

EIN HILU – A Chalcolithic Site on the Desert Fringes of Samaria

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ABSTRACT

An excavation at Ein Hilu in the desert fringes of Samaria, exposed a three strata Chalcolithic site from the second half of the fifth millennium B. C. E. The site was discovered and partly excavated in 1988 by the Manasseh Hill Country survey and re-excavated by the author in 2006. As this is the only site to have been excavated in this area, this paper sheds new light on the lifestyle and economy of the peoples who inhabited this virtually unexplored region. These were permanent settlers with a subsistence economy based mainly on herding mixed with agriculture and hunting.

INTRODUCTION

During February-June 2006, an excavation was conducted at the site of Ein Hilu¹, as part of a research project focusing on the Late Chalcolithic period² and the beginning of the Early Bronze Age in the southern Jordan Valley and the desert fringes of Samaria. The site (Israel Grid. 1981/1922, 40 m below sea level) was discovered during the survey of the Manasseh Hill Country in 1988 (Zertal 1996: 515-517; 2008: 557-561). Site size was estimated to be 12 dunams and traces of a few walls were visible on the ground. In October 1988, a small trial excavation was conducted at the site under the direction of A. Zertal and the partial remains of a broad house were exposed. On the earthen floors of the house indicative finds dating to the Late Chalcolithic period, particularly V-shaped bowls and fragments of a churn were discovered (Zertal 1996: 516). During the 2005 Season of the Manasseh Hill Country survey the site was revisited and a decision was made to continue the excavation as part of the author's PhD thesis on the pattern of settlement in the Late Chalcolithic and Early Bronze 1 in the lower Jordan Valley and the desert fringes of Samaria.

ENVIRONMENTAL BACKGROUND

The site of Ein Hilu is located on a hill slope overlying Wadi Malih fault, east of the modern Tubas-Mehula-Beqa'aot Junction and west of the convergence of the desert fringes of Samaria and the Jordan Valley (Figs. 1, 2). The spring of Ein el-Hilu, from which the site receives its name, is located some 500 meters northeast of the site. This is the only fresh water source in the vicinity of the site.

The site is situated in an semi-arid region with present-day average rainfall c. 250 mm (Schachar *et al.* 1995: 28). Climatic indications from the Chalcolithic period, though somewhat debated, appear to support a wetter period than today (Lovell 2001: 12-15). Today, the site is dominated by Irano-Turanian vegetation; the flora consists mostly of annual garigues with a few, mainly small bushes. No trees are found here (Sabah 1992), and the only tall shrub is the *Ziziphus spina-christi*.

The dominant geomorphologic formation in the area is the Far'ah Anticline, which borders the Shechem Syncline to the east. This anticline is the northern continuation of the Judah and Ephraim chain of anticlines. It is defined by a broad, subterranean axis and a relatively narrow upper axis. The slanted blocks of the Far'ah Anticline slope moderately west, while the eastern branch drops sharply toward the Jordan Valley. The anticline is intersected by

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2. In this paper the term and cultural significance of "Late Chalcolithic" is based upon Y. Garfinkel's sequence (1999).

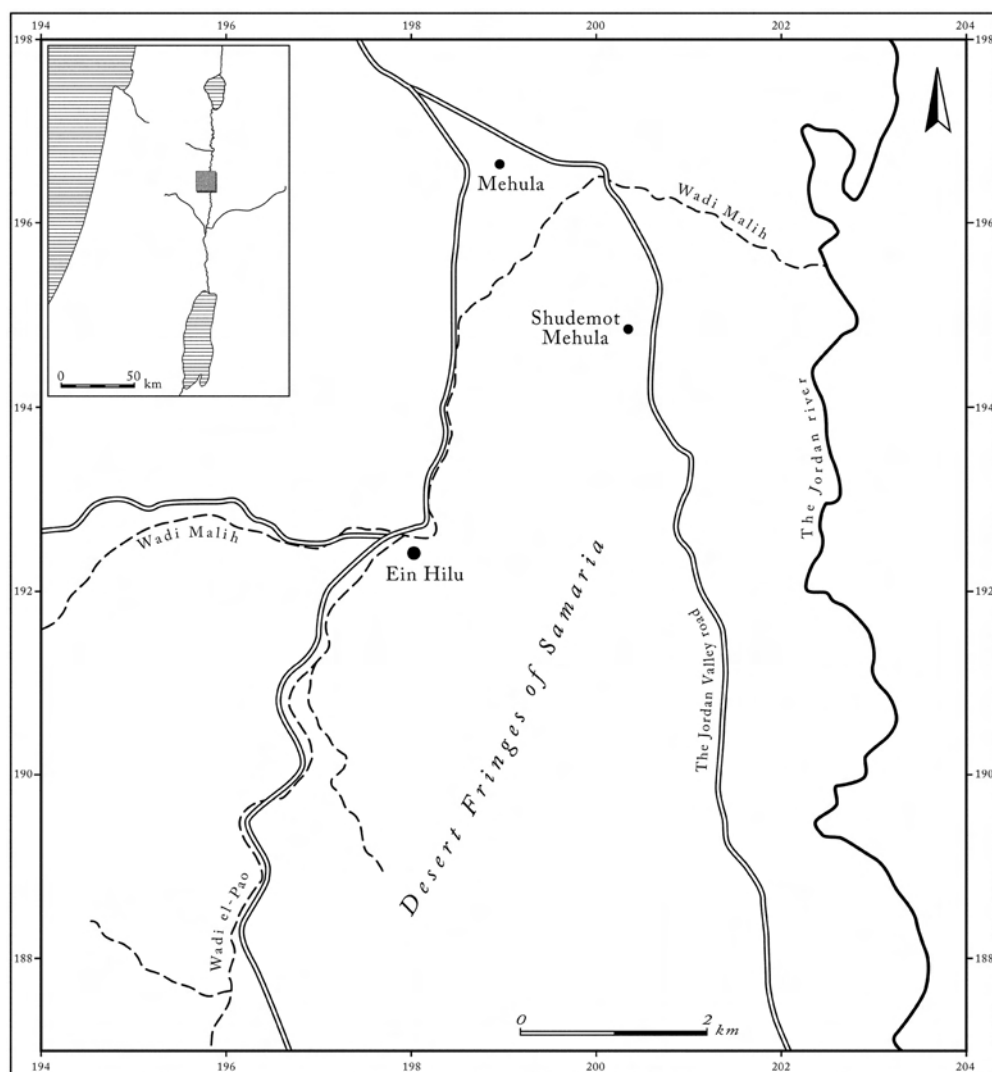


Figure 1. General location.

geologic faults, forming river valleys and wide ravines. The longest of those faults underlies the valley of Wadi Far'ah. The site of Ein Hilu is situated ca. 20 km to the north of Wadi Far'ah in the valley of Wadi Malih. Thus, the site is set within a hilly terrain incised by deep wadis running from the Samaria hills in the west to the Jordan Valley in the east. South of the site, there is a small valley of 300 dunams. Northeast of the site, along the banks of Wadi Malih, more terrain is available for dry farming.

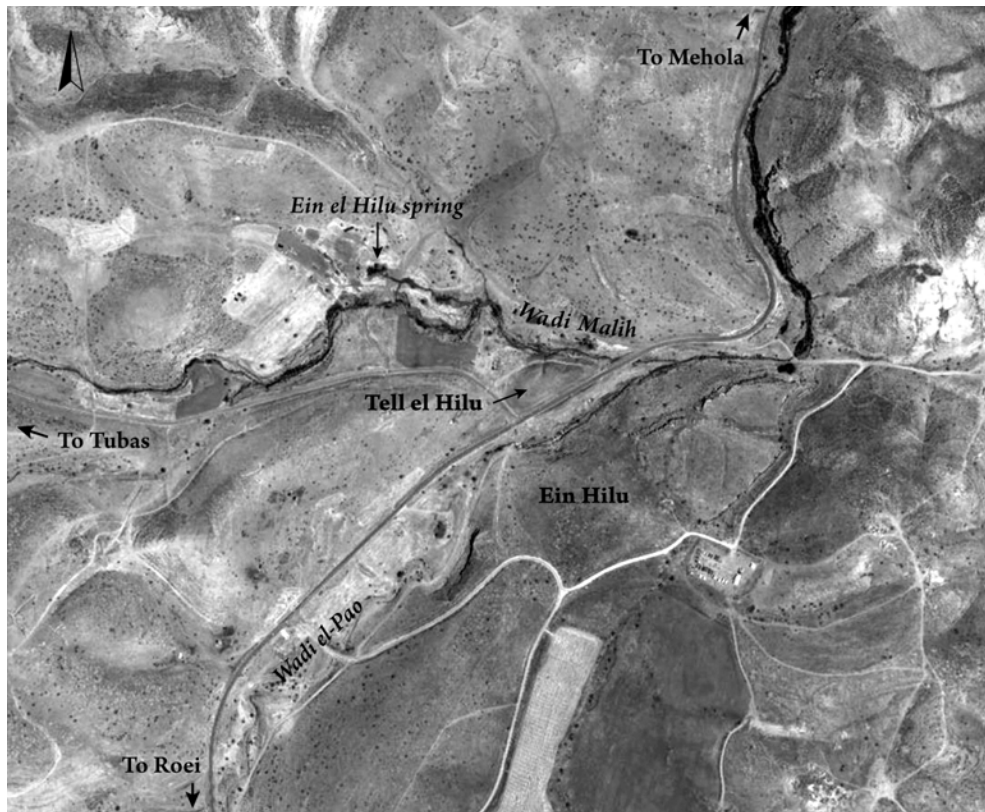


Figure 2. Aerial view of Ein Hilu.

The area to the west of the northern part of the Far'ah Anticline and the desert fringes of Samaria is conspicuously devoid of Chalcolithic sites and there are no Chalcolithic sites in Wadi Malih. The nearest Chalcolithic settlements are site number 76 (Zertal 1996: 241-242) and site number 99 (Zertal 1996: 292). The first is a small site 4.5 dunams in area, situated in esh-Shaqq valley, 3 km north of Ein Hilu, while site 99 is a scattering of sherds 6.5 km to the west.

Two clusters of Chalcolithic sites are found north and west of the site: the first in the southern Beit-Shean Valley (many sites that were found in the region south of Tirat Zvi by Zori (1962) and Zertal (2005)), and the second in the Zababdeh-Tubas Valleys in the mountains of Samaria, discovered by Zertal (1996). It can be assumed that one of the routes connecting the Beit-Shean Valley and the Jordan Valley to the Zababdeh-Tubas Valleys passed through Wadi Malih and the site of Ein Hilu³.

3. Another possible route was via Wadi Shubash, c. 9 km. north of Wadi Malih.

THE RENEWED EXCAVATION

The main excavation area (Area B) was dug with the aim of both cleaning and re-excavating parts of the previous excavations. Also, a test pit was opened in a new area (Area C), adjacent to area B, to try to decipher the stratigraphy of the site. Prior to the excavation, a nearly complete structure (Area E) was found some 80 meters south of previous site boundaries (Fig. 3). For its architectural interest, it was decided to excavate it.

Stratigraphy

Three strata were discovered in Areas B-C. These are shortly described below:

Stratum 1 – An early phase of the Late Chalcolithic, dated to the second half of the fifth millennium B.C. The dating was based upon ceramic typology and a single radiocarbon sample from Area B which provides a “*terminus post quem*” for the early construction phase of stratum 1 (see below). The large building in Area B incorporated at least two phases of construction. Area C was probably a courtyard exterior to the large building. Area E is possibly from the same chronological horizon, since it exhibits a similarity in wall construction methods and ceramic typology.

Stratum 2 – An earlier phase of the Chalcolithic, since the limited data gathered in Areas B and C do not allow greater precision. In Area B, two floors, a wall and three installations were found within a small 2x3.5 m area (Fig. 4). These were found below the main structure of Stratum 1 (Figs. 5-6). In Area C, a brick wall and what appears to be an adjacent floor were found in a 2.5x3.5 m area below the open courtyard adjacent to the main structure of Stratum 1.

Stratum 3 – The earliest stratum of the site. The sparse data gathered only in area C do not allow greater precision. A single radiocarbon sample which provides a “*terminus post quem*” was dated to the third quarter of the fifth millennium B.C. (see below). A paved stone floor partly excavated in area C, was found below the brick wall and the floor of stratum 2.

THE EXCAVATION AREAS

Area B

Area B is situated in the center of the site, and work consisted of cleaning, probing, and expanding the 1988 area. The method used here differed from that of the other areas. First, accumulation and debris from the 1988 operations had to be cleared (collapsed barks and material washed into the area). Next, the first layer of potentially ancient sediment (considered “surface material”) was removed. Only after probably late intrusive material had been removed did we begin to both excavate the remains of the barks and deepen the lower limit of the excavation. This situation caused two problems:

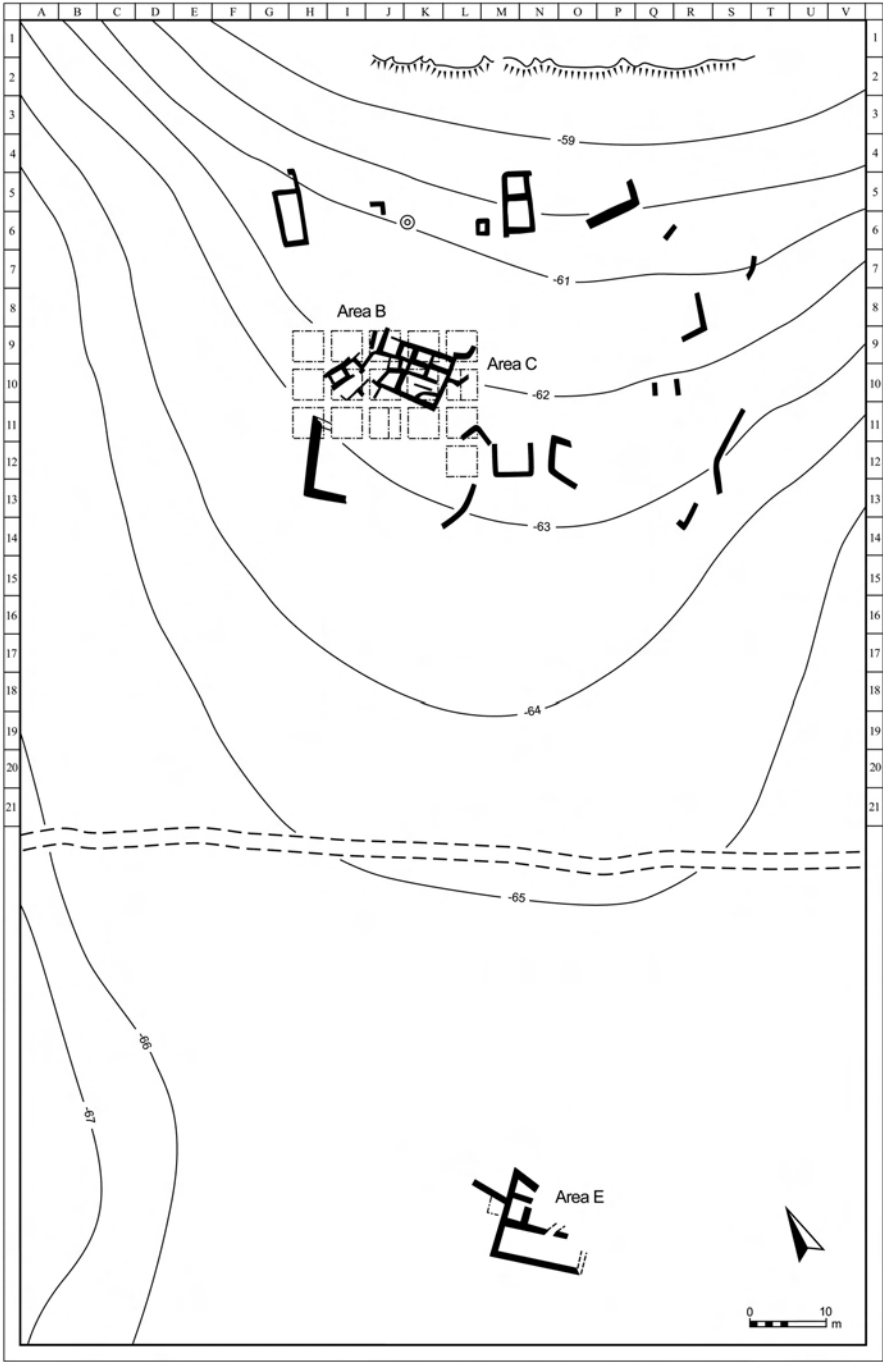


Figure 3. General Plan and the Excavation Areas at Ein Hilu.

