L152), mainly near W121. The fills associated with Phase IIIa (L109, L114, L126) are gray-brown to red-brown in color and sometimes included small angular stones. These fills contained pottery sherds and flint items characteristic of the Pre-Ghassulian period, as well as animal bones, albeit in lesser quantities than in the fills of Phase IIIb. No clearly stratified groundstone objects were found in this phase. An EB I Canaanean retouched blade segment found in this phase must be considered intrusive.



Plan 3. Layer II (for sections, see Plan 1).

Layer II (Plan 3)

This layer is represented in Sq 3 by W107 and Installation J—a round installation formed by W148 (L147; see Plan 1: Sections 1–1, 2–2). Wall 107 is a curvilinear wall constructed above the remains of W121 (Phases IIIa–IIIb) and cut into it (Fig. 7). It was built of two rows of fieldstones (average size 0.45 × 0.35 × 0.20 m), with no bonding between the stones, and preserved to a length of about 5.5 m and the height of a single course. Attached to the south face of W107 is a layer of medium and small stones (c. 1.5 m long) incorporating part of W121, tentatively labeled Unit I. Installation J (W148, L147) cut into Layer III in the southeastern part of Sq 3. To the south of Unit I is a fill (L119). North of W107, several fills are associated with this layer (e.g., L108, L123), but no clear structures were visible. The few potsherds associated with this layer are dated to EB I (see below). One diagnostic Canaanean blade blank and a grinding slab were retrieved from this layer.

Layer I (see Plan 1: Sections 1–1, 2–2, 3–3)

Layer I represents topsoil in all three excavated squares. Two phases were discerned. Phase Ia (L100 in Sq 1) is a recent fill of gravel laid for the construction of a modern house. Phase Ib is brown to dark brown agricultural soil containing finds from Hellenistic to modern times (e.g., Loci 101–104, 127, 141).[3] It ranges from 0.4 to 0.5 m in depth, and includes several modern pits and root intrusions (e.g., L102a).

THE FINDS

The Pottery

In this section, we concentrate mainly on the Pre-Ghassulian pottery, while brief descriptions of the EB I finds are also provided. All the ceramics found at the site were potsherds, and no vessels were restorable. The pottery repertoire presented here comprises almost all the diagnostic sherds found during the excavation; for this reason no relative frequencies are given. Since sherds demonstrate great mobility

Fig. 7. Layer II, Unit I and Installation J, looking west.

between sediment layers, and there are no complete or restorable vessels from any of the layers, it is difficult to establish differences between the two Pre-Ghassulian phases.

Pre-Ghassulian (Figs. 8, 9)

Pre-Ghassulian pottery is characterized by two main forms: open (e.g., bowls), and closed (e.g., jars). The fabric resembles that of central-southern Ghassulian Chalcolithic assemblages, but is coarser. Although no complete vessels were found, most of the pottery forms find parallels in Pre-Ghassulian assemblages (e.g., Gilead 1990; Goren 1990; Garfinkel 1999:189–199). It is worth mentioning the absence of cornets, churns and pierced handles typical of the Ghassulian and Be'er Sheva' cultural horizons of the Chalcolithic period.

Most of the sherds are of coarse, yellowish brown (10YR 5/4) ware, with a minority of reddish yellow paste, and a very pale brown (10YR 7/4) slip. In general, the pottery has a gray (10YR 6/1) core, indicating a relatively low firing temperature. The vessels are tempered with small- to medium-sized white grits, some of them shiny; there is no indication of the inclusion of straw in the production of the vessels. The finish of the vessels is crude, some bearing plastic decoration (rather than incised). No signs of wheelmarks were discerned, and it seems that all the vessels were handmade by coiling. The coils were apparently smoothed on both sides of the vessel by hand or tool; however, analysis of this aspect of production is difficult due to the heavy concretions on the surface of most of the sherds. The potters also

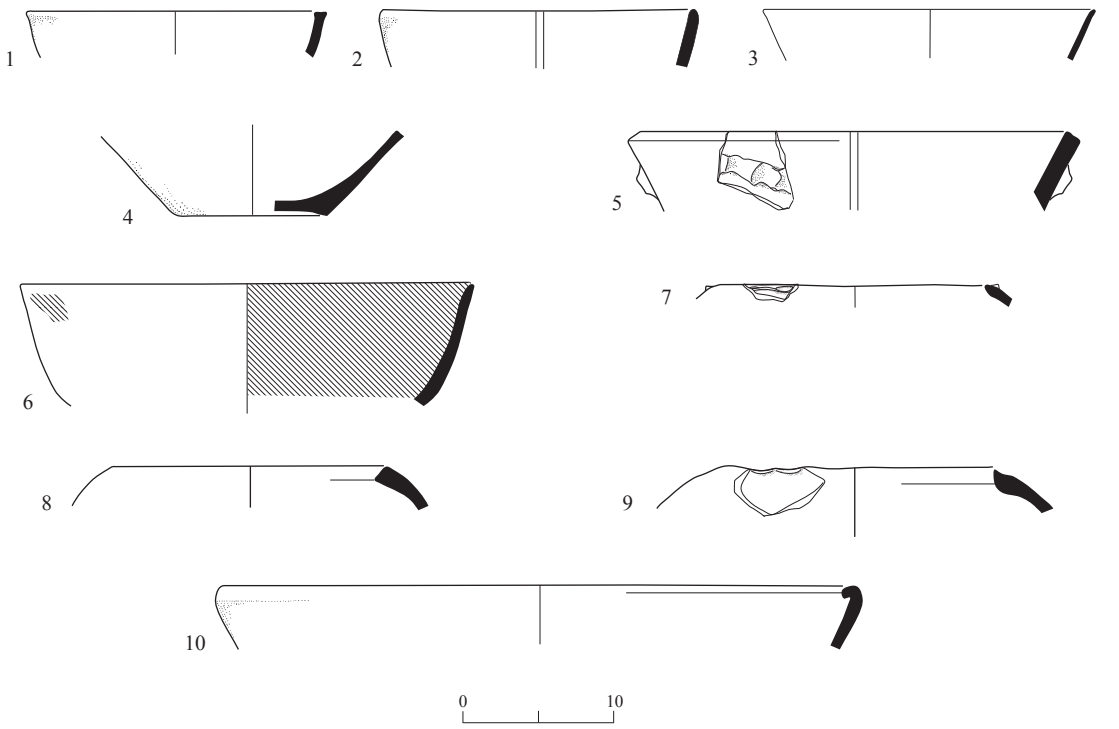


Fig. 8. Pre-Ghassulian pottery: bowls and holemouths.

No.	Type	Locus	Basket	Description
1	Bowl	136	1050	
2	Bowl	115	1041	
3	Bowl	140	1056	
4	Bowl	136	1050	
5	Bowl	133	1043	Red slip, rope decoration
6	Bowl	Trench 2	-	Red slip
7	Holemouth jar	139	1053	Thumb-indented rim
8	Holemouth jar	136	1050	
9	Holemouth jar	140	1054	
10	Holemouth jar	122	1023	

used straw mats as work surfaces, as attested by the mat-impressed bases (see below).

Only three sherds were petrographically analyzed: two holemouth jars and a bowl.[4] The bowl is made of calcareous marl clay characterized by a high calcite content, and includes coarse grains of sand, some silty dolomite, coarse fragments of chert, opaque minerals and a very low quantity of quartz, added as temper. This clay could have derived from clay deposits of the Moẓa Formation in the Moẓa region. The holemouth jars have a similar but finer matrix.

Bowls.— Two types of bowls were found. Type 1 comprises shallow bowls with slanted walls (Fig. 8:1–4), which appear to correspond to what Garfinkel (1999: Fig. 95:1–9) terms

'Beth Shean Ware'. Type 2 is made up of deep bowls of medium size (diam. 20 cm) with slightly rounded or slanted walls and flat bases, bearing irregular red slip (Fig. 8:5, 6). These are also characteristic of Garfinkel's 'Beth Shean Ware' (1999:160–163, Fig. 96), as well as the Qatifian and Besorian assemblages of the northwestern Negev and the southern coastal plain (e.g., Gilead and Alon 1988: Figs. 11:3; 12:3). At Gilat, similar deep bowls were found (Commenge 2006: Pl. 10.7). Bowl No. 5 has an applied rope decoration similar to that on a bowl from Tel Ẓaf (Gophna and Sadeh 1988–1989: Fig. 10:11), interpreted there as probably representing a snake. At Ḥorbat 'Uẓa (Getzov 2009: Figs. 2.30:20, 21; 2.31:2), this decoration on bowls is a mark of the latest phases of what the excavator terms Early Chalcolithic.

Holemouth Jars.— Holemouth jars are classified according to their size. Type 1 are small jars (mouth diam. c. 20 cm) with different rim sections, some with thumb indentations on the rim (Fig. 8:7–9). Type 2 are large holemouth jars (mouth diam. c. 50 cm; Fig. 8:10). Both types are characteristic of the Qatifian and Besorian assemblages (e.g., Epstein 1984: Fig. 2:5, 6; Roshwalb 1987: Fig. 5.1:10; Gilead and Alon 1988: Fig. 11:9; Commenge 2006: Pl. 10.13:1–3).

High-Neck Jars.— These jars are mainly represented by rims and body sherds. Some of the bases could also belong to such jars, although it is not possible to attribute them to any specific type. Two rim types are evident. Type 1 are everted rims (Fig. 9:1) and Type 2 are bow rims (i.e., swollen necks; Fig. 9:2). The latter type is characteristic of the Wadi Rabah and post-Wadi Rabah cultures, with parallels known mainly from the north (e.g., Garfinkel 1999:177–179; Getzov 2009: Fig. 2.22:1–6).

Handles.— Two types of handles were found at the site. Type 1 are strap handles that widen at the attachment to the vessel (Fig. 9:3–6). They are typical of Pre-Ghassulian sites and represent a continuation of the earlier Wadi Rabah types. It is suggested that most of these handles belonged to jars. They are present in the Qatifian and Besorian assemblages (Gilead 1990; Goren 1990), and in northern assemblages such as Ḥorbat 'Uẓa (Getzov 2009: Figs. 2.26:2; 2.27:2, 3), Garfinkel's 'Beth Shean Ware' (1999: Fig. 111), as well as Tel Ẓaf (Gophna and Sadeh 1989: Fig. 13:12). In the Jerusalem area, similar handles are depicted in the material collected at Khirbat es-Sauma'a (Gibson and Rowan 2006: Fig. 10), south of Tell el-Ful, establishing that this site also contains a level of the Pre-Ghassulian horizon.

Type 2, loop handles with round or oval sections (Fig. 9:7–10), probably belonged to 'Beth Pelet' storage jars or pithoi (Nahshoni et al. 2002:6*). They have a finer shape than the strap handles. One handle (No. 7) has impressed circles (thumb indentations?) on the body near the attachment. 'Beth Pelet' handles are common at the Wadi Ghazzeh/Naḥal Ha-Besor sites (Macdonald 1932:1–6; Gilead and Alon 1988: Fig. 11:13–15; Nahshoni et al. 2002: Fig. 4:18) and are attributed by Nahshoni et al. (2002:12*–22*) to the Besorian horizon. Such handles appear to have been present in the early occupation at Gilat as well (Goren 2006:380).

Bases.— In most cases, it is impossible to assign the bases to a specific vessel type. Therefore, we illustrate some noteworthy features, such as thick, heavy bases (Fig. 9:11, 12), which create an angle between the top of the base and the walls of the vessel (cf. Gilead and Alon 1988: Fig. 11:11, 12; Najjar et al. 1990: Fig. 11:25), and bases with mat impressions (Fig. 9:13), which appear in Wadi Rabah (Garfinkel 1992: Fig. 131) and Qatifian assemblages (Gilead 1990: Fig. 5:11).