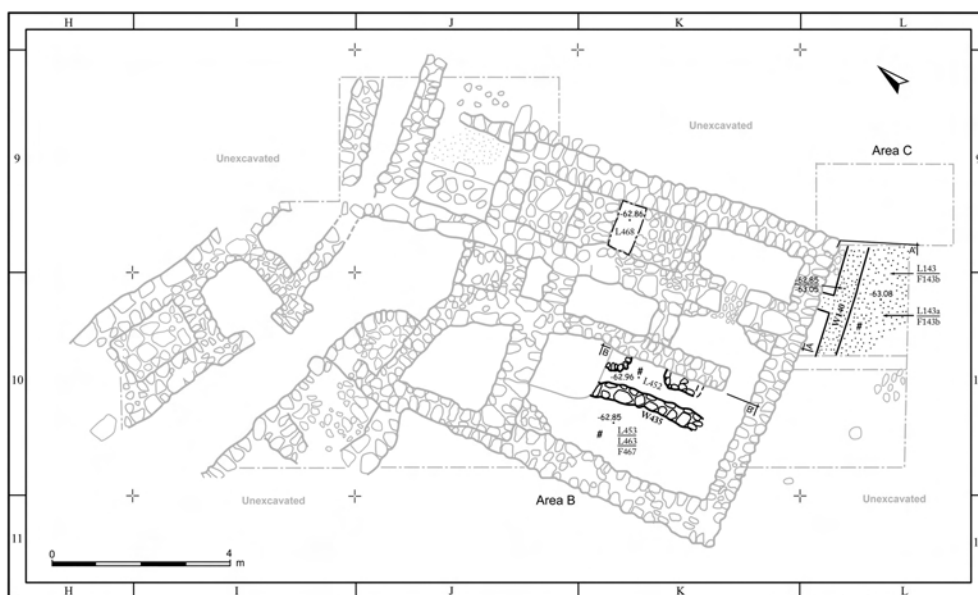


Figure 4. Areas B and C, Stratum 2 (light grey indicates later strata).

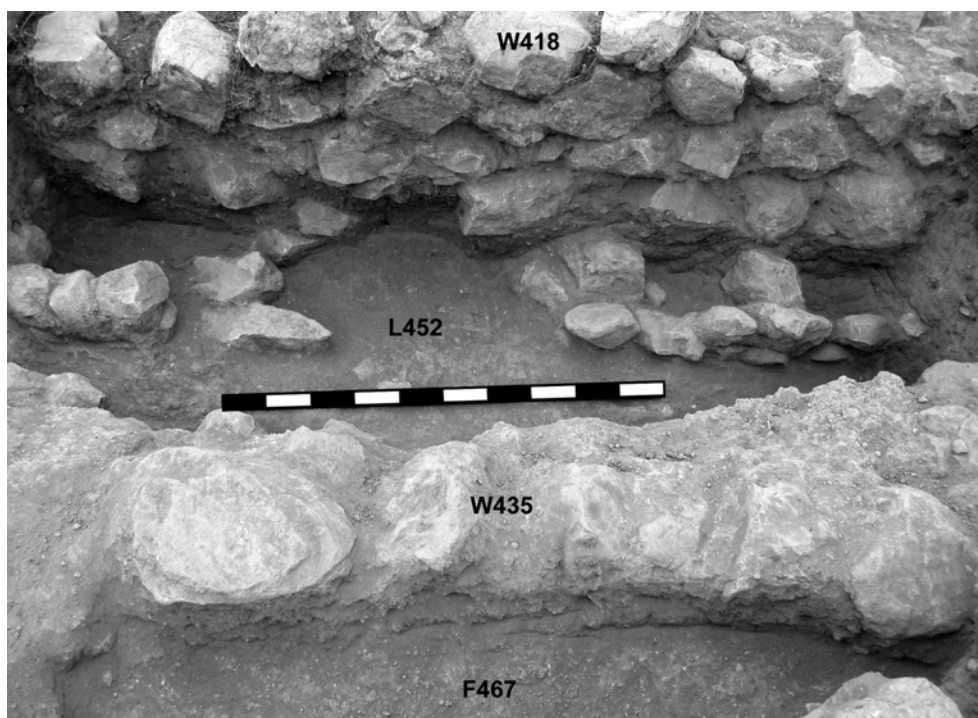


Figure 5. Area B, Stratum 2 (looking eastwards).

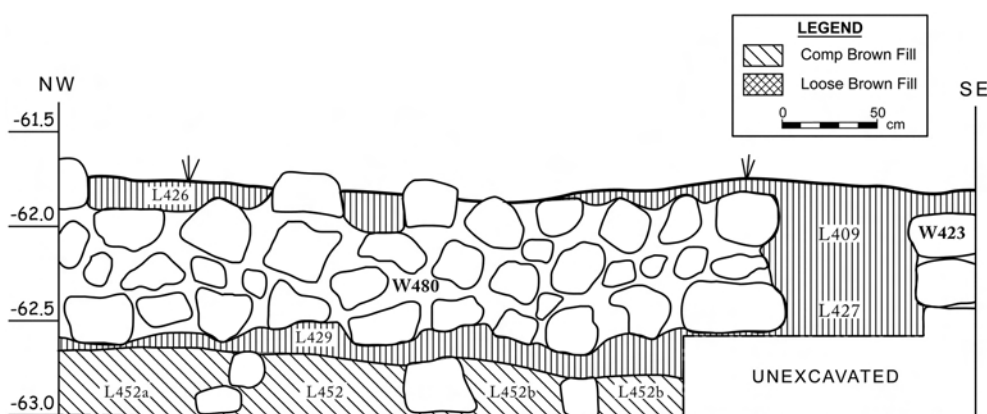


Figure 6. Area B, Section B-B', Stratum 1 and 2 (see location in Fig. 8).

1. Since much of the sediment excavated was not sieved (sieving using a 6 mm mesh was performed in area B only in selected, “sealed” loci) collection of data regarding the lithic and fauna was only partial.
2. Most of the material recovered came from secondary deposits. Loci in primary deposition with *in situ* materials were found only in a few locations⁴.

The size of the excavated area was c. 120 sq. m. and two strata (1-2) were exposed.

Stratum 2:

Stratum 2 (Fig. 4) was exposed in a very limited area in Square K10. Wall 435 consisted of a stone foundation supporting bricks (average width 0.5 m). A tamped earth floor (Locus 467) abuts the wall from the west. On the surface identified to the east (Locus 452- Fig. 5) the remains of three stone-built installations (one of them lined with pottery fragments) were found. Stratigraphically, these installations are located below the foundation of Wall 418 ascribed to stratum 1 (Fig. 6).

The finds from stratum 2 in Area B are scant, including two holemouth rims, a krater rim, a lug handle, and a number of flat bases that are consistent with the known material culture of the Chalcolithic period.

Stratum 1:

The main element in this stratum is a large building 7 x 12 m, delimited by Walls 422, 423 and 432 (Figs. 7, 8); its northern boundary is unknown. It is divided into three longitudinal rooms separated by double walls (418, 420). The western room was probably a closed rectangular courtyard (delimited by Walls 418, 423, 432 and 434). The middle room (between Walls 418

4. The main loci of the primary deposition in area B were: 19, 414, 429, 431, 433, 452, 467, 470.

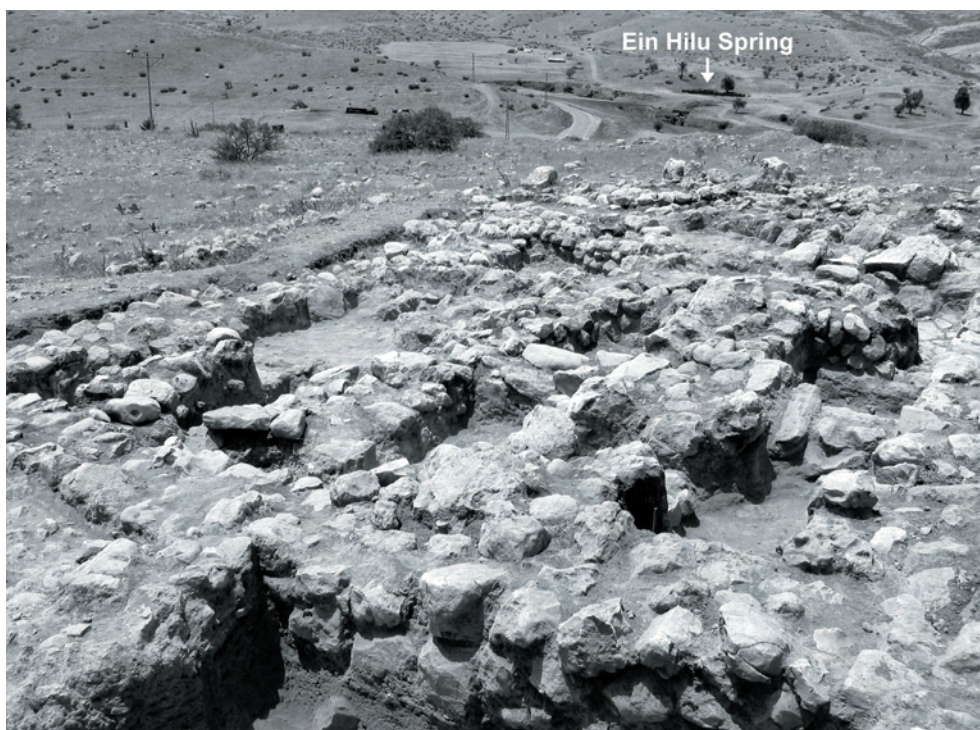


Figure 7. Ein Hilu, Area B (the main building- looking north-eastwards).

and 420- Fig. 9) and the eastern one (between Walls 420 and 422- Fig. 10) were divided by partitions into a number of smaller secondary rooms/cells. Some of these cells were paved with stone (Loci 407, 415) and may have been used for storage.

The main entrance into the building was not identified. Such an entrance was probably in the southern part of Wall 432, in the centre of the longitudinal line of the rectangular building, in an unexcavated area. Another possibility for the location of the entrance may be in the vicinity of Locus 413, which postdates the first construction phase of the building. An interior entrance (Locus 464- Fig. 11) identified in Wall 420, is paved with small and medium stones. They were set in place at a slight incline so as to overcome a 20 cm. difference in elevation between Rooms 470 and 427.

The walls of the building were preserved to a height of three stone courses. In a few places the remains of clay bricks were preserved on the stone courses. In most cases the floors that were definitely identified are located at the elevation of the upper part of the first stone course. Thus one can assume the lower part of the wall was built of stone and its upper part was made of bricks (the stone construction continued to a height of c. 0.5 m. above the level of the identified floors). The exterior walls range between 0.80 m. and 1.00 m. in width. There are

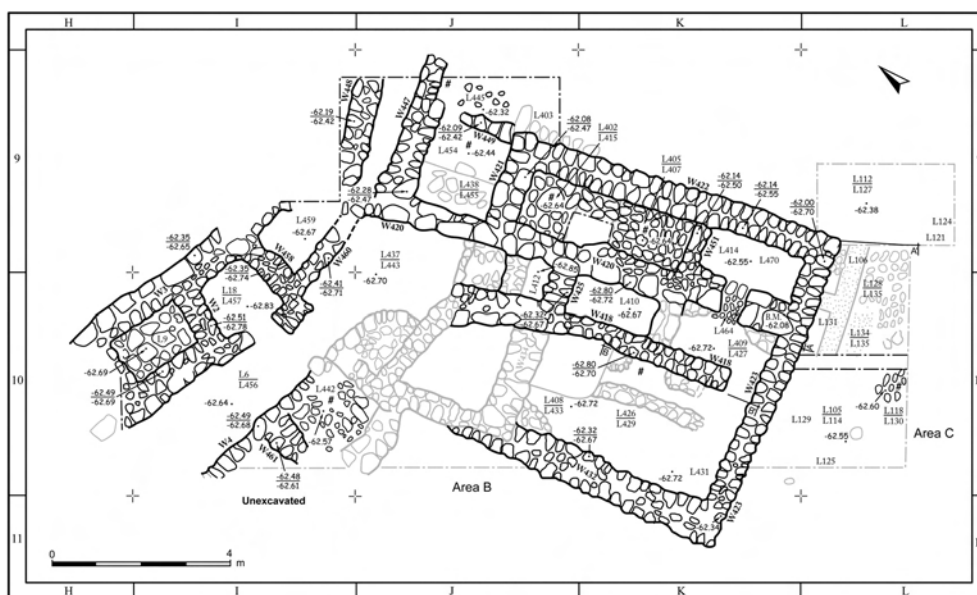


Figure 8. Areas B and C, Foundation phase (light grey indicates earlier or later strata).

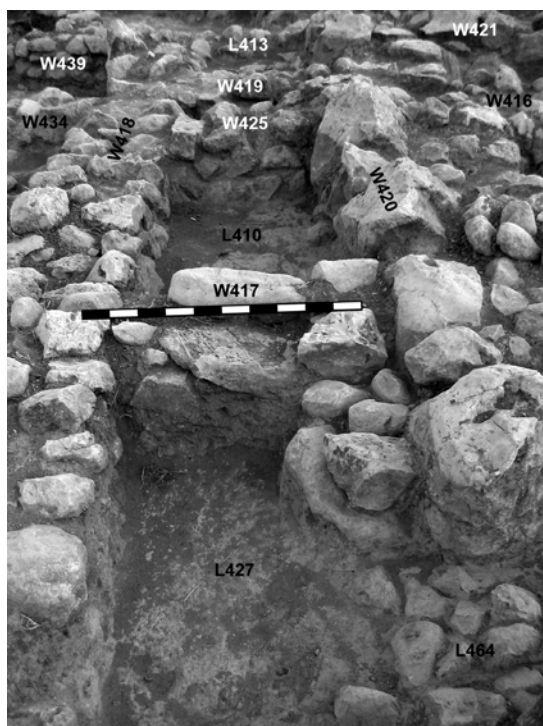


Figure 9. Area B, central part of building (looking northwards).