Early Bronze Age I

A few EB I sherds were found in association with Layer II, comprising mainly one bowl/platter, holemouth jars, storage jars and pithoi. The majority of the vessels are made of reddish

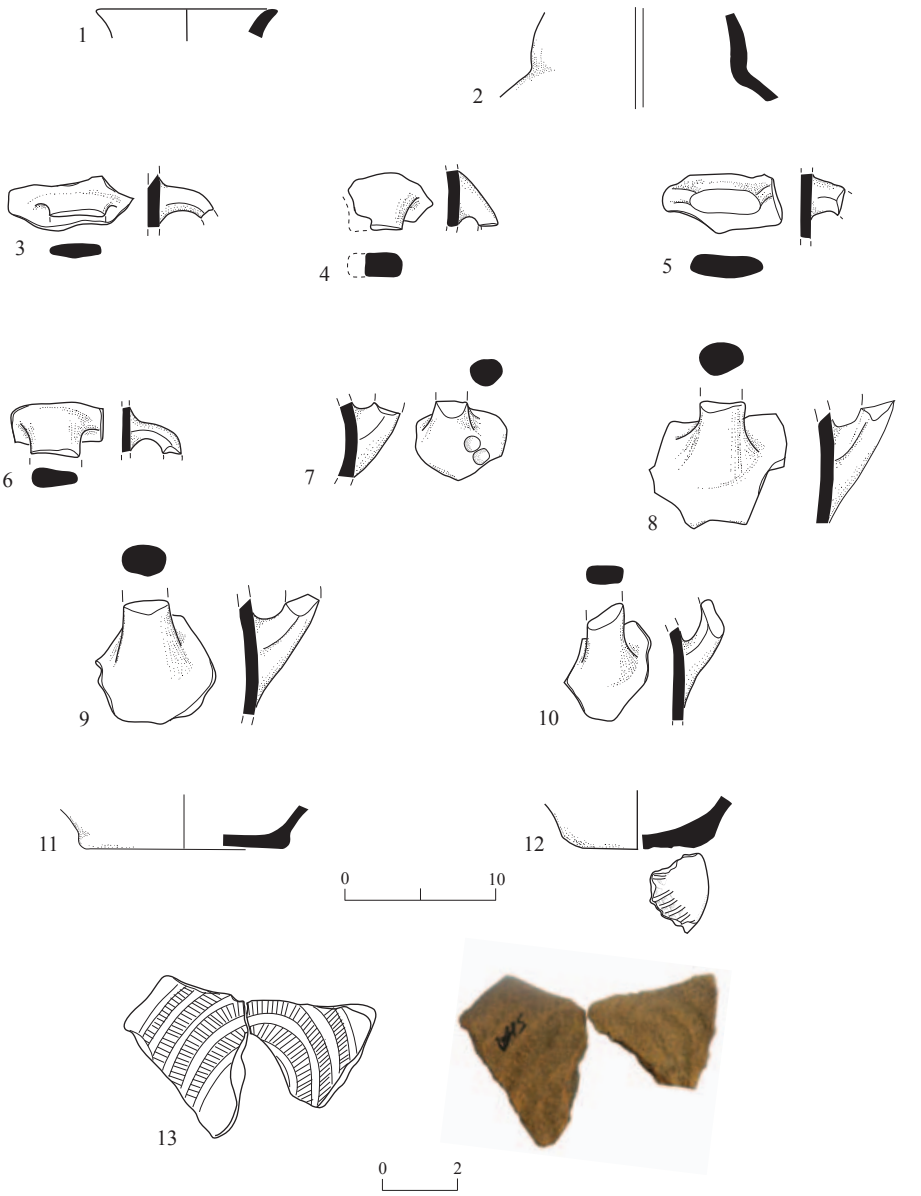


Fig. 9. Pre-Ghassulian pottery: jars, handles and bases.

No.	Type	Locus	Basket	Description
1	Jar rim	144	1071	
2	Jar rim	136	1050	
3	Handle	136	1045	
4	Handle	129	1042	
5	Handle	133	1043	
6	Handle	117	1020	
7	Handle	112	1013	Thumb indentations

No.	Type	Locus	Basket	Description
8	Handle	127	1031	
9	Handle	153	1068	
10	Handle	133	1043	
11	Base	133	1051	
12	Base	144	1071	
13	Base	136	1045	Mat impression

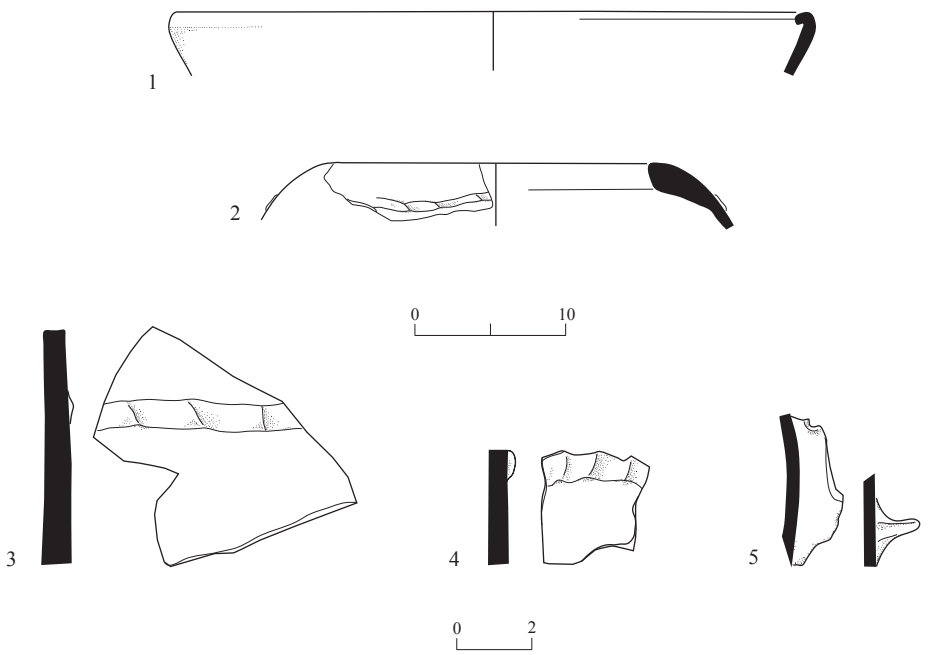


Fig. 10. Early Bronze Age IB pottery.

No.	Type	Locus	Basket	Description
1	Bowl	122	1023	
2	Holemouth jar	122	1023	
3	Pithos	147	1063	Decorated body sherd
4	Pithos	122	1073	Decorated body sherd
5	Ledge handle	144	1071	

yellow (5YR 7/8) ware, with a very pale brown slip (10YR 7/3). Most of the diagnostic sherds are illustrated in Fig. 10.

Due to its poor state of preservation, the large bowl/platter (Fig. 10:1) is difficult to define typologically; it has an inverted rim and is coarsely made, lacking surface treatment that is typical of EB II bowls. It is suggested here that it could belong to a group of similar deep bowls found at Tel Afeq (Beck 2000: Figs. 8.2:23; 8.3:3) and other sites (e.g., Alon and Yekutieli 1995: Fig. 19:14; Gophna, Paz and Taxel 2010: Fig. 8:6, with references therein), and attributed to the end of EB I–beginning of EB II (Beck 2000).

The holemouth rim in Fig. 10:2 has an applied rope decoration, similar to Tel Ḥalif vessels (e.g., Alon and Yekutieli 1995: Fig. 16:11, 12; Dessel 2009: Pl. 1:17). The rope motif is also found on body sherds of pithoi (Fig. 10:3, 4), resembling vessels from several sites in both the center and the south of the country (e.g., Braun and Milevski 1993:13, 14).

The ledge handle in Fig. 10:5 may be classified as Amiran's thumb-indented type (1969: Pl. 8:11–15), and probably belonged to a pithos or some other large vessel. According to the known ceramic repertoires from the southern Levant (Braun 1996:94–102; Yekutieli 2000), these finds can be assigned to EB IB (late EB I; c. 3200–3000 BCE).

The Chipped-Stone Assemblage

All of the flint items retrieved from the excavation, except for two Canaanean blade

Table 1. The Flint Assemblage

	Unstratified, Layer I		Layer II		Layer III		Total	
	N	%	N	%	N	%	N	%
Debitage								
Primary elements			6	23.1	22	7.6	28	8.9
Flakes	7	58.4	17	65.4	183	66.5	207	65.9
Blades/bladelets	3	25.0	1	7.7	34	12.5	38	12.1
Canaanean blade			1				1	0.3
Primary blades					5	1.8	5	1.6
Ridge blades	1	8.3			4	1.4	5	1.6
CT	1	8.3			9	3.3	10	3.2
Outrepassé					2	0.7	2	0.6
CTE			1	3.8	17	6.2	18	5.7
Total Debitage	*12*	*100.0*	*25*	*100.0*	*277*	*100.0*	*314*	*99.9*
Debris								
Chips			4	50.0	45	43.2	49	43.0
Chunks	2	100.0	4	50.0	59	56.8	65	57.0
Total Debris	*2*	*100.0*	*8*	*100.0*	*104*	*100.0*	*114*	*100.0*
General								
Debitage	12	63.2	26	57.8	275	63.4	314	63.0
Debris	2	10.5	8	17.8	104	23.9	114	22.9
Cores			1	2.2	24	5.6	25	5.1
Tools	4	26.3	9	22.2	32	7.1	45	9.0
Total	*19*	*100.0*	*44*	*100.0*	*434*	*100.0*	*498*	*100.0*

segments, can be attributed to Pre-Ghassulian industries.

Raw Material.— Most of the flint material is of local origin and belongs to the formations of the Judean Group (Barzilay 2003), among them the Soreq Formation, and include flint nodules. In addition, flint outcrops are known some 2 km northeast of the site, probably to be attributed to the Bet Me'ir Formation (Barzilay 2003: Plan 2:2). The color of the archaeological material is divided into two groups: a dark grayish brown (10YR 4/2), and another that ranges from light gray (10YR 7/1) to white (10YR 8/1). The dark grayish brown raw material appears in small nodules and is very characteristic of Ghassulian Chalcolithic assemblages from the Central Hills and the Shephelah (Milevski et al. 2013). It has either a semi-translucent or a relatively opaque appearance.

There is also a small amount of banded, coarse-grained material that was used mainly for blades and originates as nodules in secondary deposition in streambeds. It is very common in the Naḥal Be'er Sheva' Chalcolithic sites (Hermon 2003:48–50).

Debitage and Cores (Table 1; Figs. 11, 12).— Based on observations of the debitage cores, it is clear that the Abu Ghosh, Jasmine Street assemblage is dominated by flakes (65.9% of the debitage), which were used mainly for ad hoc tools. Blades and bladelets (12.1%) are relatively prominent, used mainly for the production of sickle blades, as well as retouched and backed blades (Tables 1–3).

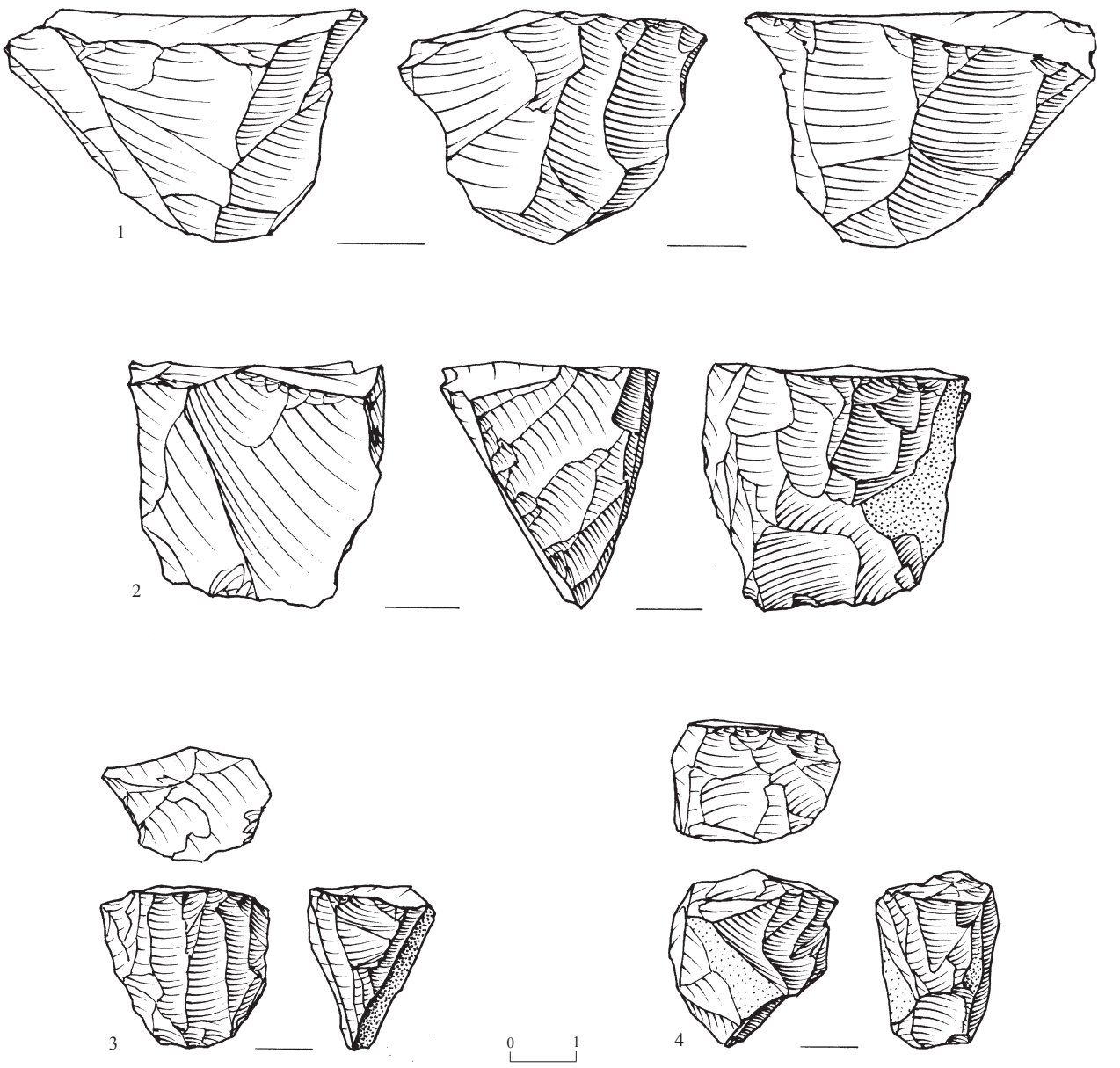


Fig. 11. Flint cores.