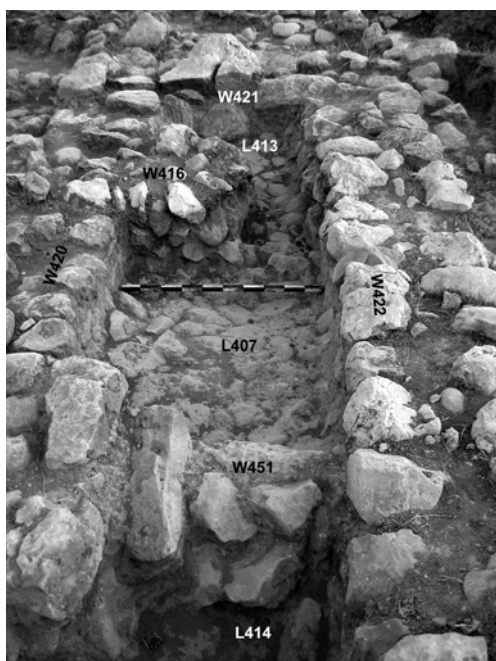


Figure 10. Area B, eastern part of building (looking northwards).

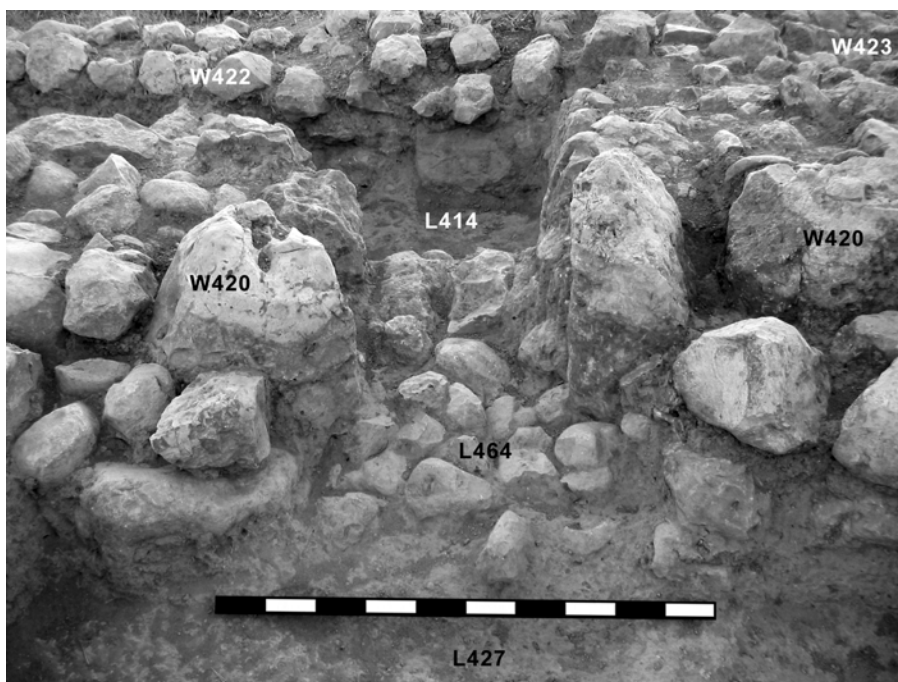


Figure 11. Area B, L464 (looking eastwards).

considerable differences in the interior walls and they range between 0.4 m and 1.1 m wide. The method of construction employed is identical in most cases, with two rows of large and medium stones, and a fill of small stones and soil deposited between them. Large monoliths (up to 1 m high) were incorporated in the stone construction of the walls (e.g. Walls 3 and 420- Fig. 9). In most cases floors were made of packed earth. In some of the smaller rooms the floors were made of flat slabs whose underlying niches were probably used for storage.

While later alterations were identified in the structure, their order of construction was impossible to determine⁵ (see plan of the developed stage of stratum 1 in Fig. 12). They include Wall 416 which partitions the large paved room into two smaller paved spaces, and Wall 417 which partitions the area between Wall 418 and Wall 420 into two smaller spaces, a stone paved installation (Locus 413) and the room adjacent to it (Locus 441).

A small, irregular shaped courtyard (Locus 443), accessed by an alley/corridor (Locus 456), was identified north of the main building. Near the surface south of the corridor are paved areas, the nature of which is unclear (Locus 442); they are separated from Corridor 456 by a thin wall (Wall 4). Three rooms/cells were also unearthed north of this alley: Room 9, a paved rectangular room probably used for storage, and Rooms 457 and 459 (only the southern part of the latter was excavated).

The finds from Stratum 1 in Area B are typical of the Late Chalcolithic period. Noteworthy among the ceramic assemblage are the holemouth jars, shallow and “v” shaped bowls, churns and lug handles, characteristic of the Late Chalcolithic period (see below). Few finds were discovered outside the main building, in the area of the corridor and the rooms/paved surfaces next to it. This is mainly due to erosion stemming from the proximity of the stratum to the surface level and the fact that most of this part of area B was already excavated in 1988. A radiocarbon date (RTT 5442, see discussion below) from the sealed locus 468 (below stone paved floor 407), gives a “*terminus post quem*” for the foundation phase of the structure between 4530 – 4230 BC calibrated (95.4% probability). This date falls in a time span early within the Late Chalcolithic period⁶.

5. These later alterations were distinguished from the original building construction phase because:
 1. W 416 is built from small stones in a manner completely different from the other walls of the building. When its eastern part was excavated we found that floor 407 continued below it.
 2. W 417 is a late alteration because its base is higher than the living surface of adjacent L 410 and 427.
 3. L 413 is a late alteration because its base is higher than the living surface of the loci around it.
 4. L 441 is a late alteration because it overlaps earlier W 432.
6. It is quite problematic due to its long span of years and falls around the transition from the middle phases (D-E) to the late phases (C-A+) of Teleilat Ghassul, and is in the general time scale of the sites of Abu Hamid (again between middle and late phases), Beer-Sheva, Shiqmim and the Golan (Lovell 2001: 45, 219).

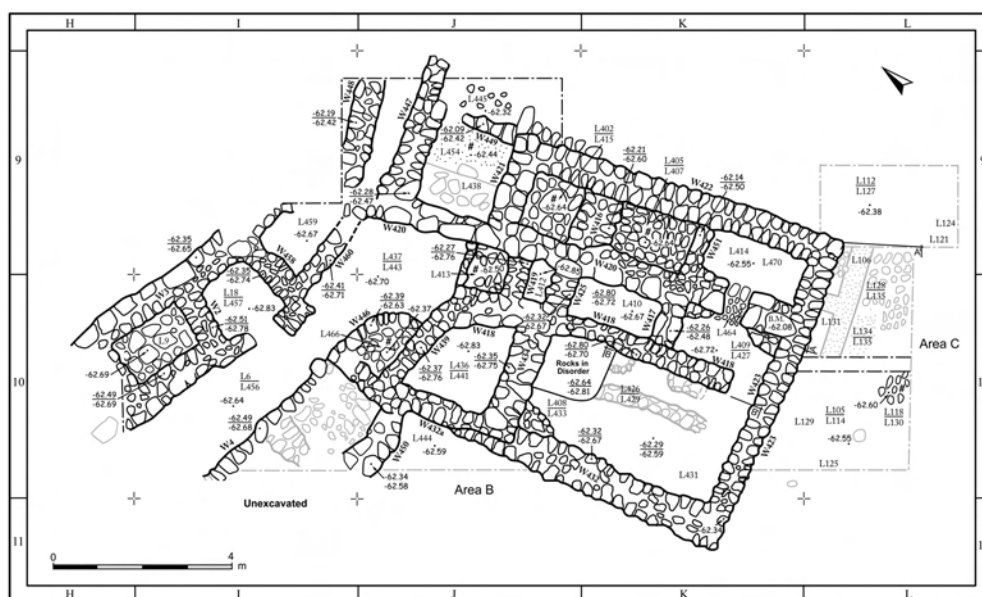


Figure 12. Areas B and C, Progressive phase (light grey indicates earlier strata).

Area C

A probe (c. 25 sq. m., Squares L9, L10) was opened here in order to understand the local stratigraphy and to compare it to the finds from area B. After reaching the possible 'living surfaces' of Stratum 1, we decided to narrow the excavated area and dug further only within a 2.5x3.5 m deep cut. Sterile sediment was reached after excavating through 2 m of archaeological deposits (see section A`-A in Fig. 13).

Stratum 3:

This strata was reached only in this area. The remains of a stone pavement (floor 145 – Figs. 14, 15) with average accumulation of c. 15 cm. of habitation level and organic material can be ascribed to the stratum. The finds mostly include burnt pottery sherds, among them a bowl rim, holemouth rim, ceramic weight and two flat bases. In light of the preliminary data this small assemblage can be ascribed to the Chalcolithic period.

A radiocarbon date (RTT 5443) from locus 144a (accumulation of organic material found on floor 145), gives a date for a late use of floor 145. The date, between 4540 – 4240 BC calibrated (95.4% probability), falls in the same time span as the date from area B- early within the late Chalcolithic period. The excavation continued below floor 145 (Locus 146) to a further depth of c. 30 cm. in the natural deposits devoid of any archaeological artifacts.⁷

7. Apart from 3 small non-diagnostic body sherds.

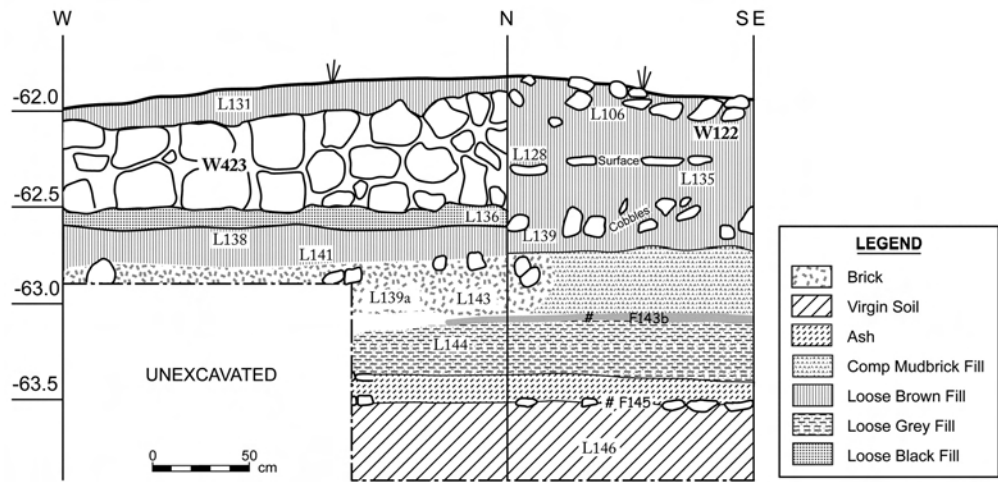


Figure 13. Ein Hilu Area C, Section A-A' (see location in Fig. 8).

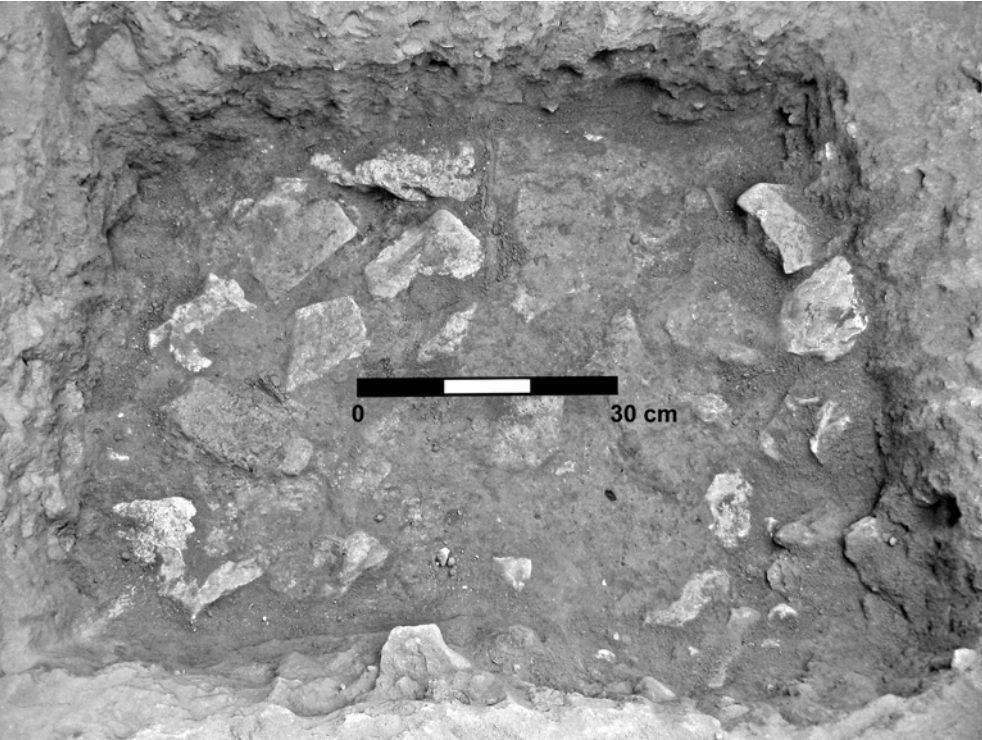


Figure 14. Area C, Stratum 3, Floor 145 (looking westwards).

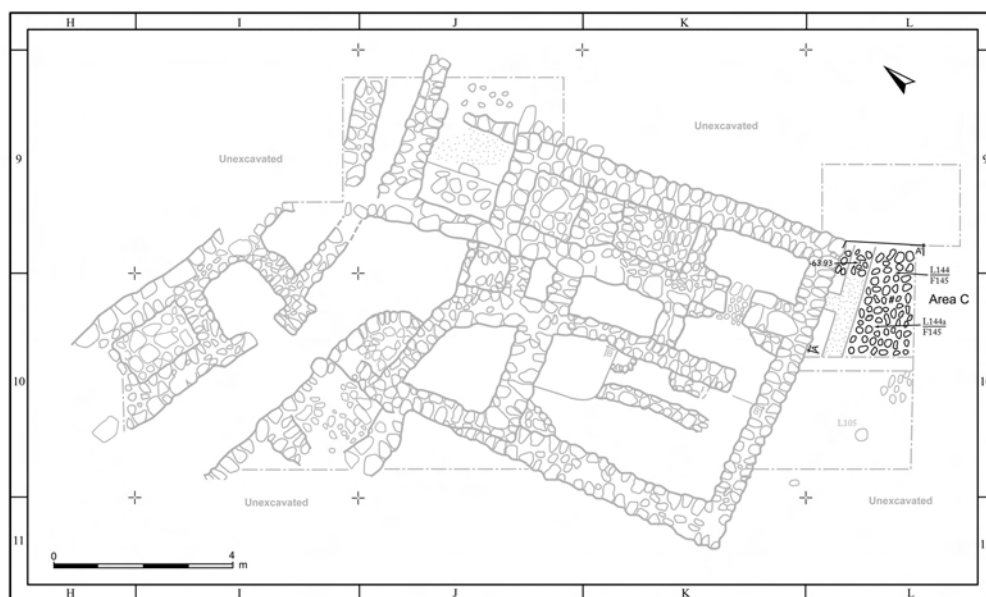


Figure 15. Area C, Stratum 3 (light grey indicates later strata).

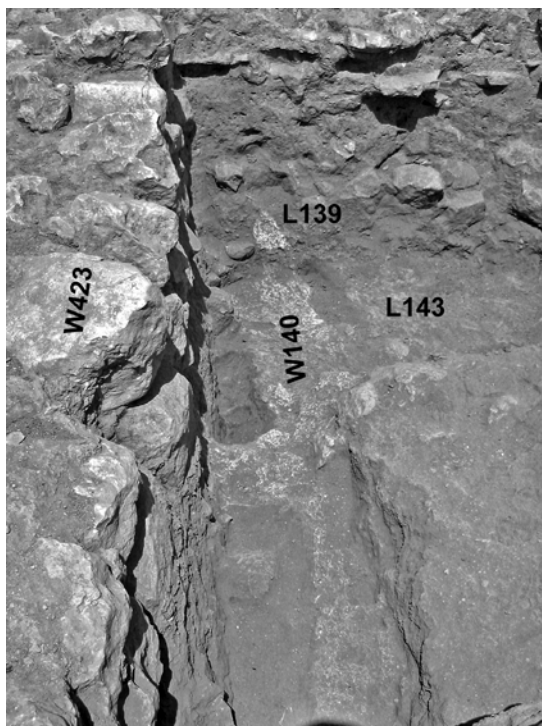


Figure 16. Area C, Stratum 1 and 2 (looking westwards).

Stratum 2:

The meager architectural remains of a mudbrick wall (Wall 140 – Fig. 16) and remains of a tamped earth floor mixed with mudbrick material can be ascribed to this stratum. This material probably collapsed from Wall 140 (Locus 143b). The artifacts recovered from the floor include five bowls, a jar, lug handle, and a rim with rope ornament, all consistent with the material culture of the Chalcolithic period.

Stratum 1:

The most striking element of this stratum is the outer face of Wall 423, belonging to the main building in Area B, Stratum 1. This wall survived to a maximum height of three courses (c. 0.5 m.). Another element in the stratum is the fragmentary remains of large stone pavement that has survived in the eastern part of the probe (Loci 128, 135- Fig. 17). This pavement abuts Wall 423 at the elevation of the lower part of its second course (similar to the pavements of Stratum 1 inside the main building in Area B). Considering the limited area exposed, the artifacts in area C are numerous, diagnostic, and some of them found *in situ*. Noteworthy among them are the bowls (11 items), jars, and holemouths jars. A ceramic spoon was also found.

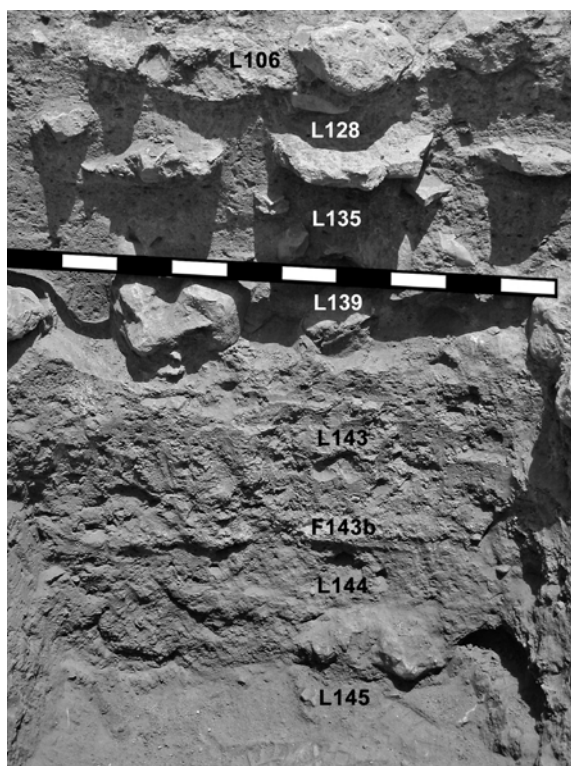


Figure 17. Area C,
Section A-A`.

Area E

The excavation of Area E, about 120 meters south of Areas B and C, and outside the known boundaries of the ancient settlement (Fig. 3), was conducted using a 5x5 m quadrants system. A single building attributed to the Late Chalcolithic was exposed here (Figs. 18- 19). From an architectural standpoint this structure is quite unique and includes a combination of known Chalcolithic elements. Due to the proximity of the living surfaces to the bedrock (we reached bedrock at an average depth of 20 cm), all the material recovered and the sediments were treated as “surface finds” and sieved only in a few selected loci where *in situ* material was found⁸(Fig. 3).

The building includes a spacious rectangular broad room (5.5 x 12.0 m, Fig. 20) whose southeastern part was eroded away (its known boundaries are delimited by Walls 303, 304 and 309). The room is divided into an open rectangular area where an installation was unearthed (Locus 319a) and a possible diagonal opening (Locus 325). The installation, made of small slabs organized in a circle, and adjacent loci in the northern part of the broad room were the only places in Area E where *in situ* material was found. The opening was paved with large stones arranged along a diagonal axis. The door socket (Fig. 21) indicates a door installed inside the wall, apparently opening inwards. Three stones arranged like a small bench (Locus 327) were discovered near the entrance, adjacent to the wall.

The walls in the broad room, as in all of area E, are almost identical. They are constructed of two rows of stones one course high. This suggests they might have been a stone foundation, probably intended for mudbrick walls. These did not survive because of their proximity to the surface. The walls are 0.7 to 1.0 m. wide, having identical masonry: two rows of large and medium stones with a fill of small stones and soil deposited between them (the same style implemented in Area B Stratum 1). Exceptions to this are Walls 304, 306C and 312, which were thickened for some unclear reason (it cannot be determined if this occurred when the building's foundations were laid or as a later alteration).

A rectangular room (4 x 5 m.), divided by a partition (Wall 328) into two secondary cells (Loci 302 and 307), was present in the northwestern part of the broad room. A number of square rooms are built up against this room (Fig. 22). One (Locus 310) built against it to the south was severely damaged by erosion. All that survived of this room are two walls (309 and 321) and a paved surface of small stones (Locus 315) that probably served as a foundation for an upper pavement or as a floor.

Northwest of the cell in the broad room another rectangular room (Locus 305, 4 x 5 m.) was identical to the cell in the broad room. A wall (330) extends from the northern wall of this room to the north. The remains of a pavement made of small stones were unearthed where the

8. These were Loci 316, 319, 322.

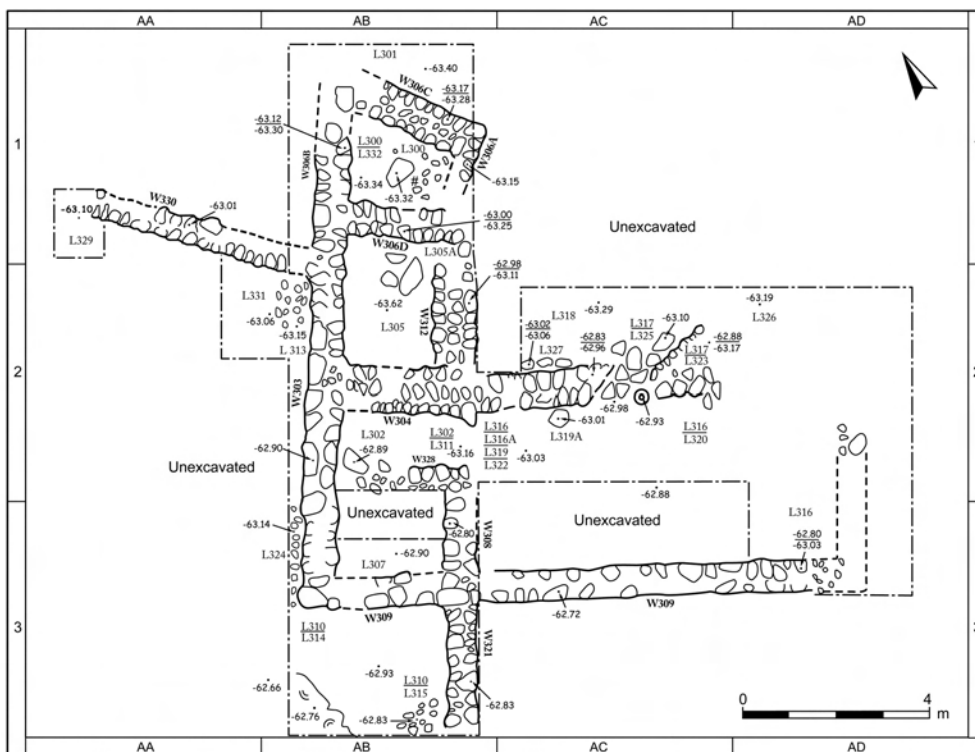


Figure 18. Area E, General Plan.



Figure 19. Area E (looking southwards).



Figure 20. Area E,
The broad room
(looking north-eastwards).

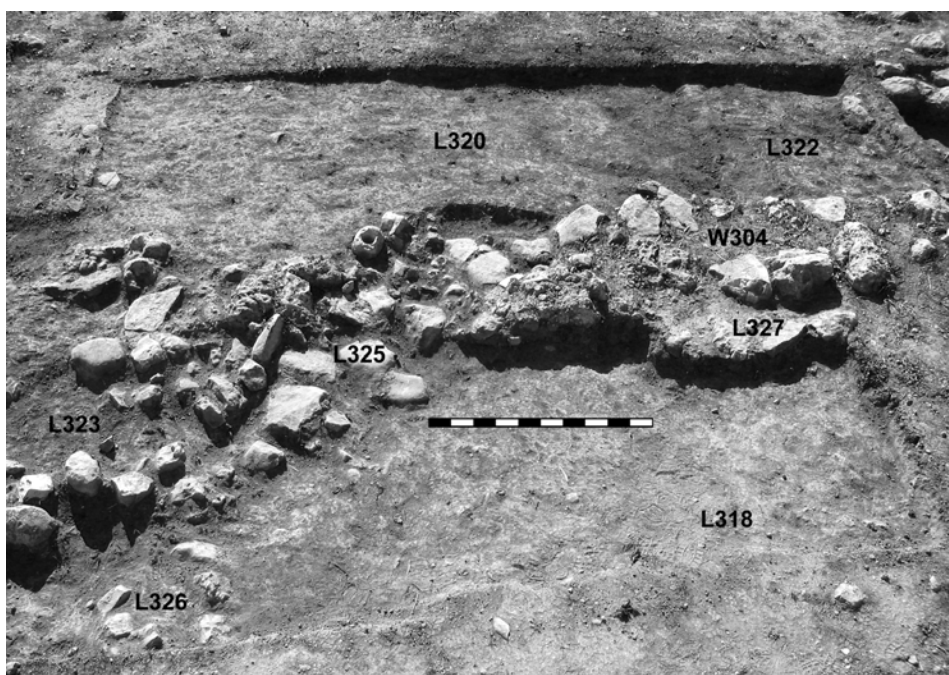


Figure 21. Area E, Entrance to the broad room (looking southwards).

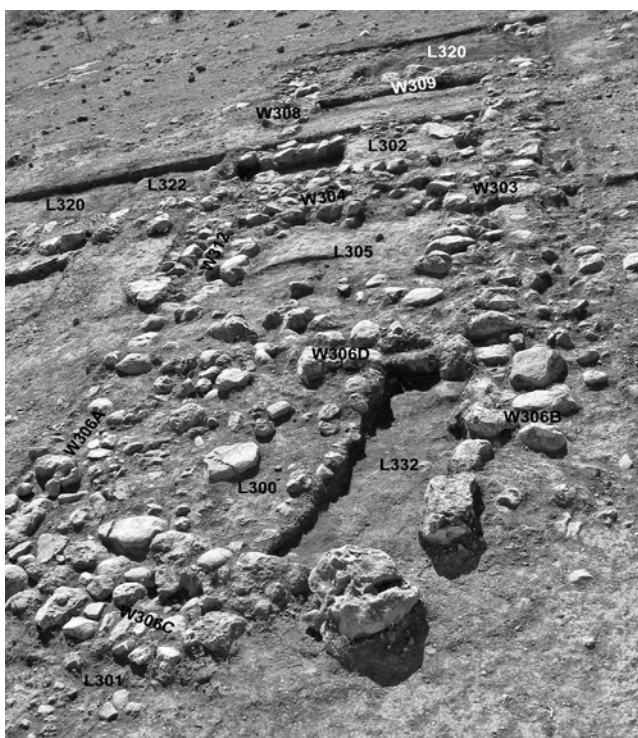


Figure 22. Area E, rooms adjacent to the broad room (looking southwards).

walls meet. Identical pavement remains were also discovered north of Locus 307, probably a courtyard partly delimited by Walls 330 and 303.

Another room (Locus 300) partially eroded and irregular in shape, was east of Room 305. This room was apparently paved with small and medium size stones, with a large flat stone in its center, presumably supporting a column for a roof. In the north-eastern part of this room Walls 306a and 306c seem to reflect a different phase, due to their different orientation.

The ceramic finds from Area E are characteristic of the Chalcolithic period. Outstanding among them are various kinds of holemouth vessels and shallow bowls, some red slipped. Other diagnostic items include the handle of a churn and a ceramic spoon. A flat oval shaped ceramic weight and a shallow stone bowl were also found.

It seems that the building in Area E is equivalent to Stratum 1 in Areas B and C. The reasons for this conclusion are:

1. The wall building material and masonry in area E and in stratum 1 areas B and C is identical. Both are completely different from that of Stratum 2 of Areas B and C.
2. The similarity in ceramic finds points to the same conclusion. Most of the ceramic subtypes found in Area E also appear in areas B and C Stratum 1. At the same time, 50% of the subtypes found in stratum 2 do not appear in Area E (Table 3).

THE POTTERY (O. Cohen and S. Bar)

A total number of 3778 pottery sherds were found and analyzed in the excavation (Table 1). Because of the small amount of material recovered *in situ* during the excavation, it was decided to compile a typology of the main forms presented. A sample of 167 diagnostic pottery sherds was chosen to classify the vessel forms and produce a typology (Table 2). This typology is based mainly on Stratum 1 pottery (including Area E) unless otherwise noted.

Typology

Bowls and Kraters:

This is the most abundant group identified at the site. Seventy three bowl rims of this class were found, constituting 44% of the ceramic finds. Most of the bowl fragments (55 sherds) were found in stratum 1 (Table 4). A single bowl fragment was found in stratum 3.

Table 1. The pottery of Ein Hilu, Totals and subdivisions

Stratum	Area	Total	Total Decorated	%	Painted	%	Applied ornamentations	%	Perforated	%
1	B	1572	57	3.6	50	3.2	6	0.3	1	0.06
	C	1087	94	8.6	88	8.1	4	0.03	2	0.02
2	B	144	7	4.8	6	4.1	0	0	1	0.6
	C	290	26	8.9	22	7.5	2	0.6	2	0.6
3	C	67	7	10.4	7	10.4	0	0	0	0
	E	618	44	7.1	43	6.9	1	0.1	0	0
1		2659	151	5.6	138	5.2	10	0.3	3	0.1
2		434	33	7.6	28	6.4	2	0.4	3	0.6
3		67	7	10.4	7	10.4	0	0	0	0

Table 2. The pottery of Ein Hilu, subdivided into main typological Classes and strata

Class	stratum1	%	stratum2	%	stratum3	%	AreaE	%	Total	%
B	55	44	12	7	1	50	5	22	73	44
H	29	23	2	12	1	50	13	57	45	27
JR	34	27	3	18			3	13	40	24
CH	6	5					1	4	7	4
SP	1	1					1	4	2	1

Table 3. The pottery of Ein Hilu, subdivided into subtypologies and starta (B-bowl, H-hole-mouth, JR-jar)

TYPE	S1	S2	S3	E		TYPE	S1	S2	S3	E
B1a	2	1		2		H1	9			6
B1b	4	2				H2	7			1
B1c	3	2	1	1		H3	10		1	4
B2	17	1				H4				1
B3	3			1		H5	3	2		1
B4a	5					JR1	1			
B4b		1				JR2a	7			
B4c	16	3				JR2b	3			
B5				1		JR3a	19	2		2
B6	3	2				JR3b	3	1		1
B7	1					JR4	1			
B8	1									

Table 4. Bowls subtypes

TYPE	S1	%	ALL	%
B1a	2	4	5	7
B1b	4	7	6	8
B1c	3	5	7	10
B2	17	31	18	25
B3	3	5	4	6
B4a	5	9	5	7
B4b	0	0	1	1
B4c	16	30	19	26
B5	0	0	1	1
B6	3	5	5	7
B7	1	2	1	1
B8	1	2	1	1

Type B1 – Shallow bowls.