No.	Type	Locus	Basket
1	Single striking platform, flakes and bladelets	144	1071
2	Two striking platforms, flakes and bladelets	143	1058
3	Single platform	138	1052
4	Amorphous	125	1047

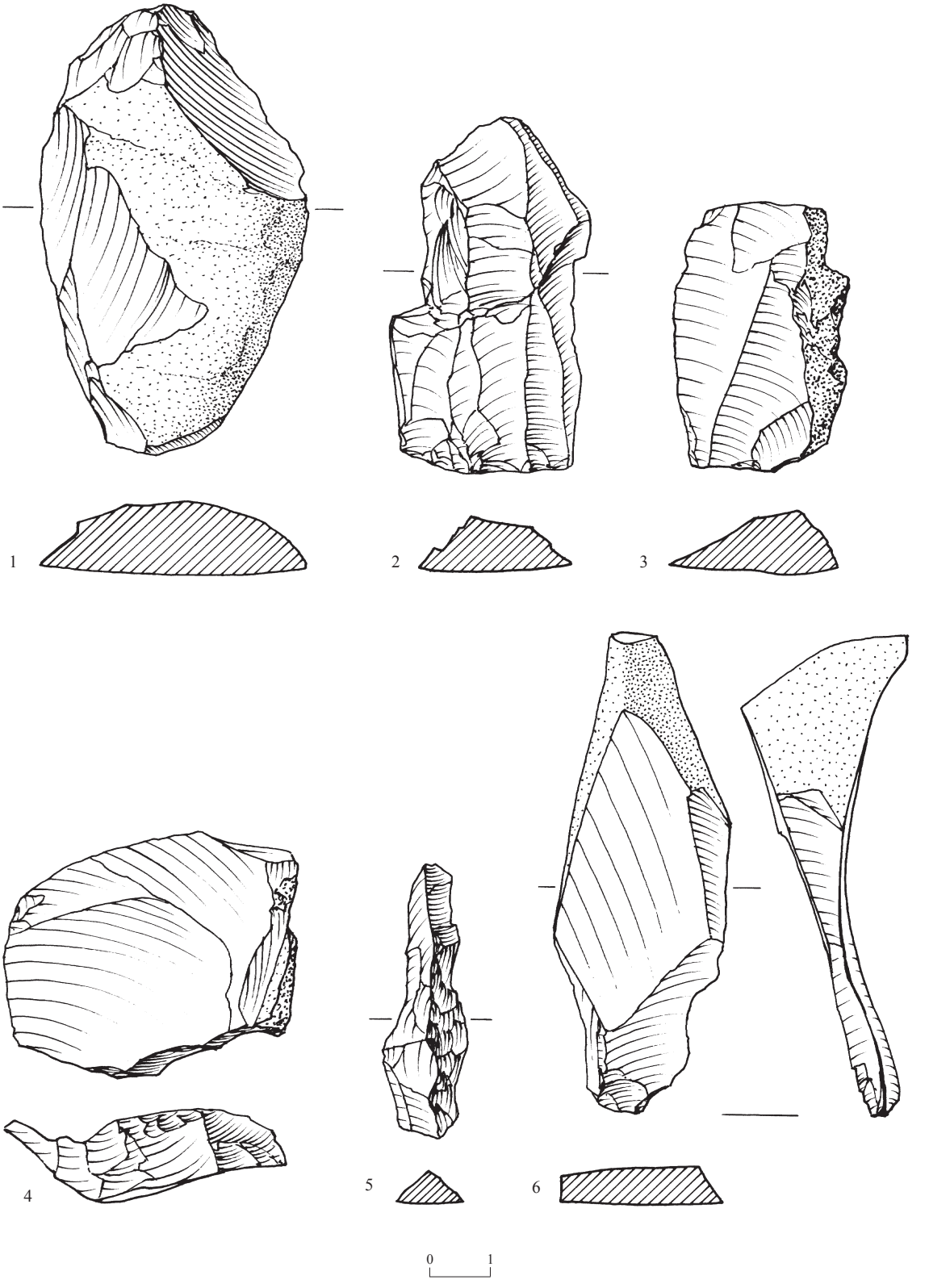


Fig. 12. Core-trimming elements.

The cores are small and irregular (average dimensions 3.3 × 3.0 × 2.3 cm), dominated by single-platform (Fig. 11:1, 3) and amorphous (Fig. 11:4) items. In addition, two-striking-platform cores (Fig. 11:2) and cores on flakes were also found.

Most of the cores were used for producing small flakes and flakelets, and a few cores were utilized exclusively for bladelet production. No cores for blade production were found. However, based on the study of the core-trimming elements (CTE) and the blade/bladelet component, it is suggested that blades and elongated bladelets were produced on site. This is evident from a broad, elongated, initial core tablet (CT; Fig. 12:1); CTEs displaying bidirectional scar patterning, removed while renewing a blade/bladelet core's debitage surface (Fig. 12:2); flakes with unipolar, broad blade negatives (Fig. 12:3); wide, flat core tablets (e.g., 0.49 × 0.14; 0.54 × 0.10 cm; Fig. 12:4); ridge blades (Fig. 12:5); and two outrepassé blades (0.70 × 0.27 cm; 0.79 × 0.29 cm; Fig. 12:6).

◂ **Fig. 12**

No.	Type	Locus	Basket
1	Initial core tablet	129	1033
2	Core-trimming element	136	1045
3	Core-trimming element	115	1041
4	Core tablet	144	1071
5	Ridge blade	125	1049
6	Outrepassé blade	133	1051

Tools (Tables 2, 3).— In spite of the small number of tools present in the assemblage (n = 45; see Table 1), almost all the types typical of Pre-Ghassulian and Ghassulian sites are present. It should be noted that tools are probably over-represented (9.2% of the total assemblage) due to the retrieval methods characteristic of salvage excavations (i.e., 10 mm mesh used for sieving).

Table 2. Flint Tools

	Unstratified, Layer I		Layer II		Layer III		Total	
	N	%	N	%	N	%	N	%
Endscrapers					5	15.7	5	11.1
Micro-endscraper	1	20.0					1	2.2
Sidescrapers					2	6.2	2	4.4
Burins								
Borers					3	9.4	3	6.7
Awls					4	12.5	4	8.9
Retouched flakes	1	25.0	1	12.5	4	12.5	6	13.3
Notches and denticulates			2	25.0	2	6.2	4	8.9
Sickle blades	1	25.0	2	12.5	5	15.7	8	17.8
Backed blades					4	12.5	4	8.9
Retouched blade					1	3.1	1	2.2
Canaanean retouched blade					1	11.1	1	2.2
Axes	1	25.0	1	12.5	1	3.1	3	6.7
Adze					1	3.1	1	2.2
Chisels			2	25.0			2	4.4
Total	*4*	*100.0*	*8*	*100.0*	*33*	*100.0*	*45*	*99.9*

Table 3. Blanks according to Tool Types

	Blades	Flakes	Indeterminate	Total
Endscrapers		5		5
Micro-endscraper	1			1
Sidescrapers		2		2
Borers	3			3
Awls	2	2		4
Retouched flakes		6		6
Notches and denticulates		4		4
Sickle blades	8			8
Backed blades	4			4
Retouched blade	1			1
Canaanean retouched blade	1			1
Axes			3	3
Adze			1	1
Chisels	1		1	2
Total	*21*	*19*	*5*	*45*

Table 4. Flint Raw Materials according to Tool Types

	Light Gray	Dark Grayish-Brown	Banded	Others	Total
Endscrapers	2	1		2	5
Micro-endscraper		1			1
Sidescrapers	1	1			2
Borers		3			3
Awls	1	3			4
Retouched flakes	2	3		1	6
Notches and denticulates	1	1		2	4
Sickle blades	3	4		1	8
Backed blades	2	1	1		4
Retouched blade			1		1
Canaanean retouched blade			1		1
Axes	2			1	3
Adze	1				1
Chisels	1	1			2
Total	*16*	*19*	*3*	*7*	*45*

In general, the tools were made on blades and flakes in similar frequencies (Table 3), with most of the blades used to produce sickle blades, backed blades and borers, while most of the ad hoc tools were made on flakes. The raw material of the tools (Table 4) is evenly

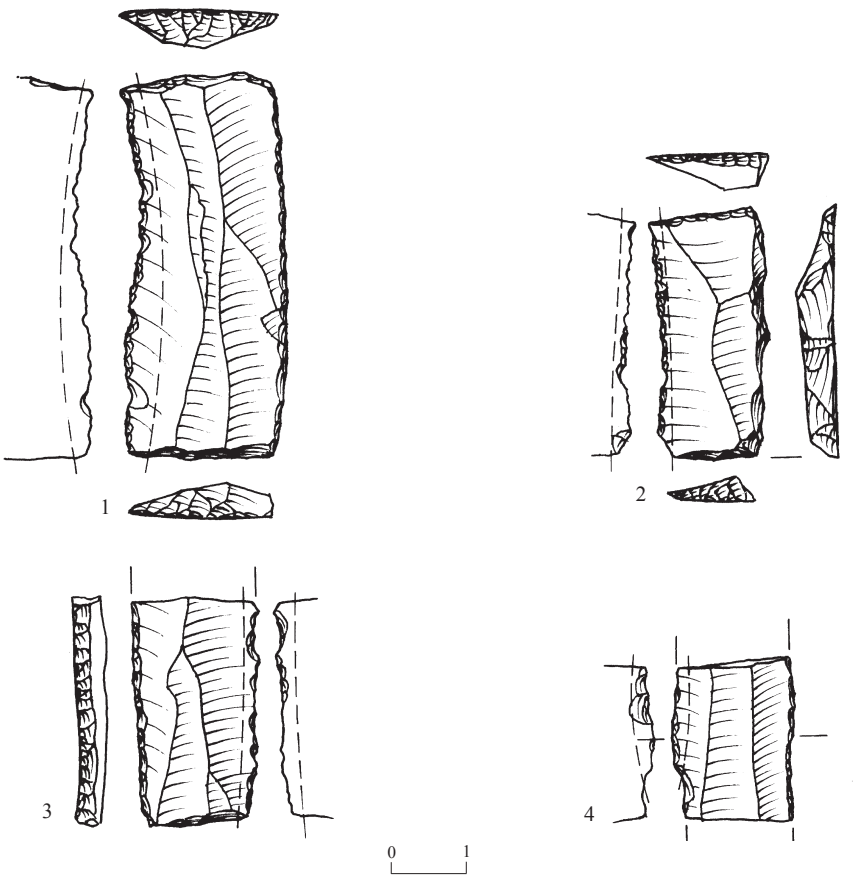


Fig. 13. Flint sickle blades

No.	Type	Locus	Basket
1	Sickle blade	122	1023
2	Sickle blade	115	1041
3	Sickle blade	122	1023
4	Canaanean retouched blade	115	1038

distributed between the light gray and dark grayish-brown flint. Only three blades were made on banded flint.

Most of the tools belong to the ad hoc category (c. 58%), mainly scrapers and perforators (see Table 2). Diagnostic blade tools represent c. 29% and bifacials, c. 13%.

Sickle Blades and Backed Blades (Fig. 13).— The sickle blades are backed and truncated with a trapezoidal or triangular section (Fig. 13:1–3), and the working edge is plain or finely retouched. Morphologically, these segments fall within the shape range attributed to Pre-Ghassulian and Ghassulian assemblages.

Most of the sickle and backed blades (n = 12) are broken (n = 8). Their average measurements are: width 13.3 ± 3.6 mm, thickness 5.1 ± 1.7 mm, length 32.7 ± 7.1 mm (including the broken segments). These items

are wider than the sickle blades of the Be'er Sheva' Valley Chalcolithic assemblages (e.g., Gilead, Hershman and Marder 1995: Fig. 5.19; Vardi 2012) and some of the Shephelah Chalcolithic sites (Hermon 2003:274; Vardi 2012). However, these widths are consistent with most Pre-Ghassulian assemblages, both in the north (Dag and Garfinkel 2007: Fig. 5; Uziel et al. 2007: Fig. 18) and the south of Israel (e.g., Gilead and Alon 1988; Nahshoni et al. 2002: Fig. 11; Fabian, Hermon and Goren 2004: Fig. 12; Lupu and Dayan, this volume). However, it is noteworthy that Qatifian assemblages (e.g., Site Y-3—Gilead, Hershman and Marder 1995: Fig. 5.19) show wider sickle blades, similar to those of the Wadi Rabah assemblages (see Dag and Garfinkel 2007:400–402). In short, it seems that the width of the sickles at Abu Ghosh may have a chronological significance, placing this assemblage in the first half of the fifth millennium BCE.

Retouched Canaanean Blade (Fig. 13:4).— A small retouched blade segment (22 × 16 × 4 mm) made on banded flint from Phase IIIb exhibits parallel scars and regular retouch on one edge, and damage on the opposite edge. It is possibly a Canaanean blade of the Early Bronze Age.

Bifacial Tools (Figs. 14, 15).— The bifacial tools, made mostly on light gray flint, are represented by axes, adzes and chisels. They display all the known morphological characteristics of Pre-Ghassulian and Ghassulian bifacials, and most of them bear traces of polishing. Of particular note is a broken chisel (Fig. 14:2) converted into a core, and a massive axe (Fig. 15:2) with signs of rejuvenation.

Obsidian Artifact (Fig. 16).— A fragment of an obsidian tool with irregular breaks and old patina on both surfaces was recovered from Layer II, although it can be attributed to Layer III based on its typology. One edge displays steep retouch, the other has regular retouch. Obsidian is known from other Pre-Ghassulian assemblages, as at Ḥorbat 'Uẓa (Lieberman-Wander 2009) and Tel Ẓaf (Garfinkel et al. 2007:23), and also from probable Pre-Ghassulian horizons at Gilat and Teleilat Ghassul (Yeillin, Levy and Rowan 1996).