B1a (Figs. 23:1-3): Shallow bowls characterized by a straight wall and tapered rim. The average diameter of these bowls is 15 cm, and in most cases they are undecorated. Bowls of this type are sometimes treated with a brown or red slip on the interior or exterior. Five sherds of this type were found at the site. Parallels to this sub-type were reported for the Late Chalcolithic of Teleilat Ghassul (Lovell 2001: Fig. 4.32:2). Another parallel from the Middle Chalcolithic was found at Tel Tsaf stratum I (Gophna and Sadeh 1988-1989: Fig. 9: 11).

B1b (Figs. 23:4-5): Shallow bowls characterized by a splayed wall and a rim folded out and rounded. Their average diameter is 12 cm and most are not decorated. Six sherds of this type were found at the site. Parallels to this sub-type also occur in the Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.32:3).

B1c (Figs. 23:6-7): Large shallow bowls characterized by a splayed wall and a tapered rim. They range from 18 to 25 cm in diameter and are slipped red on the interior and exterior. Seven sherds of this type were found. Parallels to this sub-type are known from Ein Gedi (Ussishkin 1980: Fig. 8: 15) and 'Ain Assawir (Yannai *et al.* 2006: Fig. 4.19: 17).

Type B2 (Figs. 23:8-10) – Large, deep bowls. characterized by a straight, diagonal wall (V-shaped) and a tapered rim. They range from 18 to 30 cm in diameter and are often slipped on the interior and exterior or are decorated with a red band on the rim. Sometimes they are completely undecorated. Eighteen sherds of this type were found, 17 of which were recovered from Stratum 1. This type of bowl, one of the most common both at Ein Hilu and throughout most Chalcolithic assemblages, also appears in the Early Chalcolithic phases and continues to appear in the Early Bronze Age 1. Parallels to this type occur in Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.32:7; 4.33.:2), Tel Te'o VI (Eisenberg 2001: Fig. 6.1: 3), Shoham North cave 4 (van den Brink and Gophna 2005: Fig 6.12: 2) and Fatzael (Porat 1985: Fig. 3: 7).

Type B3 (Fig. 23:11-12) – Large shallow bowls characterized by an everted wall, rounded or tapered rim and a flat base. They are wide bowls with an average diameter of 25 cm, sometimes slipped red on the interior and exterior or decorated with a red stripe on the exterior of the rim. Four such sherds were found. Parallels to this type are known from Grar (Gilead and Goren 1995: Fig. 4.4: 2), Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.3: 7) and Beer Sheva (Contenson 1956: Fig. 9:1).

Type B4 – Hemispherical bowls.

B4a (Figs. 23:13-14): Small shallow rounded bowls with a tapered rim and average diameter of 13 cm. In most cases they are not slipped. Five sherds of this type were found. Parallels to this sub-type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.31:6) and Shoham North cave 4 (van den Brink and Gophna 2005: Fig 6.11: 22).

B4b (Fig. 23:15): Small deep rounded bowls with a tapered rim and an average diameter of 9 cm. They are often slipped on the interior and exterior, yet also often found without a slip. Parallels to this sub-type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.31:2), Giv'at HaOranim; (Scheftelowitz and Oren 2004: Fig. 3.4: 7) and Gheshher (Kovello-Paran 1995: 50: 21).

B4c (Figs. 23:16-18): Large deep rounded bowls with a tapered rim and an average diameter of 20 cm. They are either slipped on the interior and exterior, with a red stripe on the rim, or not slipped at all. Nineteen sherds of this type were found, 16 from Stratum 1. This is the most common bowl at Ein Hilu. Parallels to this sub-type are known from Late Chalcolithic

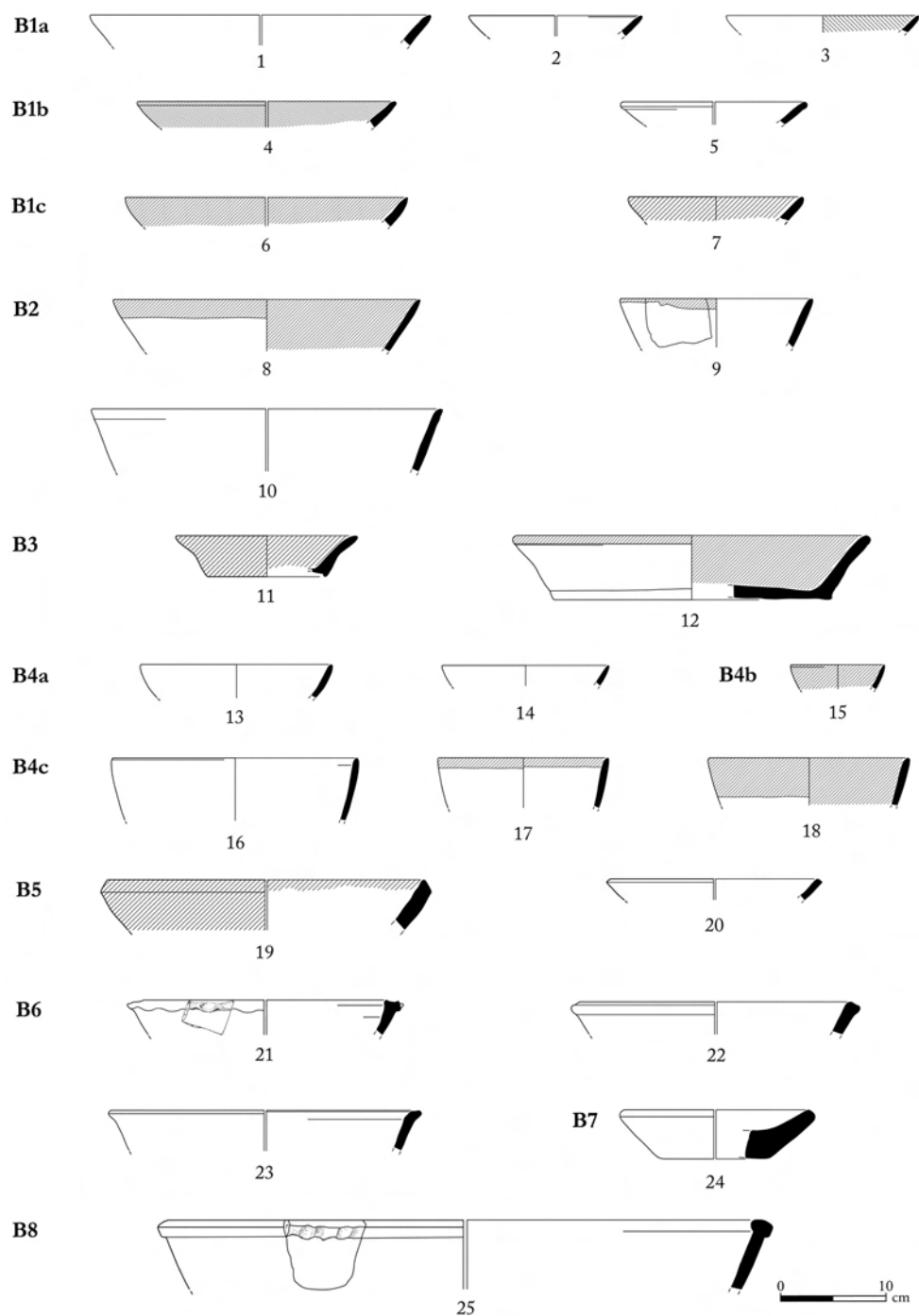


Figure 23. Bowls and basins.

No.	Locus	basket	description
1	143a	1050	Coarse, reddish-brown (exterior and interior) clay and core, red, white and grey (calzit) grits.
2	300	3000	Coarse, brown (exterior and interior) clay and core, red and black grits
3	316	3044	Medium fired, brown (exterior and interior) clay and core, grey and white grits. Brown slip and burnish (interior)
4	135	1035	Medium fired, brown (exterior and interior) clay, grey core, black and white grits. Red wash (interior and exterior). Burning traces (exterior)
5	143	1045	Coarse, light brown (exterior and interior) clay, black core, red and white grits.
6	144	1047	Coarse, light brown (exterior and interior) clay, grey core, grey and white grits. Red paint (exterior and interior)
7	301	3002	Coarse, light brown (exterior and interior) clay and core, grey and white grits. Red slip and burnish (exterior and interior)
8	431	4029	Well fired, brown (interior and exterior) clay, gray core, red, white and gray (calzit) grits. Red paint on rim and Brown slip
9	128	1033	Medium fired, pinkish to orange (interior and exterior) clay, gray core, red, shiny and white grits. Red paint (on rim, exterior). Burning traces (exterior)
10	443	4037	Underbaking, brown clay (exterior), grey core, many grey (calzit) and white (quartz) grits. Burning traces (interior and on rim exterior)
11	305a	3041	Medium-well fired, light brown (exterior and interior) clay, grey core, red, black, grey and white grits. Brown (exterior) and red (interior) paint
12	414	4015	Medium-well fired, reddish brown (exterior and interior) clay, grey core, red, white and grey grits. Red paint (interior and on rim, exterior)
13	128	1036	Well fired, reddish brown (exterior and interior) clay, red core, red, white and grey grits
14	407	4012	Medium fired, reddish brown (exterior and interior) clay, brown core, yellow and black grits
15	143	1045	Well fired, reddish brown (exterior and interior) clay, red core, red, white and grey grits. Red paint (exterior and interior)
16	142	1044	Well fired, brown (exterior and interior) clay and core, red, white and grey grits.
17	429	4027	Medium fired, light brown (interior) and brown (exterior) clay, gray core, red, white, gray, black and shiny grits. Red paint on rim (interior and exterior). Brownish slip (interior and exterior). Burning traces (exterior)
18	433	4028	Medium fired, black (exterior) and brown (interior) clay, grey core, red and white (quartz) grits. Red paint interior and on upper part exterior.
19	310	3013	Coarse, brown (exterior and interior) clay, grey core, grey, red and white grits. Red paint (exterior and partly interior)
20	316	3027	Coarse, light brown (exterior and interior) clay, grey core, grey, red and white grits
21	119	1037	Coarse, red (exterior) and brown (interior) clay, grey core, white grits. Rope decoration (on rim exterior)
22	453	4041	Coarse, light brown (exterior and interior) clay and core, white and grey grits
23	128	1036	Well fired, brown (exterior and interior) clay, grey core, white (quartz) and grey (calcite) grits.
24	400	4010	Coarse, brown (exterior and interior) clay and dark brown core, red, white and shiny grits. Burning traces (interior).
25	14	185	Coarse, brown (exterior and interior) clay and dark brown core, red, white and shiny grits. Burning traces (interior). Rope decoration (on rim exterior)

Figure 23. Bowls and basins (cont.).

Teleilat Ghassul (Lovell 2001: Fig. 4.33:5; 34.4:7), Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.3: 2) and Shoham North cave 4 (van den Brink and Gophna 2005: Fig 6.12: 9).

Type B5 (Fig. 23:19-20) – Large shallow bowls with a cut rim. One vessel found in area E is slipped red on the exterior and interior, with a red stripe on the rim. Its diameter is 30 cm. Parallels with a horizontal cut rim are known from Ghesher (Kovello-Paran 1995: 50: 4) and Umm Qatafa (Perrot 1992: Ill. 3:8).

Type B6 (Figs. 23:21-23) – Deep bowls with a diagonal wall and a flat, sometimes guttered rim. The upper part of the rim is often decorated with rope ornamentation or a ridge. The average diameter of the bowls is 24 cm and they are not slipped. Five sherds of this type were found. Parallels to this type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.34:1-2), Ein Gedi (Ussishkin 1980: Figs. 8: 19; 9: 5; the rim of one of the parallels is decorated with a wavy pattern) and Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.4: 4).

Type B7 (Fig. 23:24) – A very coarse bowl with a thick everted wall, rounded rim and thick flat base, 18 cm in diameter. A single sherd was found in Stratum 1. This bowl was probably used as a crucible, as supported by XRF tests⁹, which revealed traces of Ca ($\approx 2\%$), Fe (0.7%), Zn ($\approx 0.015\%$), and Ti (not determined quantitatively). Parallels to this type are known from Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.3: 8-9).

Type B8 (Fig. 23:25) – A bowl with a diagonal upright wall and a ledge rim. Its exact diameter is not known (greater than 65 cm). There is a rope decoration on the exterior of the rim. One sherd of this type was found in Stratum 1. Parallels to this type are known from cave 49/V (Eisenberg 2002: Fig. 7: 13-14) and Gilat IIC (Commenge 2006: Pl. 10.8: 6-7).

Holemouths:

This is the second most common group of vessels at the site. Forty five holemouth rims were found, which constitute 27% of all of the identified sherds. Most of the holemouth fragments (29 sherds) came from Stratum 1, yet in Area E this type of vessel is the commonest (57%).

Type H1 (Figs. 24:1-4) – This is the most common type of holemouth at the site (along with type H3). The holemouth has a thickened rim whose upper part is sometimes cut. Two

9. The XRF tests were conducted by S. Shalev and S. Shiltein at the Weitzman institute in Rehovot.

subtypes of this vessel were defined: one is 10-15 cm in diameter, and a larger type 18-25 cm in diameter. The holemouths are never decorated or slipped. Fifteen sherds of this type were found, 9 in Stratum 1 and the rest in Area E. Parallels to this type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.36:2, 6) and 'Ain Assawir IV (Yannai *et al.* 2006: Fig. 4.30: 21).

Type H2 (Figs. 24:5-7) – A holemouth with an inverted wall and a cut rim, 22 cm in diameter. A number of examples were found adorned with an intricate rope decoration on the rim and on the body of the vessel. Eight sherds of this type were found, 7 of them in Stratum 1. Examples of this type already appear in the Early Chalcolithic period (Yannai *et al.* 2006: Fig. 4.6: 15, 16). Parallels to this type are known from 'Ain Assawir Va, IV (Yannai *et al.* 2006: Figs. 4.24: 19; 4.30: 22), Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.10: 8) and Gilat I-IIA (Commenge 2006: Pl. 10.12: 1-2).

Type H3 (Figs. 24:8-9) – This is the most common type of holemouth at the site (along with type H1). It has a slightly inverted wall and a tapered rim. Some examples exhibit a ridge below the rim. The average diameter is 25 cm. These vessels are not slipped or decorated. Fifteen sherds of this type were found, 10 of them in Stratum 1. Parallels to this type can be seen in Kissufim (Goren and Fabian 2002: Fig. 4.3: 4) and Fatzael (Porat 1985: Fig. 6: 4).

Type H4 (Fig. 24:10) – A holemouth pithos with an inverted wall and a rim which is folded out. The rim is adorned with a rope decoration ("Pie Crust"). The vessel is 38 cm in diameter. One sherd of this type was found in Area E at the site. Parallels to this type can be seen in Tel 'Ali Stratum 1A: Item 13 (Zosman 1990).