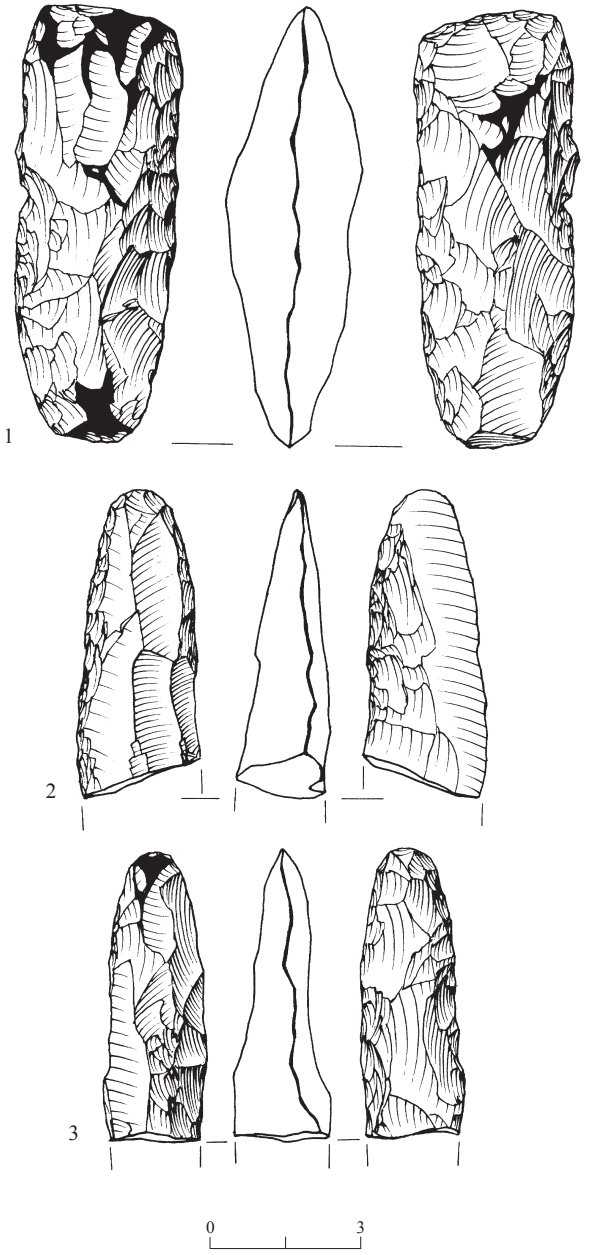
It is generally accepted, based on analyses undertaken by Perlman and Yellin in the 1970s and 1980s (Perlman and Yellin 1980; Yellin 1995; Yellin, Levy and Rowan 1996), that obsidian was brought to the southern Levant from Anatolia. Further research by Delerue (2007:389, Figs. 353, 354) and Schechter et al. (2013), who analyzed obsidian items from PPN and Late PN–Early Chalcolithic (mainly Wadi Rabah culture) sites of the southern Levant, concluded that they originated from obsidian sources in central and eastern Anatolia.

Groundstone Artifacts (Fig. 17)

Twelve groundstone artifacts were found at Abu Ghosh, Jasmine Street, most of them in Phase IIIb (Table 5). Three were recovered from topsoil or unstratified contexts (Nos. 2, 10, 11)—at least two of which can be typologically attributed to the Pre-Ghassulian occupation of the site—and one was recovered from Layer II (No. 1). None originated in a clear Phase IIIa context. For this reason, we view the groundstone artifacts as a relatively homogeneous assemblage. Observations will be made on the items from other contexts when relevant.

Raw Material and Technology

Most of the items are made of local limestone or flint. The nearest sources for limestone and flint are the Soreq Formation in the vicinity of Abu Ghosh, while other locations containing flint nodules are several kilometers northeast of the site (see above; Barzilay 2003). One item made of chalk could also have originated in the Soreq Formation. Only two items are made of basalt. The nearest known sources of basalt



No.	Type	Locus	Basket
1	Axe	117	1020
2	Chisel	189	1053
3	Chisel	123	1026

Fig. 14. Flint bifacials.

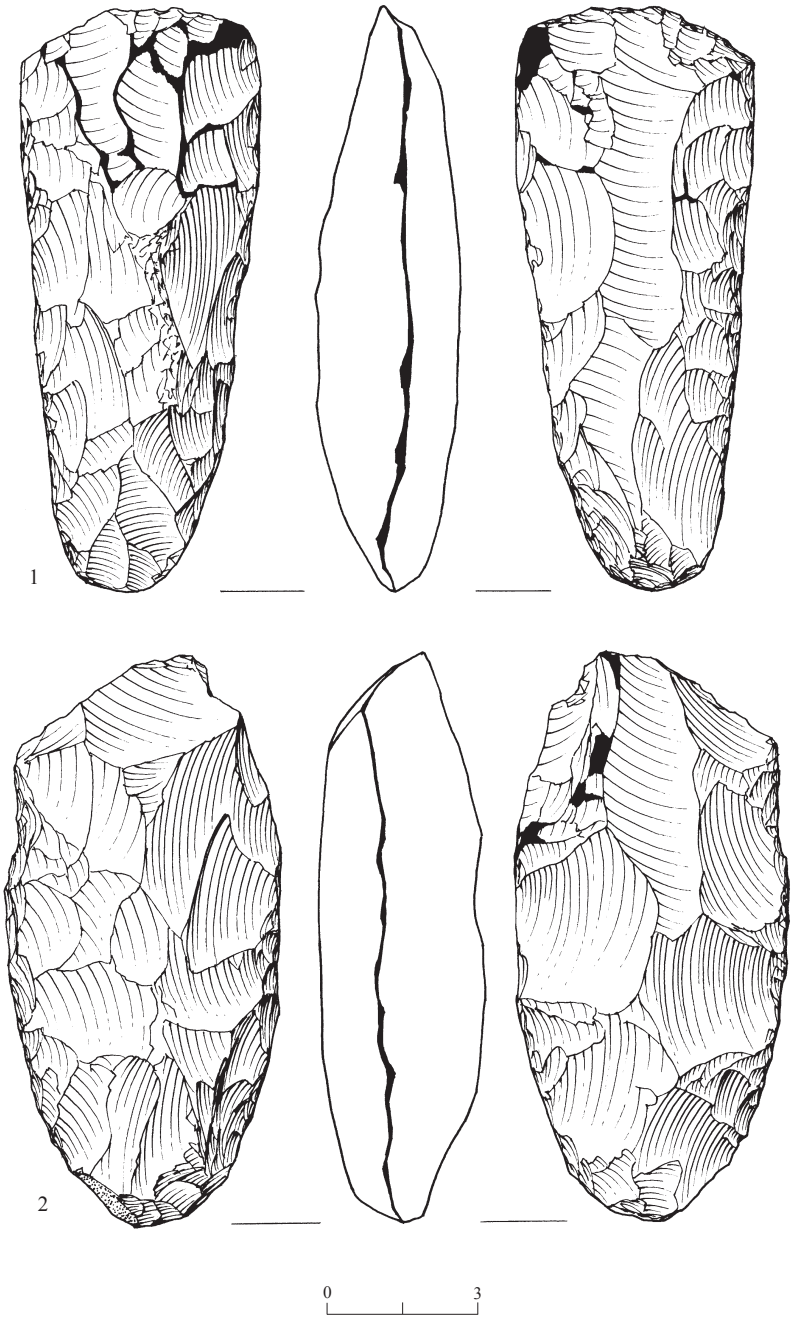


Fig. 15. Flint axes.

No.	Type	Locus	Basket
1	Axe	117	1225
2	Axe	149	1056

are located in the Galilee and in Transjordan, to the north of the Yarmuk River (Philip and Williams-Thorpe 2001).

Similar frequencies of raw materials used for producing groundstone artifacts are seen in the neighboring Neolithic site in Abu Ghosh (see Fig. 2; Lechevallier 1978:75; Khalaily and Marder 2003a:59). This seems to point to continuity in the exploitation of local sources, with a small number of items made of non-local materials that may have been acquired through exchange.

Most of the groundstone artifacts were produced by grinding and polishing (Wright

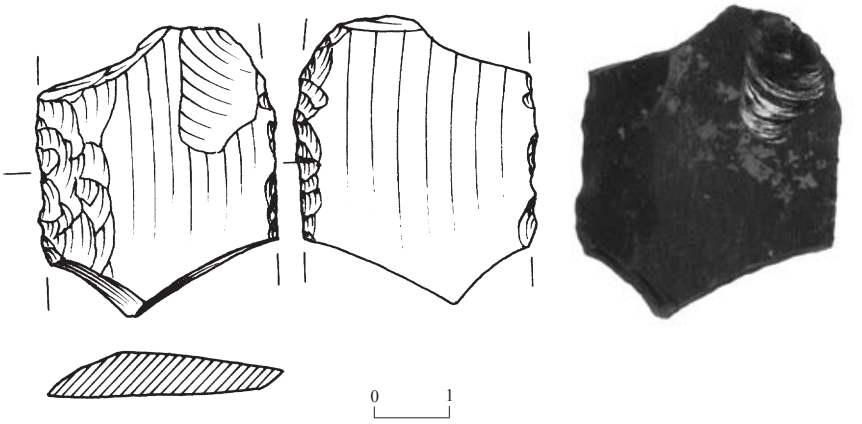


Fig. 16. Obsidian artifact (L130, B1034).

Table 5. Groundstone Artifacts

No.	Type	Subtype	Material	Basket	Locus	Layer	Context	Fig. No.
1	Grinding slab/ quern	-	Limestone	1026	123	II	Fill	17:1
2	Upper grinding stone	Oblong	Basalt	-	Trench 1	Unstratified	Trench	17:2
3	Pounder	Oblong	Flint cobble	1009	111	IIIa/IIIb	Fill	17:3
4	Hammerstone	Irregular	Flint	1036	115	IIIb	Fill	-
5	Hammerstone	Irregular	Flint	1025	117	IIIb	Fill	17:4
6	Rubbing stone	Rectangular	Chalk	1020	117	IIIb	Fill	-
7	Rubbing stone	Irregular	Limestone	1029	125	IIIb	Fill	-
8	Smoothed pebble		Limestone	1061	124	IIIb	Fill	-
9	Macehead?		Limestone	1022	117	IIIb	Fill	17:5
10	Bowl	Pedestalled	Basalt	1018	102	I	Top soil	17:6
11	Bowl	Hemispherical	Limestone	1019	105	I, II?	Fill	17:7
12	Bowl	Hemispherical?	Limestone	1030	121	IIIa/IIIb	Wall	-

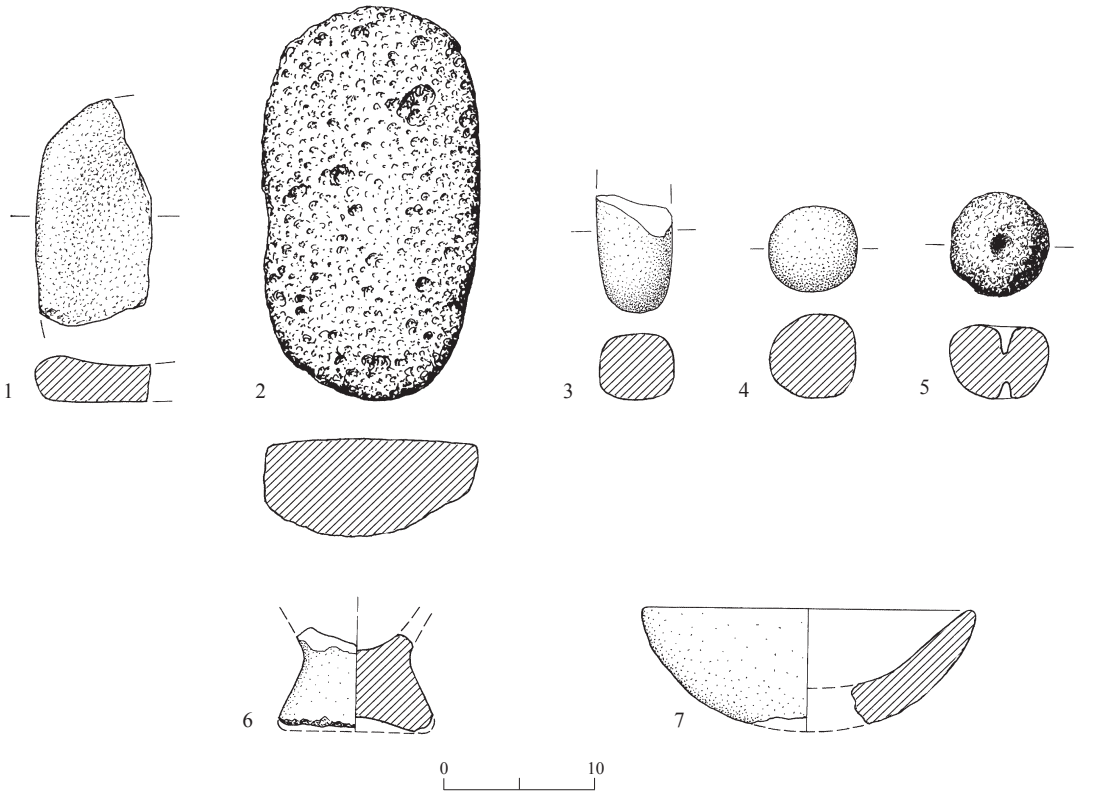


Fig. 17. Stone tools and vessels.