Type H5 (Figs. 24:11-12) – A holemouth with an inverted wall and tapered rim, 10-22 cm in diameter. Five sherds of this type were found. Parallels to this type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.40:2), Beer Sheva (Contenson 1956: Fig. 3:11) and 'Ain Assawir IV (Yannai *et al.* 2006: Fig. 4.30: 18).

Jars:

This is the third most common class at the site, following closely behind the holemouths. Forty jar rims were found, constituting 24% of all of the ceramic finds that were identified. Most of the jar fragments (34 sherds) were found in Stratum 1.

Type Jr1 (Fig. 25:1) – An intact, elongated biconical jar with a flat base and tapered rim that is everted. A pair of large lug handles is affixed to the body. Traces of vertical combing appear on the upper part of the vessel. It is 62 cm high and its rim diameter is 12 cm. A single

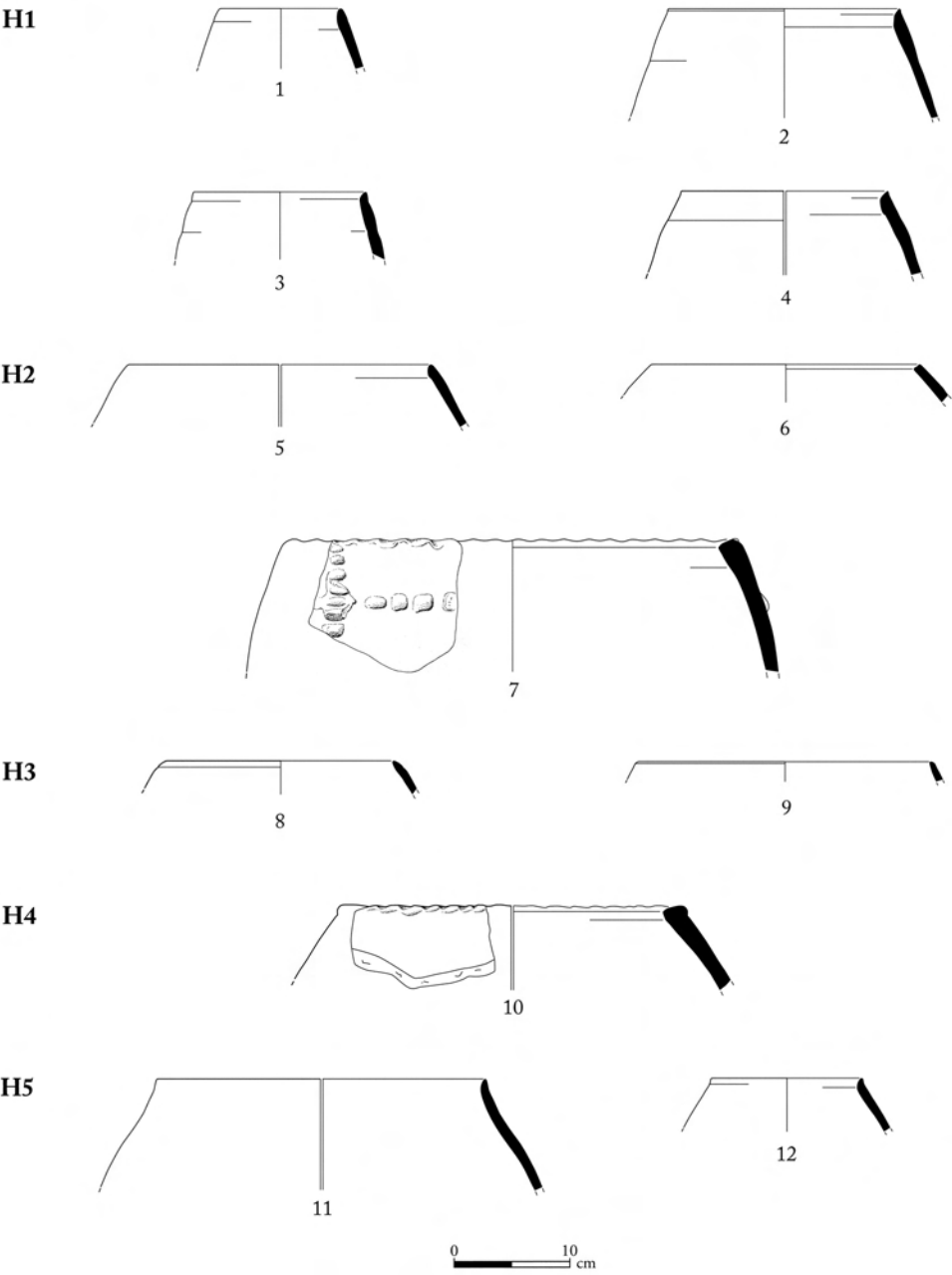


Figure 24. Holemouth Jars.

No.	Locus	basket	description
1	114	1016	Medium fired, red (exterior) and brown (interior) clay, red core, red and black grits. Potter's wheel marks on rim (exterior and interior)
2	431	4029	Well fired, brown (exterior and interior) clay, grey core, white, shiny and grey grits. Burning traces (exterior)
3	429	4027	Well fired, red (exterior) and brown (interior) clay, grey core, red, white and grey grits
4	316	1027	Medium fired, reddish brown (exterior and interior) clay, brown core, red, white and grey grits
5	433	4028	Medium fired, brown (exterior and interior) clay, red, white and grey grits. Burning traces (exterior and interior). Rope decoration (exterior)
6	455	4046	Coarse, brown (exterior and interior) clay, grey core, white and grey grits
7	433	4028	Medium fired, brown (exterior and interior) clay, red, white and grey grits. Burning traces (exterior and interior). Rope decoration (exterior)
8	319	3029	Coarse, reddish brown (exterior and interior) clay and core, red, white and black grits.
9	145	1047	Coarse, reddish brown (exterior and interior) clay and core, red, white and black grits.
10	305	3005	Coarse, reddish-brown (exterior and interior) clay, brown core, white and black grits. Reddish-brown slip (exterior and interior). Rope decoration (on rim exterior)
11	429	4024	Medium fired, brown (exterior and interior) clay, grey core, red, white and grey grits. Burning traces (on exterior and interior rim)
12	411	4014	Medium fired, brown (exterior and interior) clay, grey core, grey and white grits. Burning traces (exterior)

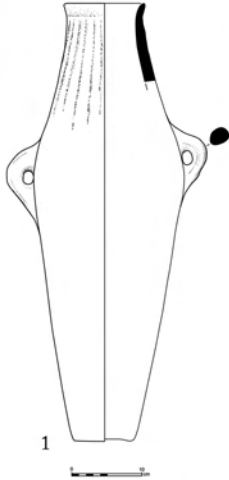
Figure 24. Holemouth Jars (cont.).

example of this type vessel was discovered in Stratum 1. No parallels to this type were found, although the body of the jar is very similar to the Gilat “Torpedo shaped” jars (Commengé 2006: Pls. 10.35:1, 10.34:3).

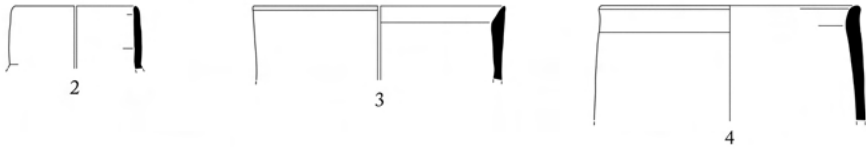
Type Jr2a (Figs. 25:2-4) – A jar with an upright wall and tapered, cut or thickened rim, and typical diameter of 10-22 cm. The jar is sometimes treated with a red slip on the interior and exterior, but is not slipped in most cases. Seven sherds of this type were found, all of them in Stratum 1. Parallels to this sub-type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Figs. 4.40:1, 5) and Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.13: 5).

Type Jr2b (Figs. 25:5-6) – Jars with a slightly inverted wall and a tapered or rounded rim, 13 cm in diameter. One example (Fig. 25:6) of this type of vessel is slipped on the upper portion of the interior and exterior. Three sherds of this type were found, all of them in Stratum 1. Parallels to this sub-type are known from Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.41:2), 'Ain Assawir (Yannai *et al.* 2006: Fig. 4.30: 14) and Cave 49/V (Eisenberg 2002: Fig. 8: 24).

Jr1



Jr2a



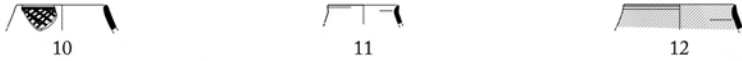
Jr2b



Jr3a



Jr3b



Jr4

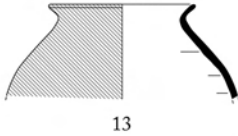


Figure 25. Jars.

No.	Locus	basket	description
1	19		Coarse, reddish (interior and exterior) clay, gray core, grey (calzit material) and white grits
2	129	1037	Coarse, reddish brown (exterior and interior) clay, brown core, red, white and grey grits
3	429	4027	Medium fired, reddish brown (exterior and interior) clay, light brown core, red, white, black and grey grits. Red paint on rim (exterior and interior), burning traces (exterior)
4	427	4030	Well fired, reddish brown (exterior) and pail brown (interior) clay, grey core, red, white and grey grits. Burning traces (exterior)
5	464	4063	Underbaking, brown (exterior and interior) clay, black core, red grits. Burning traces (exterior and interior)
6	427	4022	Well fired, very light brown (exterior and interior) clay and core, grey, white, black and shiny grits. Reddish brown paint (exterior) and red slip (interior)
7	413	4017	Well fired, pail brown (exterior and interior) clay, pail brown and black core, white, red and grey grits. Traces of burning (exterior)
8	412	4016	Well fired, pail brown (exterior and interior) clay, white and grey grits. Traces of red (and dark green) paint (exterior)
9	143	1045	Medium fired, brown (exterior and interior) clay, grey core, red, white and shiny grits
10	106	1009	Medium fired, reddish brown (exterior and interior) clay, white and grey grits. Traces of red paint (exterior)
11	307	3022	Coarse, light brown (exterior and interior) clay and core, grey and white grits
12	452	4040	Medium fired, light brown (exterior and interior) clay and core, white, grey and red grits. Red paint (exterior and interior)
13	433	4028	Medium fired, reddish brown (exterior and interior) clay and core, red, white and grey grits. Red paint

Figure 25. Jars (cont.).

Type Jr3a (Figs. 25:7-9) – A jar with an inverted wall and tapered, diagonal or everted rim. Its diameter ranges from 15 to 28 cm. In most cases, it is not slipped though a red slip rarely appears on the exterior. Twenty-three sherds of this type jar were found, 19 in Stratum 1. Parallels are known from Shoham North cave 4 (van den Brink and Gophna 2005: Fig 6.27: 11), Tel Te'o VII-VI (Eisenberg 2001: Fig. 6.4: 11), Grar (Gilead and Goren 1995: Fig. 4.14: 8), Late Chalcolithic Teleilat Ghassul (Lovell 2001: Fig. 4.41:5) and Ein Gedi (Ussishkin 1980: Fig. 10: 6).

Type Jr3b (Figs. 25:10-12) – A small jar (amphoriskos/cup) with an inverted wall and a pointed, diagonal or everted rim, and an average diameter of 8 cm. The jar is sometimes slipped red and in one case (Fig. 25:10) it is decorated with a reticulated pattern. Five sherds of this type were found. Parallels to this sub-type are known from 'Ain Assawir IV (Yannai *et al.* 2006: Fig. 4.30: 15), Kissufim (Goren and Fabian 2002: Fig. 4.1: 10) and Cave 49/V (Eisenberg 2002: Fig. 8: 22).

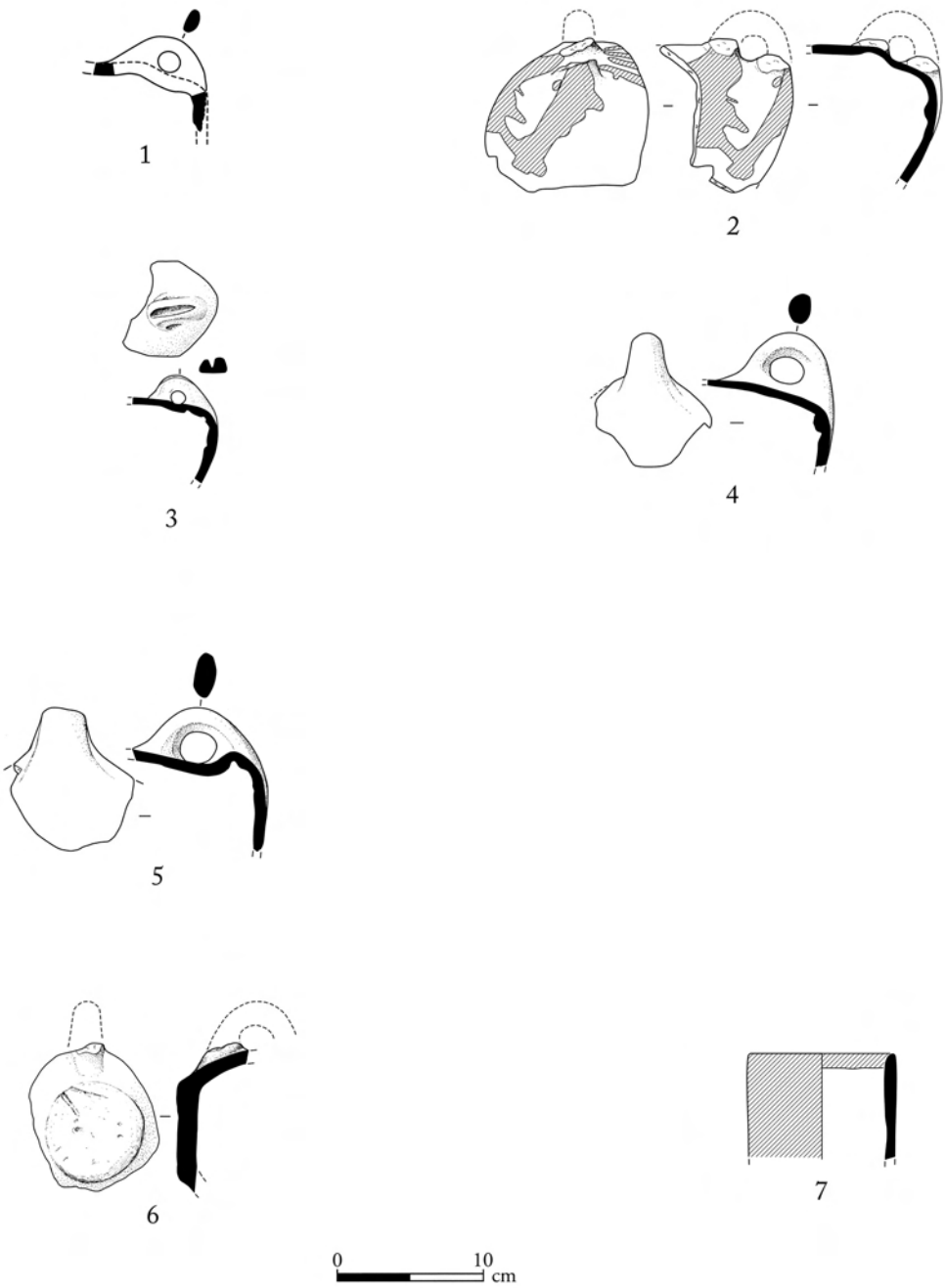


Figure 26. Churns

No.	Locus	basket	description
1	313	3012	Coarse, light brown (exterior and interior) clay, grey core, red, white (chalk?) grits
2	414	4015	Well fired, reddish- brown (exterior and interior) clay, grey core, grey, red and white grits. Red paint and burning traces (exterior)
3	427	4022	Medium-well fired, reddish- brown (exterior and interior) clay, grey core, grey, red and white grits. Burning traces
4	429	4027	Coarse, reddish- brown (exterior and interior) clay, black core, grey, red and white grits. Traces of burning (exterior)
5	437	4032	Medium fired, reddish- brown (exterior) and black (interior) clay, brown core, red and white grits. Burning traces (exterior)
6	433	4028	Well fired, reddish- brown (exterior) and light brown (interior) clay, black-grey core, red and white grits. Burning traces (exterior)
7	407	4008	Coarse, light brown (exterior and interior) clay, grey core, red, white and black grits. Red paint (exterior and on rim, interior).