No.	Type	Locus	Basket	Material
1	Grinding slab/quern	123	1026	Limestone
2	Upper grinding stone	Trench 1	-	Basalt
3	Pounder	111	1009	Flint
4	Hammerstone	117	1025	Flint
5	Macehead?	117	1022	Limestone
6	Pedestalled bowl	102	1018	Limestone
7	Hemispherical bowl	105	1019	Limestone

1992:55), while the grinding tools were finished by pecking the working surfaces. The hollowed inner surfaces of bowls were probably manufactured by drilling into the blanks.

Typology

Grinding Slab.— A fragment of a limestone grinding slab or saddle quern with an oval-shaped working surface and a relatively flat base (Fig. 17:1; cf. Wright 1992: Fig. 4:5).

Upper Grinding Stone.— A loaf-shaped upper grinding stone, made of vesicular basalt, is oblong in shape with a slightly convex working surface (Fig. 17:2; cf. Wright 1992: Fig. 6:43; Gopher and Orelle 1995:18, 35–40, 71, 72).

Pounder.— A broken, oblong flint cobble with very smooth sides and scars on the working surface (Fig. 17:3). It was probably utilized

also as a rubbing or polishing stone (cf. Wright 1992: Fig. 8:84).

Hammerstones.— Two fist-sized hammerstones of irregular shape made on flint, one complete (Fig. 17:4) the other broken (cf. Wright 1992:70; Gopher and Orelle 1995:59; Nahshoni et al. 2002: Fig. 8:2–5).

Rubbing Stones.— Two rubbing stones were found (not illustrated). One is made of chalk with a parallelepiped body, the other is of limestone with an irregular-shaped body that shows signs of burning.

Smoothed Pebble.— An oval limestone pebble, smoothed (not illustrated).

Macehead(?).— A limestone nodule with two superficial, opposed drillings (Fig. 17:5), perhaps an unfinished macehead.

Bowls.— One pedestalled basalt bowl and two hemispherical limestone bowls were found. The pedestalled bowl (Fig. 17:6) belongs to the solid-foot type, Rowan's Type 4B (1998) and Wright's Type K.125 (1992: Fig. 11:125). This type is well-known from Late PN/Early Chalcolithic horizons, as at Tel Dan (Gopher and Greenberg 1996:75, Fig. 2:4.1) and Tel Dover (I.M., personal observation), among others. Similar pedestalled bowls were found at Kefar Gallim (Galili and Weinstein-Evron 1985: Pl. II:2) and Tel Te'o (Gopher and Eisenberg 2001: Figs. 9.1:10; 9.3:6) in Late PN/Early Chalcolithic contexts, and at Gilat, in Ghassulian contexts (e.g., Rowan et al. 2006: Fig. 12.32:13).

One rim and body fragment of a limestone hemispherical bowl (Fig. 17:7) was found in an unclear context. The other rim fragment of a limestone hemispherical bowl was recovered from Layer III (not illustrated). Hemispherical bowls are characteristic of both Pre-Ghassulian (e.g., Gopher and Orelle 1995: Fig. 16:18; Gopher and Eisenberg 2001: Fig. 9.1:7; I.M., personal observation) and Ghassulian (e.g., Gilead 1995: Fig. 7.3:5–8; Rowan et al. 2006: Fig. 12.32: 3; Milevski 2007) repertoires.

Discussion of the Groundstone Assemblage

In spite of the small quantity of groundstone artifacts retrieved from the site, we can conclude that the Phase IIIb assemblage is in accordance with the little that is known from the repertoires of the Late PN–Ghassulian transition (for repertoires of the Wadi Rabah stages, see Gopher and Orelle 1995; Garfinkel and Matskevich 2002; for the Pre-Ghassulian period, see Nahshoni et al. 2002:14*–16*). According to a preliminary report, the stone assemblage of Tel Ẓaf could be an exception (Garfinkel et al. 2007:21), as it includes basalt bowls similar to those of Ghassulian Chalcolithic assemblages.

Mortars and pestles are absent from the Abu Ghosh, Jasmine Street assemblage, perhaps due to the limited excavated area. The vessels (bowls) are consistent with Late PN/ Early Chalcolithic and Pre-Ghassulian types, while no Ghassulian vessels (e.g., V-shaped or fenestrated bowls) were recovered from the site. Also worth mentioning is the absence of decorative motifs on bowl rims and walls, which further suggests that the bowls are of Pre-Ghassulian rather than Ghassulian tradition.

The Faunal Remains (Mammals)

Materials and Methods

A small sample of animal bones was found during the excavation (n = 307). The bulk of the faunal remains derives from the pre-Ghassulian Phase III (Table 7), while isolated animal bones were recovered from the upper strata, Layers I and II, and the two test trenches (Table 6). Bone identification was based on morphological comparison with modern comparative specimens held in the National Natural History Zoological Collections of The Hebrew University of Jerusalem, where this assemblage is curated. Sheep and goats were distinguished from each other using the morphological criteria described in Boessneck

(1969) and Halstead, Collins and Isaakidou (2002). Where this was not possible, the two species were grouped and are referred to as sheep/goat.

When skeletal elements were identified, but not the species, remains were grouped into three body-size classes: small mammals (fox, hare), medium mammals (goat, sheep, pig) and large mammals (cattle, equid). For each species, the total number of identified bones (NISP counts) was summed and converted into frequencies. The minimum number of individuals (MNI) was estimated for layers with large sample sizes, and was based on the highest number of any element, taking side and age into account. Bones were measured following von den Driesch (1976).

Aging of domestic species was based on epiphyseal bone fusion and dental eruption rates found in Silver (1969), and on dental attrition (sheep/goat = Payne 1973; cattle and pig = Grant 1982). Skeletal-element representation was assessed by grouping all bones into seven categories: cranial (skull, jaws, isolated teeth), upper forelimb (scapula, humerus, ulna, radius), upper hindlimb (pelvis, femur, tibia, fibula, patella, calcaneum, astragalus), lower fore- and hindlimbs (metapodials, carpals, tarsals), trunk (vertebrae, sternum, ribs) and feet (phalanges).

Taphonomic parameters were scored for each bone, including location, number and type of all butchery damage (cut, chop, saw marks, etc.), animal-derived damage (carnivore pits, striations, puncture holes, gnaw marks, etc.) and burning (including the color).

Findings

Trench 1 (Mixed Periods).— Only six remains were recovered from this locality (Table 6). Despite the small size of the sample, all three common herd animals are represented—goat, cattle and pig, in addition to remains of large and medium-sized mammals. The pig bones represent an immature animal younger than 3–3.5 years (unfused proximal ulna), while the goat is represented by the jaw of an adult animal at least 3.5 years of age or older. A carious lesion was observed in the lower first molar of this jaw, a dental pathology often associated with a diet high in carbohydrates, but which may also be caused by genetic and developmental defects (Baker and Brothwell 1980:145–147).

Table 6. Species Representation in the Upper Archaeological Strata (NISP Counts)

Layer	Trench 1	Trench 2	Layer I	Layer II	Layers II/III
Period	Mixed Periods	Mixed Periods	Topsoil	EB IB	EB IB/ Pre-Ghassulian
Species	NISP	NISP	NISP	NISP	NISP
Goat (*Capra hircus*)	1	-	-	-	1
Sheep/Goat (*Ovis/Capra*)	-	1	-	2	7
Cattle (*Bos taurus*)	1	-	1	1	3
Pig (*Sus scrofa*)	1	-	-	2	2
Medium Mammal	1	-	-	1	4
Large Mammal	1	-	-	2	1
Spur Thighed Tortoise (*Testudo graeca*)	-	-	-	-	1[i]
Total Identified	*5*	*1*	*1*	*8*	*19*
Total Fragments	*1*	-	-	*6*	*20*
Total Bones	*6*	*1*	*1*	*14*	*39*

[i] Recent

One of the large mammal bones is bleached, indicating exposure on the surface. In addition, a bone point (see below, *Worked Bones*) was uncovered, suggesting that some, if not all of the fauna from the trench, may derive from archaeological horizons.

Trench 2 (Mixed Periods).— A single sheep/goat proximal femur shaft fragment was found (Table 6).

Layer I.— A single cattle right calcaneum, probably from an adult animal, was found (Table 6).

Layer II.— A total of 14 bones was recovered from two loci of the EB IB deposits: 6 unidentified fragments in L123, and 8 identified bones in L130 (Table 6). The species identified are sheep/goat (1 metapodial shaft, 1 thoracic vertebrae spine), cattle (1 astragalus), and pig (1 heavily worn deciduous lower premolar 3 or 4, 1 fused distal tibia). The pig remains belong to an animal aged at least 2 years. Additional bones identified to size class are a medium-mammal ramus fragment and a large-mammal tibia shaft and pelvis acetabulum fragment.

Layer II/III (L119, L122, L145).— Of the 39 bones recovered from these mixed loci, 20 were unidentified fragments and 19 were identified bones (48.7%; Table 6). The spectrum of species represented in this assemblage mirrors that in both the EB IB Layer II and the Pre-Ghassulain Layer III, with a predominance of domestic caprines followed by domestic cattle and pigs. Sheep/goat represent the majority of the bones (n = 8), including one goat (1st phalanx). The presence of a deciduous upper premolar indicates an animal aged less than 17–20 months. The cattle remains comprise cranial elements and include a slightly worn, upper first molar indicating the presence of a calf. The two pig remains are tooth fragments that could not be aged.

A bone tool with a rounded end was manufactured on a mammalian long-bone shaft fragment (L122). The sole find from L119 was a recent tortoise carapace fragment with chitin adhering, representing a modern intrusion.

Layer III: Phase IIIa? (L112, L143).— A collection of 25 bones from Layer III was tentatively attributed to Phase IIIa. Of these, nine were identified to species and comprised remains of sheep/goat, cattle, unidentified medium-sized mammals and especially pig (Table 7). The pig remains include an immature animal aged about 5 months on the basis of dental eruption and attrition. Modified bones

Table 7. Species Representation in Pre-Ghassulian Layer III (NISP Counts)

Species \ Phases	Phase IIIa?	Phase IIIa	Phases IIIa/IIIb	Phase IIIb	Total	
	NISP	NISP	NISP	NISP	NISP	%
Sheep (*Ovis aries*)	-	-	1	-	1	1.0
Goat (*Capra hircus*)		1	4	5	10	7.2
Sheep/Goat (*Ovis/Capra*)	2	2	2	23	29	21.0
Cattle (*Bos taurus*)	1	1	-	8	10	7.2
Pig (*Sus scrofa*)	4	6	4	26	40	28.9
Cervid (*Cervus/Dama* sp.)	-	-	-	2	2	1.4
Medium Mammal	2	4	1	29	36	26.0
Large Mammal	-	1	-	9	10	7.2
Total Identified	*9*	*15*	*12*	*102*	*138*	*100.0*
Total Fragments	*16*	*12*	*17*	*63*	*108*	
Total Bones	*25*	*27*	*29*	*165*	*246*	

comprise a burnt (black) unidentified splinter, a carnivore digested sheep/goat 2nd phalanx (L112), and a medium-mammal ramus jaw fragment cut off at a right angle from the corpus (Fig. 19).

Layer III: Phase IIIa (L113, L126, L139, L140).— A total of 27 bones were associated with this phase, many of them unidentified splinters (n = 12). The 15 identified bones represent domestic goat, sheep/goat, cattle, pig and unidentified medium and large mammals (Table 7). The pig remains include those of a young animal aged less than 2–2.25 years on the basis of bone fusion (unfused distal metapodial), while the isolated goat bone derives from an animal older than 1.5–2 years (fused distal tibia). A spatula manufactured on a bone shaft was also found (L113; see below, *Worked Bones*, Fig. 18:4), and a bone point, possibly an awl (L126, see below, *Worked Bones*, Fig. 18:1).

Layer III: Phase IIIa/IIIb (L111, L129, L137).— Of the 29 bones recovered from Layer III deposits attributed to Phase IIIa/IIIb, only 12 were identified. They comprise remains of both sheep and goat, as well as pig and medium-sized mammals (Table 7). The goat remains include at least one young animal aged 2 years or less (fusing distal metacarpal). The single sheep bone derives from an animal at least 10 months old (fused distal humerus) (Table 11), while the pig remains include an animal aged less than 2 years (unfused proximal 1st phalanx). Two burnt (black) bones were noted: a pig 1st phalanx and an unidentified fragment. Modified remains comprise two bone points, one manufactured on the halved shaft of a distal sheep/goat metapodial. The medullary cavity and sides of the shaft were smoothed, and the pointed end is missing.

Layer III: Phase IIIb (L115, L117, L124, L125, L133, L136, L138, L142, L144, L146, L151, L153).— The bone assemblage attributed to this phase (n = 165) comprises the bulk of the faunal remains from the site. Only 38% (n = 63) of the remains are unidentified fragments, and the majority of the sample (n = 102) could be identified to skeletal element and/or species. Of these, five taxa were identified: goat, sheep/goat, cattle, pig and cervid (Table 7). The two cervid antler fragments may be the only wild taxon represented, although a calcaneum of an immature (unfused proximal) pig has a length beyond that of Chalcolithic pigs and may represent a wild boar (see below). The majority of the remains, however, belong to domestic herd animals, especially caprines (27.4%), while cattle comprise only 7.8% of this sample. Pigs comprise an almost equal proportion of the assemblage as sheep and goat (25.4%), assuming that all represent domestic animals. If the large-mammal bones are added to those of cattle, then their frequency rises to 16.6%; while if the medium-mammal remains are proportionally distributed between the caprine and pig remains, the same pattern is maintained, with the caprine frequency augmented to 42% and pig to 39%. The MNI estimate for this sample is two goats, three sheep/goat (of which some of the remains may belong to the goats), two cattle and three pigs.