Figure 26. Churns (cont.)

Type Jr4 (Fig. 25:13) – A jar with convex wall and an everted rim, 12 cm in diameter, and exterior that is treated with a red slip. One example of this type was found in Stratum 1. Parallels are known from Grar (Gilead and Goren 1995: Fig. 4.15: 1), Giv'at HaOranim (Scheftelowitz and Oren 2004: Figs. 3.12: 6; 3.13: 7) and Umm Qatafa (Perrot 1992: Ill. 3:10).

Churns:

Seven fragments of churns were discovered (Fig. 26), six of which in Stratum 1. All the fragments are similar representing churns with curved bodies and large lug handles attached to their ends. One of the churns (Fig. 26:2) is decorated with an abstract red painting. Another smaller churn has an incised lug handle (Fig. 26:3). The neck of a churn, which is upright and has a tapered rim, was also found. The outer wall is slipped red and there is a red stripe on the interior of the rim (Fig. 26:7). Parallels are known from many sites, e.g. Beer Sheva (Contenson 1956: Figs. 9:7, 8).

Spoons:

Parts of two ceramic spoons (Figs. 27:3-4) were found. The spoons were round, with a plain rim and slightly longer than 5 cm. Parallels to this type are known from Giv'at HaOranim (Scheftelowitz and Oren 2004: Fig. 3.16: 10) and Umm Qatafa (Perrot 1992: Ill. 4:4).

Ceramic weights:

Four ceramic weights of two distinct types were found. Two of the weights are possible biconical loom weights (Figs. 27:1-2), perforated from both sides. They measure between 3-4 cm. wide and 2.5-4.0 cm. long. Parallels to this type are known from Giv'at HaOranim (Scheftelowitz and Oren 2004: Figs. 6.2: 1-3).

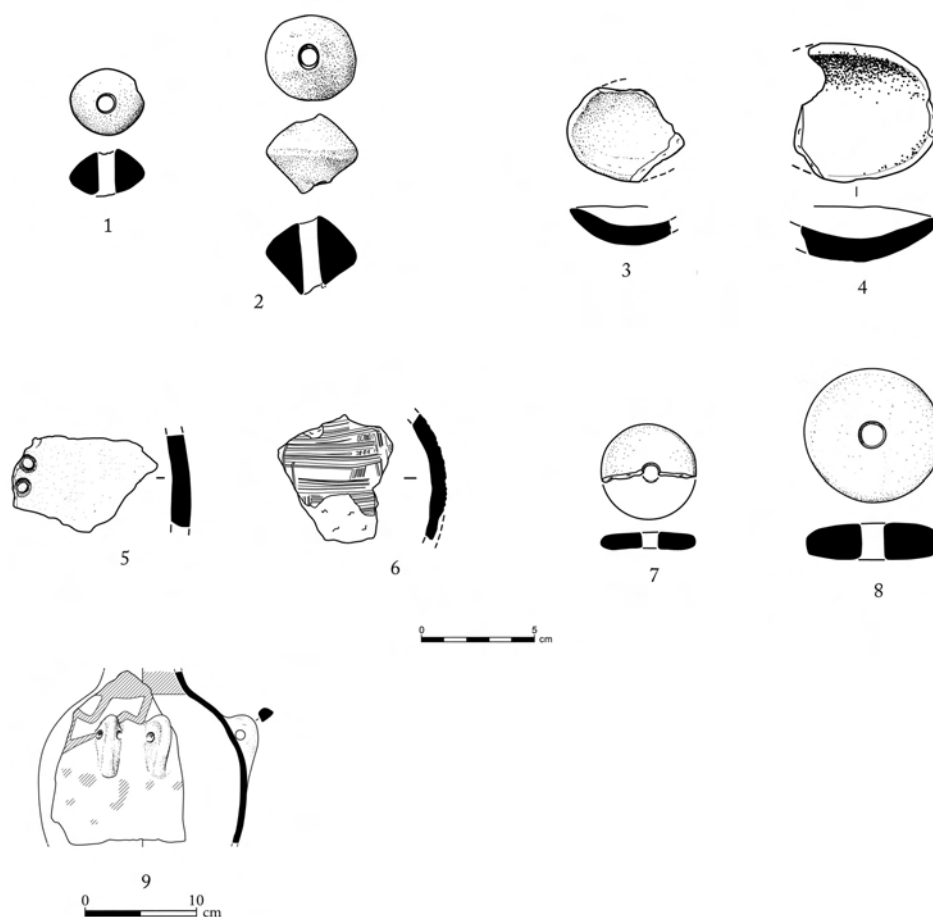


Figure 27. Varia.

Two are spindle weights (Figs. 27:7-8) shaped like flat discs with a round hole in the center. They measure 4-5 cm in diameter and are 1-2 cm thick. Parallels to this type are known from Giv'at HaOranim (Scheftelowitz and Oren 2004: Figs. 6.2: 5-7).

The Ceramic Fabric:

A visual examination of the fabric was performed on a sub-sample of sherds. The primary purpose of this examination was to identify the kinds of tempers in the clay and to understand the function of certain vessels.

Much of the clay used to make Ein Hilu's vessels contains numerous red, black, gray, and white inclusions. Mica was also identified. The clay is mostly coarse but there are also vessels that were well fired, mainly bowls (Types B2, B4, and B6) and jars (Types Jr2, Jr3).

No.	Locus	basket	Type	description
1	316	3027	Loom weight	Coarse, light grey clay and core, white ,red and grey grits. Burning traces (exterior)
2	452	4040	Loom weight	Coarse, light brown clay and core, white and shiny grits
3	128	1033	Spoon	Medium fired, light brown (exterior and interior) clay, grey core, white grits. Burning traces (exterior and interior)
4	311	3009	Spoon	Coarse, black (exterior) and light brown (interior) clay, black core, red, white and shiny grits. Traces on burning (exterior)
5	122	1030	Decorated sherd	Well fired, reddish- brown (exterior and interior) clay, brown core, white and shiny grits. Two reed imprints (exterior). Yellow wash (exterior)
6	135	1035	Decorated sherd	Well fired, light brown (exterior and interior) clay, grey core, grey and white grits. Imprints on surface (exterior)
7	145	1047a	Spindle weight	Coarse, brown (exterior and interior) clay and core, small black grits
8	129	1030	Spindle weight	soft limestone
9	129	1037	Decorated jar	Well fired, light brown (exterior and interior) clay and core, white, grey and red grits. Red paint (exterior and on shoulder, interior).

Figure 27. Varia (cont.).

The color of the fabric ranges from light to dark brown; sometimes there are remnants of soot on the sherd, implying that it was used for cooking. Generally, the inclusion of shells (calcite) or chalk (quartz) in temper indicates that a vessel was used for cooking. An examination of the sherds that indicate cooking (whether by the addition of quartz or calcite temper, or from traces of soot or burning) reveals the following: among the bowls, Types B2 (3 sherds) and B4c (2 sherds) stand out as vessels that may have been used in cooking. Other sherds of the bowl class that were identified as possible cooking vessels belong to Types B1a, B6 and B7. Among the jars, Type Jr2a (3 sherds) stands out as a vessel that may have been used for cooking. Types H2 (2 sherds) and H5 (2 sherds) stand out as holemouths that were probably used for cooking. Another sherd of this class was identified and belongs to Type H1. Examination of the artifacts suggests that both open and closed vessels were used for cooking.

Petrographic analysis¹⁰.

A small selection of sherds from Stratum 1 of areas B and C was submitted for petrographic analysis. The results of the analysis revealed two separate groups:

10. The petrographic analysis was made by Y. Goren from the Laboratory for Comparative Micro-archaeology at the Sonia and Marco Nadler Institute of Archaeology, Tel Aviv University

Group 1 – Marine Lower Cretaceous:

Pottery composed of diversified shales or shale-rich clay with ferruginous ooliths, quartz and calcite crystals. The matrix is rather silty (usually about 2% by volume or more). The temper of this group contains diversified shales, ranging from black to light yellow in thin-section. Quartz is widespread in all cases, usually badly-sorted, angular to subrounded, reaching a coarse grain size of up to 1 mm. Also common are calcareous rock fragments, both as calcite crystals and limestone. Within the limestone fragments, in some cases, several types of fossils occur including *Orbitolina* sp., which is typical of the marine Lower Cretaceous formations of Samaria and the Galilee. A typical attribute of this group is the appearance of many opaque ooliths¹¹, determined under reflected light to be composed of hematite and limonite.

Provenance: Lower Cretaceous formations most likely of Eastern Samaria (Wadi Far'ah, Wadi Malih).

This group is the most common in Ein Hilu and therefore strengthens the assumption that, as in the cases of other Chalcolithic sites (e.g. Shiqmim, Goren and Gilead 1987), most of the material used for pottery production was brought from the vicinity of the sites (probably from Wadi Malih which runs by the site).

Group 2 – Taqiye Marl (one sample – a jar)

This fabric is distinguishable to the naked eye by its whitish or yellowish color that tends to appear greenish-gray at higher firing temperatures (above c. 700 C). However, the estimated firing temperatures in our case (according to structural changes of various minerals) are far lower, and the whitish shade dominates the sherd. Microscopically, this fabric is characterized by light, highly calcareous clay (marl), containing foraminifers and iron oxides (with limestone and dolomite sand temper). The microfaunal assemblage within the matrix, when identified, is usually of Paleocene age. Based on its mineralogical and micropalaeontological affinities, this clay is identified as marl of the Taqiye Formation of the Paleocene age (Goren *et al.* 2004: 256-258 with references and discussion). The exact provenance of this vessel cannot be determined.

Decoration:

Three kinds of decorations were identified on the ceramics from Ein Hilu: paint (slip), plastic decoration, and perforation (Table 1).

Painted decorations applied after firing, were either painted with a brush or by immersing the vessel in the paint. Red and brown are the only colors that were identified on the sherds

11. Ooliths are spherical to elliptical bodies, 0.25 to 2.00 mm. in diameter, which may or may not have a nucleus, and have concentric or radial structures. In this case, some ooliths are developed around quartz grains, others have no internal structure.

from Ein Hilu. Painting with a brush was used mostly on open vessels (bowls) or on the exteriors of closed vessels (primarily holemouths). The “lipstick” design that is painted on the rims of the vessels, also characteristic of the Chalcolithic period, is the most abundant painted decoration on the ceramics from the site. A very large number of sherds (216) decorated with paint were found at the site, 138 of which were recovered from Stratum 1 and 43 from Area E. One example of a reticulated pattern (Fig. 25:10) is reminiscent of the decorations on the vessels from Tel Tsaf (Gophna and Sadeh 1988-1989) and Kataret Es-Samra (Leonard 1989) that are probably from slightly earlier phases of the Chalcolithic.

Plastic decorations were probably applied to the vessels when they were in the state of “leather hard”, one stage before the vessels were fired. Primarily, sherds with rope ornamentation were found at the site. A total of 12 sherds with applied decorations were discovered, most of them (10) in Stratum 1.

Like the plastic ornamentation, perforated decorations were probably added to the surface of the vessel prior to firing, when it was still “leather hard”. Six sherds decorated with perforations were found at the site.

Overall, decorated vessels were relatively uncommon at the site. Of the sherds that were found in Stratum 1 only 5.6% were decorated in some manner (Table 1). The data regarding the finds from Stratum 2 (7.6%) and Area E (7.1%) are not significantly different from those of Stratum 1. It is interesting to note that despite the small number of finds from Stratum 3, more than ten percent of the sherds (10.4%) are painted.

Pottery spatial analysis (Fig. 28):

Intra-site spatial analysis was performed only for Stratum 1 Areas B and C, as the limited exposures of Strata 2 and 3 were not extensive enough for analysis, and Area E lacks material relevant to this procedure. The analysis is based upon selected artifacts from *in situ* deposits (mainly floor deposits) and minimum number of individuals. The analysis is used to identify special activity areas. Two areas within the excavation contained most of the finds suitable for our analysis:

The possible inner courtyard between walls 423, 432, 434 and 418 in area B, and the outer courtyard south of wall 423 in area C.

The inner courtyard contained a large number of pottery vessels which probably leaned against, or were placed alongside wall 432. In a 1x4 m section adjacent to wall 432, we found 3 churns, 4 holemouth jars, 4 jars and 4 bowls, all lying horizontally on the packed earth floor. On the other side of the same courtyard, along wall 418, an area of similar size produced only one jar and one bowl. Room 441, to the north-west of the inner courtyard, housed *in situ* remains of two jars and one holemouth jar.

The longitudinal rooms separated by walls 418 and 420 (Loci 427, 410, 412 and paved locus 413) contained small amounts of ceramic material (fragments of 2 vessels each), not

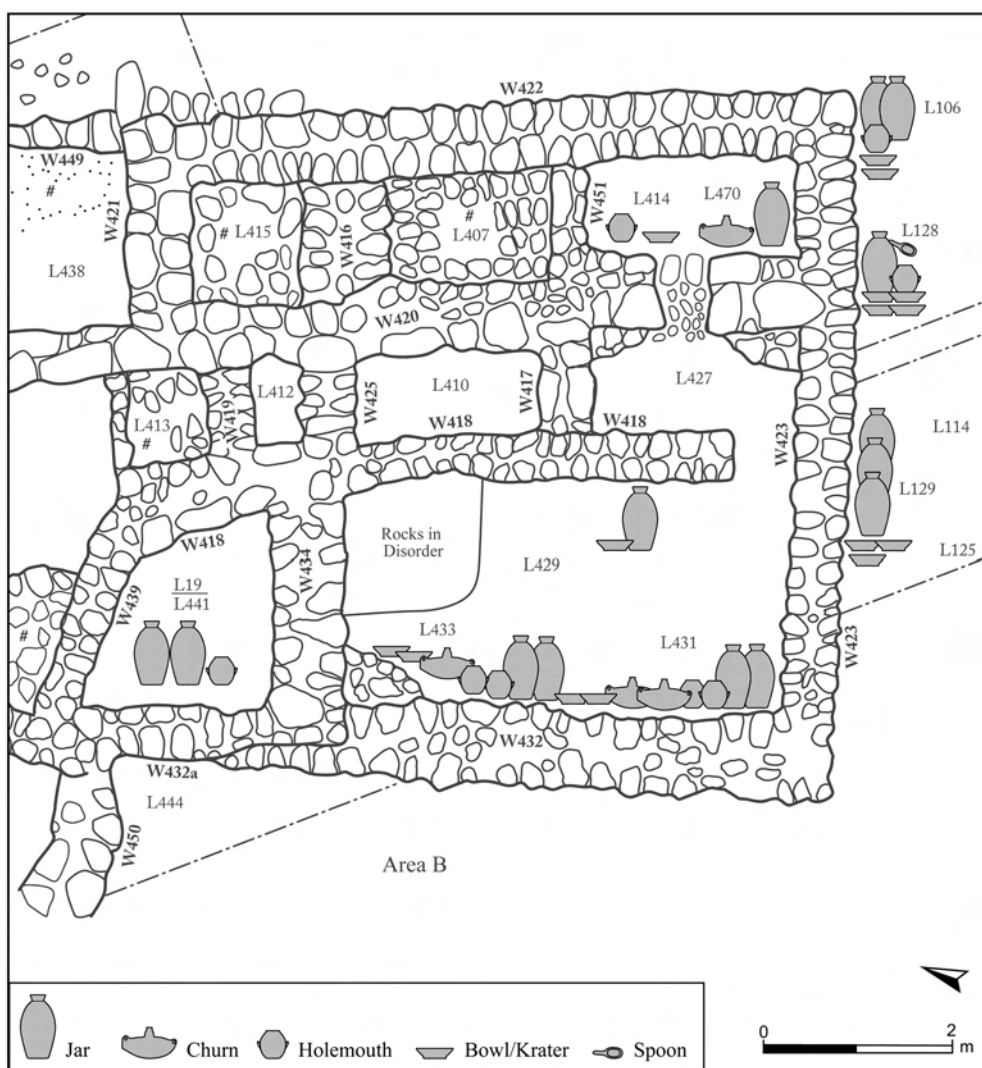


Figure 28. Pottery Spatial analysis (schematic sketch).

in situ. Paved rooms 407 and 415 (in the eastern part of the building) contained no *in situ* material, but the unpaved room 414 and 470 (actually two parts of the same room) contained *in situ* crushed vessels. These include one churn, one holemouth jar, one jar, and one bowl.