Age data for domestic animals, based on bone fusion as well as dental wear stages, are presented in Table 8. The goat sample included at least one animal aged less than 13–16 months (unfused 1st phalanx) and another aged 2.5–3 years or older (fused proximal calcaneum). The age breakdown for the sheep/goat remains indicates the presence of an immature animal aged less than 10 months (unfused proximal radius), and a second older, but still young animal, aged over 1.5–2 years (fused distal tibia) but less than 2.5–3 years (unfused ulna proximal and radius distal ends). Cattle include a young adult and an older animal (tooth wear). The pig remains are all from immature animals including one neonate (unfused proximal metatarsal), another large, but still young animal, aged less than 1 year, and possibly a third animal aged at least 2 years (fused 1st proximal phalanx).

Table 8. Age Data for Pre-Ghassulian Layer III

Skeletal Element / Species	Bones Fused NISP	Bones Unfused NISP	Dental Ages
Pig			
Lower jaw with crypt for M3 germ			Pre-17–22 months
Upper jaw with dp3, dp4—no wear			c. 5 months
Humerus distal		1	
Radius distal		2	
Ulna proximal		1	
Metatarsal proximal	1		
Metatarsal distal		1	
Metapodial distal		1	
Calcaneum proximal	1		
Cervical vertebra		1	
1st ph proximal	1	1	
Sheep/Goat			
Lower M1			Payne Stages 7–8
Cervical vertebra		1	
Lumbar vertebrae		1	
Proximal radius		1	
Distal radius		1	
Ulna proximal	1		
Metapodial distal		1	
Goat			
Lower M3			Payne Stage 10; c. 4–6 years
Metacarpal distal		2	
Calcaneum proximal	2		
Tibia distal	3		
1st ph proximal	1		
Sheep			
Humerus distal	1		
Cattle			
Upper M1			Young adult
Lower Jaw Molars			Grant Stages M_1=N; M_2=L; M_3=K/L
Lower M1/2			Almost no wear
Upper PM3/4			Quite worn
Lumbar vertebrae		1	
2nd phalanx proximal	1		

The skeletal-element representation for domestic herd animals, as well as cervids and large and medium-sized mammals, is presented in Tables 9 and 10. The sample sizes for each taxon are small, so patterns are difficult to assess, also given the potential impact

Table 9. Pre-Ghassulian Layer III Skeletal-Element Representation (NISP Counts)

Skeletal Element	Goat	Sheep	Sheep/Goat	Cattle	Pig	Cervid	Medium Mammal	Large Mammal
	NISP	NISP	NISP	NISP	NISP	NISP	NISP	NISP
Cranial bones			1			2		
Mandible			4	1	2		2	
Mandibular teeth	1		2	2	2			
Maxilla					2			
Maxillar teeth				2	1			
Vertebra fragment							2	
Cervical vertebrae			2		3			
Thoracic vertebra			1					
Lumbar vertebrae			1					1
Rib shaft					3		10	3
Rib proximal			2		1			
Scapula blade			1		2			
Humerus shaft				1	1		8	
Humerus distal		1			1			
Radius shaft					1		2	1
Radius proximal			1					
Radius distal			1		2			
Ulna shaft					1			
Ulna proximal			1		1			
Metacarpal shaft	1							
Metacarpal distal	2							
Carpal				1				
Pelvis acetabulum/ pubis			2		2			1
Pelvis ilium							1	2
Femur shaft			1		1		2	
Tibia shaft					3		8	
Tibia distal	2		2					
Fibula								
Metatarsal proximal			2		1			
Metatarsal shaft			1					
Metatarsal distal					1			
Calcaneum	2		1		1			
1st phalanx	2		1	1	3			
2nd phalanx			1	2				
Metapodial shaft			1		5		1	2
Total	*10*	*1*	*29*	*10*	*40*	*2*	*36*	*10*

Table 10. Body-Part Representation for Pre-Ghassulian Layer III

Body Part[i]	Sheep/Goat		Cattle		Pig	
	NISP	%	NISP	%	NISP	%
Cranial	8	20.0	5	50.0	7	17.5
Upper forelimb	5	12.5	1	10.0	9	22.5
Lower forelimb	3	7.5	1	10.0	-	-
Upper hindlimb	10	25.0	-	-	-	-
Lower hindlimb	3	7.5	-	-	2	5.0
Trunk	6	15.0	-	-	7	17.5
Feet	4	10.0	-	-	3	7.5
Misc. metapodials	1	2.5	3	30.0	5	12.5
Total NISP	*40*	*100.0*	*10*	*100.0*	*40*	*100.0*

[i] Cranial: skull, antler, horn, maxilla, mandible and loose teeth;
Upper forelimb: scapula, humerus, radius, ulna;
Lower forelimb: proximal metacarpal, carpals;
Upper hindlimb: pelvis, femur, tibia, patella, calcaneum, astragalus;
Lower hindlimb: proximal metatarsal, tarsals;
Trunk: atlas, axis vertebrae, cervical and thoracic, lumbar and caudal vertebrae;
Feet: 1st, 2nd and 3rd phalanges.

of bone-density-mediated attrition on the assemblage. However, for pigs and caprines, both represented by 40 bones (Table 10), some marked differences are evident with markedly more upper forelimb elements represented for swine than for caprines (22.5% versus 12.5%), while upper hindlimb elements are absent in the pig. This is surprising since the latter is an especially meaty part of the pig carcass—the ham.

Modified bones comprise eight burnt bones (seven unidentified fragments and a large-mammal pelvis fragment) and three with butchery damage (one cattle humerus shaft and one goat calcaneum with cut marks on the distal ends and one sheep/goat proximal rib with chop marks on the distal end of the shaft). In addition, a bone awl was found in L144 (see below).

Worked Bones

Altogether, seven bone tools were recovered from the deposits associated with Phases IIIb and IIIa, six are points or awls and one is a spatula. The points in Fig. 18:1, 2 were manufactured on mammalian long-bone shafts, the first on a halved bone. The awl in Fig. 18:3 was made on a sheep/goat right distal tibia. The distal epiphysis (fused) was unmodified and complete, while the proximal end had been halved and severed to form a point. The spatula in Fig. 18:4 was manufactured on a halved long-bone shaft.

Considering the small volume of excavated deposits, this is a relatively rich corpus. Furthermore, the fact that six of the seven items are bone points or awls and only one is a spatula, may be indicative of the types of activities engaged in at the site. In the ethnographic literature of such disparate regions as Australia and North America, bone points have often been associated with hunting and/or skin working (Francis 2002; Burch 2006:206).

Discussion of the Faunal Remains

This discussion focuses on the Pre-Ghassulian faunal assemblage (n = 246) deriving from Layer III (all phases), as this sample is the largest and derives from well-dated contexts.

As no marked differences were discerned between building phases in species representation, skeletal-element breakdown, age profiles or modified bones that could not be attributed to differences in sample size, the samples from the

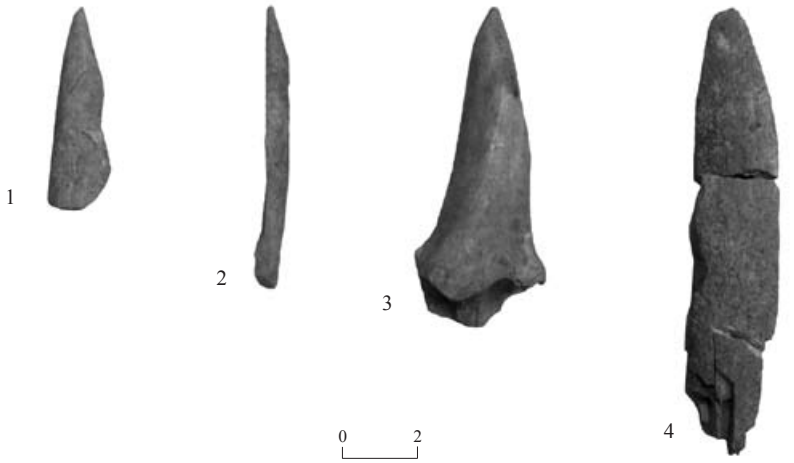


Fig. 18. Bone tools.

No.	Type	Locus	Basket
1	Awl?	126	1036
2	Point	Trench 1	-
3	Awl	144	1071
4	Spatula	113	1011

different phases were pooled. Even so, the small size of the Layer III assemblage severely curtails the extent of analysis that could be undertaken on this material.

Species Representation.— In terms of species representation, the standard range of Near Eastern domestic herd animals form the basis of the animal economy and diet at the site—domestic sheep (*Ovis aries*), goat (*Capra hircus*), cattle (*Bos taurus*) and pigs (*Sus scrofa* dom.). Sheep/goat remains formed the largest category (29.2%; Table 7). Remains of both caprine species were present in the Pre-Ghassulian assemblage, goat remains being more common with a ratio of 10:1 (Table 7). If bones of the medium-sized mammals are incorporated proportionally into the caprine and pig samples, then the caprine frequency for the Pre-Ghassulian assemblage, 43.4%, resembles that of the earlier assemblage from the neighboring PN site in Abu Ghosh (38.8%; Horwitz 2003). However, at Abu Ghosh, the PN site represents an ephemeral occupation that was mixed with underlying PPNB material, and therefore an unknown proportion of the caprines from this site may represent wild caprines or those in the early stages of domestication deriving from the PPNB deposits. While almost equal numbers of sheep and goats were found in the PN horizon at this site, only 4.5% of the material could be reliably attributed to domestic caprines.

There are indications, based on metrics, that a portion of the Pre-Ghassulian pig remains may belong to wild boar (Table 11). This is not surprising given the close proximity of suitable habitats for this species: abundant sources of freshwater, including a tributary of Naḥal Kesalon, high ground-water and several springs (Barzilay 2003), as well as the lush, dense vegetation that would have grown near the river banks and springs. Indeed, wild boar comprise 8.5–9.5% of the fauna from the PPNB layers and boar/pig, 10.5% of the PN layers at Abu Ghosh (Horwitz 2003; Ducos and

Table 11. Bone Measurements (in mm, after von den Driesch 1976)

Species	Layers	Element[i]	Side	Measurements		
				GLpe	Bd	Bp
Goat	II/III	1st phalanx		36.6	11.7	12.1
Goat	IIIb	1st phalanx (UF)		(32.4)	11.3	
Goat	IIIb	1st phalanx		42.8	13.0	14.1
				Bd	Dd	
Goat	IIIa?	Distal tibia	R	27.4	21.1	
Goat	IIIb?	Distal tibia	L	26.9	21.4	
				GL	Bp	Dd
Goat	IIIb?	Metacarpal (UF)		(77.3)	21.6	14.5
Goat	IIIb?	Metacarpal (UF)		76.8	21.0	14.1
				GL		
Goat	IIIb	Calcaneum		55.1		
Goat	IIIb	Calcaneum (UF)		51.1		
				GLl	Bd	Dl
Cattle	II	Astragalus	R	62.9	41.9	34.8
				GLpe	Bd	Bp
Cattle	IIIb	2nd phalanx		37.8	22.8	27.9
Cattle	IIIb	2nd phalanx		41.7	27.8	-
Cattle Gilat[ii]		2nd phalanx		N = 8 X = 39.3 Min = 30.4 Max = 50.1 SD = 5.5		N = 13 X = 29.4 Min = 24.9 Max = 37.1 SD = 3.4
				Bd	Dd	
Pig	II	Distal tibia	R	25.1	21.2	
Pig Gilat[iii] (N = 6)		Distal tibia		X = 28.5 Min = 26.8 Max = 30.1 SD = 1.18		
				GL		
Pig	IIIb?	1st phalanx - central (UF)		(26.0)		
				Bd		
Pig	IIIb?	1st phalanx (burnt)		15.9		
				Bp	Dd	
Pig	IIIb	Metatarsal IV proximal		20.8	13.0	
				GL		
Pig	IIIb	Calcaneum (UF)		71.4		
Pig Gilat[2] (N = 2)		Calcaneum F		X = 65.7 Min = 65.0 Max = 66.4		

[i] UF = unfused; F = fused
[ii] Grigson 2006: Appendix 6.3
[iii] Grigson 2006: Appendix 6.4

Horwitz 2003). Unfortunately, the small size of the Layer III Pre-Ghassulian bone sample, the absence of complete, measurable bones and teeth of pigs, as well as the fact that many of the pig remains derive from immature animals (unfused epiphyses), have limited our ability to resolve this issue.

Cattle remains in the Pre-Ghassulian assemblage are few (7.2%). This frequency resembles that reported for the PN layer at Abu Ghosh (8.8%), but is slightly less than that found in the earlier PPNB layers at the site (15.5–17.5%). The Pre-Ghassulian cattle from Abu Ghosh are similar in size to those from the Pre-Ghassulian and Ghassulian layers of Gilat (Grigson 2006), supporting their identification as domestic animals.

Noteworthy in the Pre-Ghassulian assemblage is the absence of wild taxa, such as gazelle, small carnivores, hares, birds, reptiles and rodents, although two fragments of antlers of an unidentified species of cervid were recovered from Phase IIIb. It is likely that deer were hunted in the forested hills above the site or along the water courses, but it is also possible that since these are only antler fragments, they were traded from sites in the Mediterranean zone, where deer were probably more abundant.

The paucity of wild fauna is partly related to issues of sample size and recovery (lack of fine sieving for all sediments) rather than diagenesis, as these taxa are found in abundance in the earlier levels of the neighboring PPNB site in Abu Ghosh. Another critical factor may be chronology, as by the PN period most sites in Israel, including Abu Ghosh, were greatly impoverished in terms of species diversity (e.g., Horwitz 1987; Horwitz and Tchernov 1998; Haber 2001; Garfinkel et al. 2002; Milevski et al., forthcoming). Compared to Pre-Pottery Neolithic and earlier sites, their wild faunal component had become negligible, while the triad of traditional Near Eastern domestic herd animals was predominant (see, e.g., summaries in Grigson 1995b; Horwitz and Tchernov 1998).

Management Strategies.— In order to assess management strategies for caprines, data on ageing was examined. Unfortunately, these are insufficient, as few complete long bones and no complete jaws were recovered. The limited data on bone fusion for goat and sheep/goat (Table 8) indicates a broad spread of ages, with the youngest less than 10 months and the oldest 2.5–3 years or older. The latter is also supported by dental remains—an isolated lower third molar showing Payne's Wear Stage 10, indicating an animal 4–6 years of age. Though bone density-mediated attrition may have biased the numbers of younger animals, the available age data for caprines suggests a mixed cull strategy, with some young animals slaughtered for meat and others kept into adulthood for secondary products and/or reproduction.

For cattle, the age data are even more limited, and nothing can be concluded beyond a suggestion in the dental evidence for the presence of a young adult and another older animal. Information on pig mortality is slightly more robust, given the larger sample size. However, the sample lacks refinement due to the absence of complete jaws. Based on long-bone fusion rates, the majority of the remains belong to immature pigs, some less than 10 months, while the oldest is at least 2 years old (Table 8). A preponderance of young animals (especially males) selected for slaughter for their meat has commonly been considered a signature of domestication (Meadow 1989). However, it is just as likely that wild-boar piglets were selectively hunted, given that they are less aggressive and hence less dangerous than adults. In addition, until the age of c. 20 months, piglets live together with adult females in herds called 'sounders' (von Gundlach 1968), so that several animals can be hunted/trapped at the same time. Given that no secondary products can be obtained from live pigs, the slaughter of the majority of the herd at a relatively young age makes economic sense, with a few females and males kept into adulthood for reproduction.

Even if only half the pig remains at the site are those of domestic animals, their presence suggests that this was a sedentary or semi-sedentary settlement. Following Redding (1993), the low frequency of cattle, absence of remains of other beasts of burden (equids), coupled with the relatively high frequencies of pig remains, may indicate that the site was not involved in large-scale agriculture. However, this conclusion needs to be treated with some caution given the very small sample size.

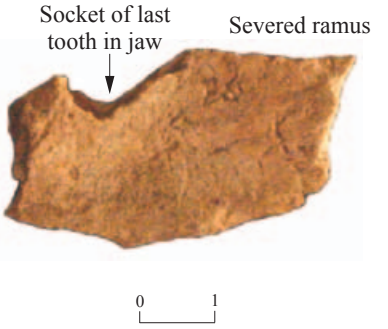


Fig. 19. Jaw fragment (ramus) of medium-sized mammal, severed at an angle from the mandible corpus (L43).

Carcass Butchery and Consumption.— Due to the small size of the bone assemblage, only tentative conclusions can be reached with respect to patterning of skeletal elements, and only for caprines and pigs as their sample sizes were the largest. For both species, a wide range of skeletal elements are represented, including all body parts (Tables 9, 10). This pattern suggests that the inhabitants had access to complete animal carcasses. However, as illustrated in Table 9, many skeletal elements are missing, due either to bone-density-mediated attrition and/or spatial variation in finds across the site. Given the small area excavated, it is not possible to distinguish between these factors.

Though there are indications for differences in body-part breakdown between pigs and caprines, in order to statistically analyze the breakdown, all caprine remains were pooled and the upper- and lower-limb categories were collapsed to increase sample sizes (the raw data are presented in Table 10). However, the results of the *chi* square test demonstrate that there are no significant differences between caprines and pigs in body-part representation, such that both species were butchered and/or consumed in a similar fashion.

Only four butchery marks were identified on bones from the Pre-Ghassulian phases: a medium-mammal jaw fragment (ramus) severed at an angle from the mandible corpus (Fig. 19), a cattle humerus shaft (Fig. 20) with cut marks across the distal end, and a goat calcaneum with cut marks across the distal end, and a sheep/goat proximal rib with chop marks on the distal end of the shaft (Fig. 21). These marks are probably associated with primary carcass dismemberment (Binford 1980: Table 4.04). Together with the skeletal-element breakdowns, the butchery data, albeit limited, suggest on-site butchery of complete or almost-complete carcasses.

In the Pre-Ghassulian assemblage, burning was observed on only 11 bones: nine unidentified fragments, a large-mammal pelvis fragment and a pig 1st phalanx. All were black in color. In addition, a carnivore digested sheep/goat 2nd phalanx (L112) was found, probably due to consumption by dogs, although their remains were not found at the site (Horwitz 1990).

Inter-Site Comparisons.— The faunal assemblage from Abu Ghosh, Jasmine Street, although small, offers interesting insights into the mode of subsistence and diet of Pre-Ghassulian populations in the Jerusalem region. It confirms the overall pattern reported for Chalcolithic Ghassulian sites in the region: Saṭaf (Grigson 1991), Naḥal Refa'im (Permit No. A-4985; unpublished report) and Holyland (Permit Nos. A-5776, A-5870; unpublished report), although at the latter two sites there was a trend for the majority of caprines to be culled young, which does not appear to have been the case at Abu Ghosh.

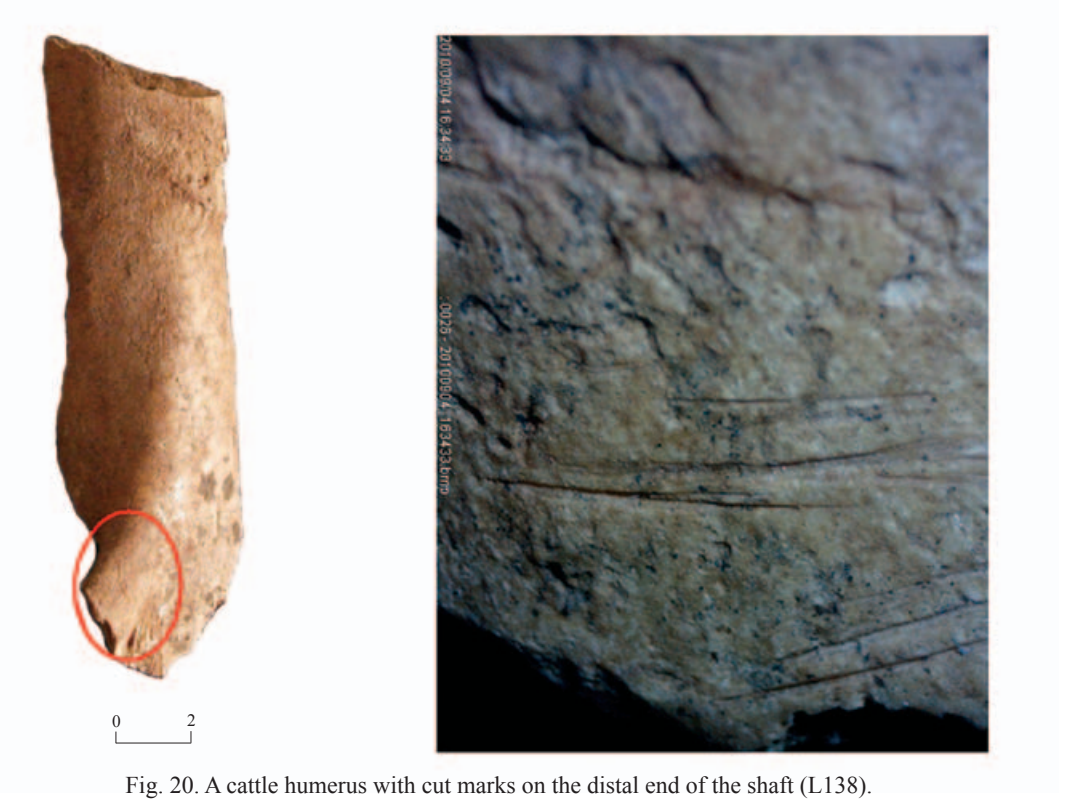


Fig. 20. A cattle humerus with cut marks on the distal end of the shaft (L138).

Fig. 21. Sheep/goat proximal rib with chop marks on the distal end of the shaft (L136).

Unfortunately, published faunal reports for two other Pre-Ghassulian sites, both in the Jordan Valley, are either based on small samples, as at Abu Ḥamid, or are only preliminary, as at Teleilat Ghassul. At Abu Ḥamid, pig frequencies are high (25.9%), only slightly lower than those of sheep/goat (Desse 1988). Data for Teleilat Ghassul are mixed with Late PN–Early Chalcolithic material. Bourke (1997a; 1997b) and Mairs (2000) report high levels of caprines (>70%) and c. 7–8% pigs in this period, while cattle comprise >15% of the assemblage. The relative frequencies of the main species stay much the same into the Late Chalcolithic phases at this site, suggesting that local environmental conditions, such as pasture availability and water sources or rainfall, were the primary factors determining faunal composition. The same is true for other sites, as demonstrated below.

Comparisons between Wadi Rabah, Pre-Ghassulian and Ghassulian assemblages indicates that, in terms of species composition and relative frequencies, the Abu Ghosh assemblage most closely resembles sites from the well-watered Mediterranean phytogeographic zone. For example, at Meẓer, Munḥata (Ducos 1968), Tel Ẓaf (Hellwing 1988–1989) and Tell esh-Shuna (Croft 1994), the average pig frequencies are well over 25% and similar to those for caprines, as at Abu Ghosh. In contrast, in the Negev sites that are located below the 200 mm isohyet (Grigson 2007), and others such as ‘En Ḥilu on the desert fringe in Samaria (Bar et al. 2008) and Jawa in the Black Desert (Köhler 1981), pig remains drop to a few percentages or are absent, while caprines are represented in very high frequencies. It is worth mentioning that pigs are relatively frequent at certain Negev sites, such as Gerar and Gilat (Grigson 1995a; 2006; 2007), while at Tell el-Mafjer, located on the outskirts of Jericho, a high pig component (24.7%) is found despite the overall aridity of the region (Al-Zawahra 2008). The presence of numerous springs in the Jericho region undoubtedly enabled large numbers of pigs to be raised at the latter site, while Grigson (2006; 2007) attributes the Gerar and Gilat pigs to sufficient rainfall.

Molluscs

During the excavations, only four archaeo-malacological items were preserved for study. These highly fragmented shells belong to four species.

Gastropoda
Family Cypraeidae
Monetaria annulus (Linnaeus, 1758) (Fig. 22)
Phase IIIa, L140, B1054: one shell with a small, round hole halfway to the dorsum and the margin near the anterior part of the shell. The hole was made from inside out with a sharp object through the aperture. The labial teeth on the outer lip of the shell are worn away opposite the dorsal hole.

Family Helicidae
Levantina spiriplana hierosolyma (Mousson, 1854)
Phase IIIa, L140, B1054: one small part of the penultimate whorl.

Bivalvia
Family Glycymerididae
Glycymeris nummaria (Linnaeus, 1758)
Phase II, IIIa?, L122, B1023: one fragment of the ventral margin.

Fig. 22. Shell bead made from the cowry species *Monetaria annulus* (Phase IIIa; L140), most probably from the Red Sea.

Family Iridinidae
Chambardia rubens arcuta (Cailliaud, 1823)
Phase IIIb, L125, B1047: one very small part of the dorsal margin.

Discussion of the Shells
Four different stories are hiding behind these four shells, briefly discussed below in order of geographical origin.

Levantina spiriplana hierosolyma.— A local land snail that is still common among rocks in Abu Ghosh and its surroundings. In principal, it is an edible species; however, from a single fragment it is impossible to determine whether these and other terrestrial snails were consumed during the Chalcolithic period in this part of the Levant.

Glycymeris nummaria.— A marine bivalve from the Mediterranean Sea. Valves of this species are still extremely common on the Mediterranean beaches in the Levant, although living species are only occasionally fished off-shore (Mienis et al. 2006). Throughout the history of humankind in the Levant, valves of *Glycymeris nummaria* have been exploited as pendants by making a hole in the umbo of the valve, although the recovered fragment is too small to determine whether it was used as a pendant. Its presence at Abu Ghosh reveals contacts with the Mediterranean coast.

Monetaria annulus.— A marine gastropod from either the Red Sea, including the Gulfs of Aqaba and Suez, or from the more-distant Indian Ocean. In the gulfs and the northern part of the Red Sea proper, it is an extremely rare species, only becoming more common toward Eritrea (Heiman 2002). This cowry species has been intensively exploited by man for shell beads, and at a much later date, as currency, i.e., shell money. The shell recovered from Abu Ghosh, Jasmine Street falls without doubt into the first category. The dorsum shows an intentional hole near its anterior part, by which it could be easily stringed. Both the dorsum near the hole and the anterior part of the labial lip show extensive wear, a firm indication that this shell had been used as a bead for some considerable time. Its presence at Abu Ghosh reveals that the inhabitants of the site also maintained contacts with the Red Sea region.

Chambardia rubens arcuta.— A large freshwater mussel from the Nile in Egypt. The interior of fresh valves of this mussel species shows a fine iridescent layer. In Egypt, the flesh of this mussel species was consumed and the shells used for spoons, small dishes, combs, scrapers and personal ornaments such as mother-of-pearl pendants. The fragment from Abu Ghosh, Jasmine Steet is too small to determine its use; however, the presence of this fragment from a mussel living exclusively in the Nile River is an indication that the inhabitants of the site also had contacts with Egypt.

Discussion and Conclusions

The excavations at Abu Ghosh, Jasmine Street revealed two phases dated to the Pre-Ghassulian period. Despite the limited excavation area and the poor preservation of the Layer III remains, an attempt is made to summarize the architectural remains revealed. In both phases, the architecture consisted of rectilinear units with apparent passages and entrances between them, and the walls were built on stone foundations. The differences between Phases IIIb and IIIa indicate changes in the architectural arrangement of the site. While some of the architectural features ressemble those uncovered at sites attributed to Wadi Rabah and post-Wadi Rabah/Pre-Ghassulian variants (e.g., Banning et al. 1996: Figs. 2, 3; Lovell, Dollfus and Kafafi 2007: Fig. 2; Khalaily 2011: Plan 2; Lupu and Dayan, this volume), such an assumption must remain tentative, as few complete structures of these horizons have so far been unhearthed, and considerable variation is evident among the architectural remains of these horizons in the southern Levant (Banning 2010).

Most of the pottery from the two Pre-Ghassulian phases resembles the pottery of Tel Ẓaf (Gophna and Sadeh 1988–1989; Garfinkel et al. 2007) and, to some extent, of Naẓur (Yannai 2001) in the north. It shows affinites with the Qatifian-Besorian horizons at southern sites, such as Site Y-3, Naḥal Ha-Besor (Wadi Ghazzeh) D2 and P14, and Ramot (Gilead 1990; Goren 1990; Fabian, Hermon and Goren 2004; Gilead and Fabian 2010). The pottery parallels discerned at Gilat may be attributable to a Pre-Ghassulian element there (Goren 2006:371–372), which is also reflected in some of the ^{14}C dates (Levy and Burton 2006; see also Gilead 2007).

Typologically, the pottery assemblage shows few bowls, and most of the vessels are closed forms, such as jars. One remarkable aspect of the assemblage is the scarcity of slip and the paucity of decoration, which is limited to thumb-impressed rope motifs. These observations suggest that the Pre-Ghassulian assemblage of Abu Ghosh is mainly associated with cooking and food preparation.

The repertoire contains strap and 'Beth Pelet' handles that closely resemble those of the Besorian culture. The clay matrix and the bow rims are also characteristic of these assemblages (cf. Goren 2006). On the other hand, none of the typical pottery forms of the Ghassulian-Be'er Sheva' horizon appear.

The lithic assemblages of Layer III are characterized by sickle blades, bifacials and perforators. While most of the components could be assigned to the Ghassulian Chalcolithic, the morphological characteristics of the broad sickle blades point to a Pre-Ghassulian horizon, resembling those at Ḥorbat 'Uẓa Stratum 16, Naẓur and Tel Ẓaf in the north, and probably the Qatifian and Besorian assemblages in the south.

The groundstone tools and stone bowls are also characteristic of repertories representing the transition between the Late PN and the Chalcolithic Ghassulian periods, with no signs of the characteristic Ghassulian 'V-shaped' basalt bowls.

Despite the limitations imposed by the small archaeozoological sample, a number of observations can be made concerning the economic strategy of the inhabitants of the Pre-Ghassulian site at Abu Ghosh: (1) the economy was focused on raising domestic sheep, goats, pigs and, to a lesser extent, cattle; (2) the presence of pigs indicates a sedentary or semi-sedentary settlement; (3) pigs were culled young for meat, while age profiles for caprines suggest a mixed exploitation strategy with some young animals culled for meat, and others kept into adulthood for secondary products or reproduction; (4) people had access to complete or near-complete carcasses, and primary carcass dismemberment was probably carried out on-site, with caprines and pigs dealt with in similar ways; (5) there is limited evidence for hunting; (6) the worked-bone tool component suggests some involvement in the working of animal hides, although not necessarily those of wild taxa.

The Abu Ghosh faunal assemblage compares well with contemporaneous assemblages from the coastal plain sites, the Jerusalem area, and, to a lesser extent, those from the Jordan Valley (Teleilat Ghassul, Tell Abu Ḥamid), which have lower pig and higher caprine frequencies.

According to the small but significant archaeomalacological remains, there is strong evidence that the inhabitants of the site maintained contacts with regions as far distant as the Mediterranean Sea, the Red Sea and the Nile River. At least one shell, *Monetaria annulus*, a cowry species most probably from the Red Sea, had been exploited as a shell bead.

The EB I remains—sherds and Canaanean blades—are too meager to reach any conclusions. Our site is probably part of a series of EB I settlements in the area, along with the site of Tel Qiryat Ye'arim (see above), Moẓa (Eisenberg 1993), Saṭaf (Gibson, Ibbs and Kloner 1991:35–37) and Jerusalem (De Groot and Ariel 2000:93, Fig. 6:1–6; see also Finkelstein and Gophna 1993). From Hellenistic times until the present, the local terraces were

clearly part of the life of the village that grew up around the spring.

The excavations at Abu Ghosh, Jasmine Street offer important evidence for a previously unknown Pre-Ghassulian site in the Judean Hills, west of Jerusalem. Although the excavation at Abu Ghosh, Jasmine Street was limited in size and finds, it reveals the importance of small assemblages for the definition of archaeological entities. However, considering the above analysis of the material remains from Layer III, we hesitate to attribute this site to any of the known cultures from the end of the sixth–mid-fifth millennia BCE, and we can only suggest a certain parallel with the Besorian based on some pottery types. Definitions of such entities are based on a tiny sampling of sites (Banning 2007) alternately designated over the years as falling within the late stages of the Wadi Rabah culture (Gopher and Gophna 1993), the Middle Chalcolithic (Garfinkel 1999), the late phase of the Early Chalcolithic (Getzov 2009:102–103; 2010), the Qatifian-Besorian cultures (Gilead 2011) and the post-Wadi Rabah–Pre-Ghassulian (Gopher 2012: Fig. 41.1). The absence of ^{14}C dates from the Abu Ghosh, Jasmine Street site hinders its chronological assignation within the framework of the Pre-Ghassulian period in the southern Levant in general (Gilead 1990), and within the inter-regional chronology of northern and southern Israel (Banning 2007; Gilead 2011). As it is possible that Pre-Ghassulian sites in the Judean Hills had their own cultural definitions that include some, but not all of the features of such sites in other parts of the country, we must avoid the adoption of a monolithic categorization that would obscure the very processes we mean to understand.

The occurence of what seems to be a similar cultural horizon is evident at other sites in the Judean Hills, such as Khirbat es-Sauma'a (Gibson and Rowan 2006). Furthermore, Ghassulian Chalcolithic sites have also been discovered in recent years in the region (Gibson, Ibbs and Kloner 1991:34–35; Milevski et al. 2010), adding to the known occurences in Jerusalem (De Groot and Ariel 2000:92–93, Fig. 6:8–23), which could shed light on the development of the Ghassulian Chalcolithic culture in the Judean Hills.[5]

The phenomenon of the Late Prehistoric (Neolithic–Chalcolithic–EB I) occupation of the Judean Hills seems to be characterized by clusters of settlements that display horizontal and vertical stratigraphy and extend over large areas, among them Abu Ghosh and Moẓa (e.g., Khalaily and Marder 2003b; Khalaily et al. 2007; Milevski et al. 2010). All these Late Prehistoric sites were sedentary settlements located near water sources—springs and/or streams, to sustain their agro-pastoral activities.

Thus, it is evident that the Judean Hills, like other regions of the country, were not empty of settlements prior to the Ghassulian-Be'er Sheva' occupation of the southern Levant. Contrary to previous estimations based on lack of data (e.g., Finkelstein and Gophna 1993:4; see also Gopher and Gophna 1993:326–327), it is evident that in Pre-Ghassulian times, the Central Hill Country was inhabited by groups of people with well-defined production modes, and the flourishing Chalcolithic communities developed from these local precursors (Gilead 1990:62).

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APPENDIX 1: List of Loci and Walls

Locus	Square	Quadrant	Layer	Description
100	1		Ia	Gravel
101	2	a, c	Ib	Top soil
102a	2, 3		Ib	Pit
102b	1, 2, 3		Ib	Top soil
103	1	b, d	Ib	Top soil
104	2	b, d	Ib	Fill
105	3	a, c	I, II?	Fill
106	2	b, c	IIIa	Wall
107	3	c, d	II	Wall
108	3	b, d	II	Fill
109	2	b	IIIa	Fill
110	2	b, d	IIIa	Wall
111	2	b, d	IIIa, IIIb	Fill
112	3	b, d	IIIa?	Fill
113	2	d	IIIa	Fill
114	2	d	IIIa	Fill
115	3	b, d	IIIb	Fill
116	1	b, d	IIIa?	Fill
117	1	b, d	IIIb	Fill
118	3	d	II	Stones
119	3	c	II, IIIa?	Fill
120	1	c, d	IIIb	Wall
121	3	c, d	IIIa, IIIb	Wall
122	2	a, c	II, IIIa?	Fill
123	3	a	II	Fill
124	1	d	IIIb	Fill
125	3	a	IIIb	Fill
126	2	a, c	IIIa	Fill
127	2, 3		Ib	Top soil
128	1, 2		IIIb	Wall

Locus	Square	Quadrant	Layer	Description
129	2	a, c	IIIa, IIIb	Fill
130	2, 3		II	Fill
131	2	a	IIIb	Fill
132	2	a	IIIb	Wall
133	3	b, d	IIIb	Fill
134	1	c, d	IIIa	Wall
135	2	a	IIIb	Wall
136	2	a, c	IIIb	Fill
137a	1	a, c	IIIa	Fill
137b	1	a, c	IIIb	Fill
138	2	b	IIIb	Fill
139	2, 3		IIIa	Fill
140	3	a, b, d	IIIa	Fill
141	1, 2		Ib	Top soil
142	2, 3		IIIb	Fill
143	1, 2		IIIa?	Fill
144	2, 3		IIIb	Fill
145	2, 3		II, III?	Stones
146	2	a, b	IIIb	Fill
147	3	d	II, IIIa?	Installation
148	3	d	II	Wall
149	3	c, d	IIIa	Wall?
150	1, 2		IIIb	Wall
151	3	d	IIIa	Fill
152	3	d	IIIa	Surface floor?
153	3	d	IIIb	Fill
154	3	c	IIIb	Stones
155	3	d	IIIb	Wall
156	1, 2		IIIb	Blockade

NOTES

[1] The excavation (Permit No. A-5750) was conducted on behalf of the Israel Antiquities Authority. Ianir Milevski directed the excavation, with the participation of Carmen Hersh (pottery drawings), Michael Smilansky (drawings of flint and stones), Mark Kunin and Boris Atkin (plans and sections), Leticia Barda (maps and aerial photograph) and Oz Rittner (photographs of finds).

Ianir Milevski is responsible for the excavation report, the pottery and the groundstone analyses. The flint assemblage, the mammal remains and the mollusca were respectively researched by Ofer

Marder (Dept. of Bible, Archaeology and Ancient Near East, Ben Gurion University of the Negev), Liora K. Horwitz (Dept. of Evolution, Systematics and Ecology, The Hebrew University of Jerusalem) and Henk H. Mienis (National Mollusc Collections, Dept. of Evolution, Systematics and Ecology, The Hebrew University of Jerusalem, and The Zoological Museum, Tel Aviv University). All authors are responsible for the final conclusions.

[2] But see a different interpretation of the remains from the French excavations at Abu Ghosh by Gibson and Rowan (2006: n. 6).

[3] The pottery dated to the Hellenistic and Roman periods (not illustrated) is scarce. The diagnostic Hellenistic sherds include bases of bowls and rims of cooking pots, probably dating to the second century BCE. Similar vessels were found in the Jewish Quarter of the Old City of Jerusalem (Geva 2003). The pottery of the Roman period is composed of a few sherds of jugs and jars, for which parallels are found at the Jerusalem Cardo (Kloner and Bar-Nathan 2007), and should date to the second century CE. The authors are very much indebted to Rachel Bar-Nathan and Renate Rosenthal-Heginbottom for their identification of the Hellenistic and Roman pottery.

[4] Petrographic and technological analyses of the ceramics from Abu Ghosh were conducted by Marion Silvain within the framework of her doctoral research on the technology of 'Early Chalcolithic' pottery assemblages. The three samples discussed here were examined by David Ben Shlomo; we are indebted to both of them.

[5] While this report was in publication, Zinovi Matskevich of the IAA discovered some surface finds at 'En Ḥemed, near Abu Ghosh (Figs. 1, 2), which can be dated to the Pre-Ghassulian or Ghassulian Chalcolithic period.

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