The rooms and alley north west of walls 421 and 439 were excavated in 1988, and our excavation only cleaned them therefore we are unable to use this part of Area B in our analysis.

The outer courtyard, south of wall 423 in Area C, contained an interesting distribution of vessels similar to that of the inner courtyard. Most of the vessels were found alongside wall 423 (11 bowls, 7 jars and 3 holemouth jars). Further from the wall (moving southwards) the density of vessels declined rapidly.

The results of the spatial analysis are:

1. Vessels were usually set alongside walls, not left in the middle of living spaces. This was probably done to save space. The convenience of leaning heavy vessels against the walls (and possibly on each other) may also have been a factor.
2. Paved rooms were not used for storage in ceramic vessels. Perishable containers (such as sackcloth) were probably utilized for storage in these rooms.
3. Large storage containers were kept mainly in courtyards.
4. Vessels of different types were found together (we did not find preferred locations for a specific type of vessel).
5. The inner courtyard in Area B was the only suitable place for sleeping during winter when sleeping outside was not possible (the other rooms are simply too small). However, we do not have any proof to whether the inner courtyard was roofed or not¹².

THE FLINT ASSEMBLAGES (H. Winter)

Aims, problems and limits of the study

The main goal of this study was to investigate the role flint tools played in the daily routine of a Late Chalcolithic population in this area and the groups of activities carried out by the tools. The proportions of these groups reflect clearly the character of the community.

Detailed technological analyses of the flint assemblage were beyond the scope of this work as the aim was the study of human life ways and not a study of the history of handicraft or technology. The study refers to technical details only as far as these have some influence on the function of the tools.

The 2006 excavation included clearing the debris which had accumulated since the early 1990s in order to renew the excavations, enlarging the excavated area, and a total surface collection of three 5x5 m. squares. As no flints which could be attributed definitively to other periods were found, all flint artifacts, including surface finds should be attributed to the Chalcolithic. Most of the sediment of the excavation was not sieved because much of it

12. No traces for roofing (such as burnt wood or bases for columns) were found in the excavation although I do believe that at least all the small rooms were roofed. A possible exception is the horizontal slab found in the middle of a room in area E – L 300 (see figs. 18, 22).

was material swept downhill which re-filled the old excavation. Furthermore, the area of the excavation was limited to a rather small part of the site and the quantity of flint artifacts was quite modest thus impeding a presentation of a comprehensive intra-site comparison of loci and the full picture of the industry. Apparently the results present only a partial picture of the situation. Possibly, special activity locations escaped our eyes or could yet be concealed at unexcavated areas.

Methodology, definitions and routine of work of this study

In this project we relied on the similarity of flint tools to modern tools and the activities designated to these, on the function of some tool types which had been studied in detail, e.g. sickles (Rosen 1997: 44-60) and to some extent, on personal ethnographic observations of Bedouin herder-farmers at the Negev Highlands. Even so, is it possible that some other activities and procedures, still not fully understood, utilized flint tools. Furthermore certain tools could be used for a variety of tasks thus complicating the definition of activities. For example, adzes could serve for woodwork as well as as hoes for digging, tilling, and planting; cutting implements could be used also for carving; scrapers and knives could be utilized both for handicraft or food processing, and axes could serve also as weapons. All tool types to which no definite function could be attributed were included in a category of unknown function.

The assemblage was divided to three main artifact groups which were sub-divided to artifact and tool categories. The clear definition of the three groups of flints in the assemblages is most important:

- 1) Group A: *Waste* – any artifact (without secondary modification or use-wear) not fit for further use. This group includes cores, unused primary elements, trimming elements, and debris such as chips and chunks.
- 2) Group B: *Debitage* – any prefabricated blank which could serve as a tool without further modification or as a blank for a retouched tool. We consider these blanks as potential tools and the category includes mainly flakes, blades, bladelets, and ridge blades.
Only a use-wear analysis can prove whether a certain blank should be classified as a tool. Use-wear is the criterion for this classification. Blanks with use-wear are found frequently in assemblages and the earliest flint tools used by humans were without secondary modification.
- 3) Group C: *Shaped tools* – any blank, with secondary modification (retouched, truncated, notched etc.). The presence of use-wear is not the criterion for this classification; the tool could be either used or unused.

- A. The shaped tool group (C) was divided into subgroups of diverse activities, which from our point of view, were most relevant for the period¹³: handicraft and household: agriculture; food processing; general and undefined purposes.
- B. Each activity subgroup was divided again according to the various tool types defined by their function and morphology.

Handicraft and household:

- a. Hammering tools: hammer-stone, punch.
- b. Heavy woodwork and tilling: axe, adze, chisel (gouge).
- c. Carving and shaping tools: burin, notch, denticulate, various kinds of knives.
- d. Perforating tools: borer, awl, needle, awl (microborer).
- e. Scraping tools: end scraper, side scraper, rounded or transversal scraper, fan scraper, thumbnail scraper, micro end-scraper.

Agriculture:

- f. Tilling tools: hoe, pick.
- g. Reaping tools: sickle segment, reaping knife.

Food processing:

- h. Cutting and butchering tools: retouched (or backed) blade, retouched (or backed) flake, backed knife, retouched fragment, utilized blank (flake or blade with clearly visible use- wear).
- i. Food preparing tools: chopper, pestle, grindstone, various kinds of knives.

General and undefined purposes:

- j. Undefined function: microliths (retouched), truncations, ad hoc tools.

The above list includes a wide variety of tools which were not necessarily present in the assemblage. Only after the final classification of the Ein Hilu assemblage it was possible to understand which part of the assemblage matches the list, which types were not present, and if any tool type not listed had to be added. During the initial inspection of the assemblage hunting tools, such as projectile points, were not found and from the beginning this category was excluded from the list.

Remarks on flint knapping, flint varieties and sources of flint

a. Primary flint knapping (Table 5)

Even though a detailed report according to area, stratum, and locus is beyond the scope of this paper (for a detailed report see Bar 2008, chapter 7.2), cores, primary elements, flaking

13. Further development of the system or the research of other periods could and would change these groups. As an example, for hunter-gatherers hunting tools should be added.

debris and hammer-stones, were present only in very few loci. Apparently primary flaking from cores imported from still unknown locations was carried out occasionally only in Strata B1 and C3. It is likely that primary flint knapping was carried out at distant locations still unknown or in unexcavated parts of the site.

Table 5. Ein Hilu Flint – Areas B, C, E – summary of cores, primary elements and hammer-stones

Areas: B, C, E			
Area	Cores	Primary elements	Hammer-stones
B	8	23	2
C	1	15	1
E	1	6	1
Total waste: 616	10 (1.6%)	44 (7.1%)	4 (0.7%)

b. Flint varieties and preferences for specific tool types

Patina on flaked surfaces was rare but a variety of different colors and qualities of flint was observed in the assemblage:

- The bulk of the assemblage consisted of medium grained, light gray to khaki colored pieces in various shadings. Some of these had zebra like stripes and some others had a marginal patina with light colored spots.
- Dark brown to black, fine grained flint pieces were present, but rare.
- Light brown, medium grained pieces were present, but rare.
- Beige, coarse grained pieces were present, but rare.
- Semi-translucent, gray, fine grained flint was present but extremely rare.

The material preferred for heavy core tools was light gray to beige, medium grained flint. For most sickles the gray varieties were preferred, but a few pieces on black and brown high quality flint were found. The few microliths were mainly from semi-translucent, gray, or black fine grained flint. Rounded and fan scrapers were prepared from beige, medium grained flint.

c. Possible sources of raw flint (Fig. 29)

The site is located on a hill consisting of limestone and marl of the Lower Cretaceous Age. At this location no flint is present. The Miocene conglomerate from the Hordos formation to the east of the site contains flint cobbles. Another potential source is the riverbed of Wadi Malih to the north and west of the site. Flint cobbles from the Eocene and Senonian Ages, swept down from the drainage basin a few kilometers west of the wadi, can be found there. Some of the recovered flints were still covered partly by a cortex proving that they originated from lenses imbedded in chalky matrix. Other parts of the surfaces were patinated to some

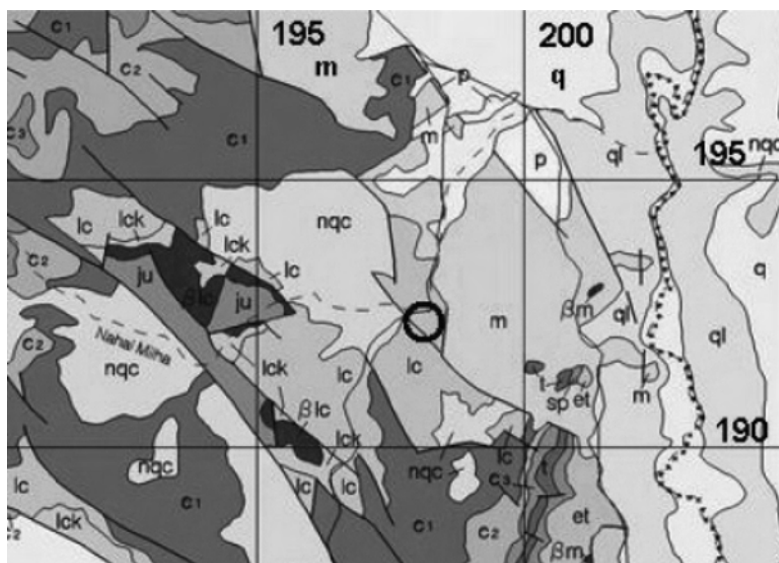


Figure 29. Ein Hilu, location on geological map (Sneh et al. 1998).

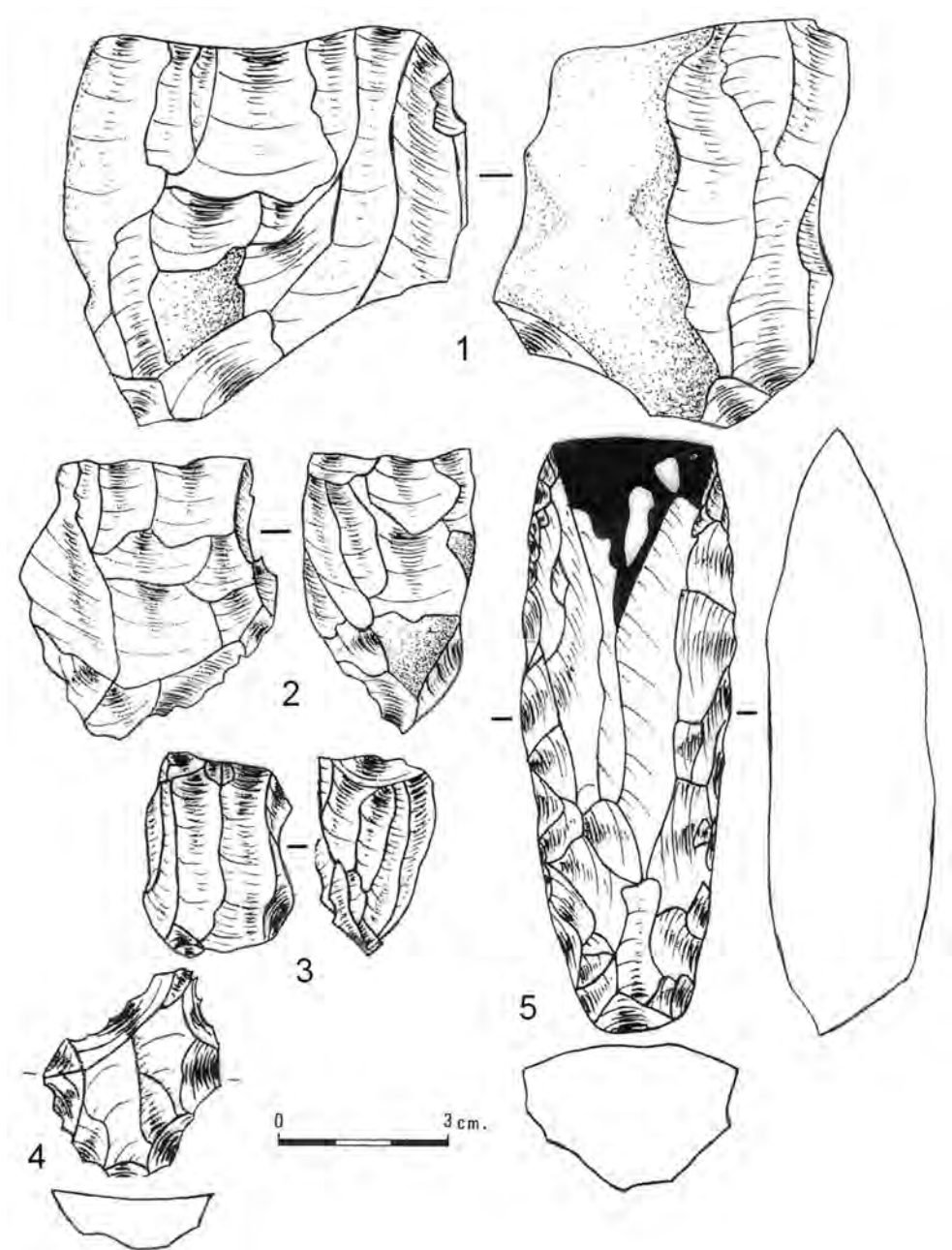
extent, but the blunt edges showed clear signs of rolling, suggesting that the cobbles were collected in a wadi bed. This accords with the location of the site and explains the wide range of qualities and colors. The sources of raw flint have not been studied in detail and only microscopic analyses and identification of micro-organisms can supply final answers as to the exact sources of the flint.

The assemblages (Tables 6-9)

Area B (Table 6; Figs. 30:1-5; 31: 1-10; 35: 1-6)

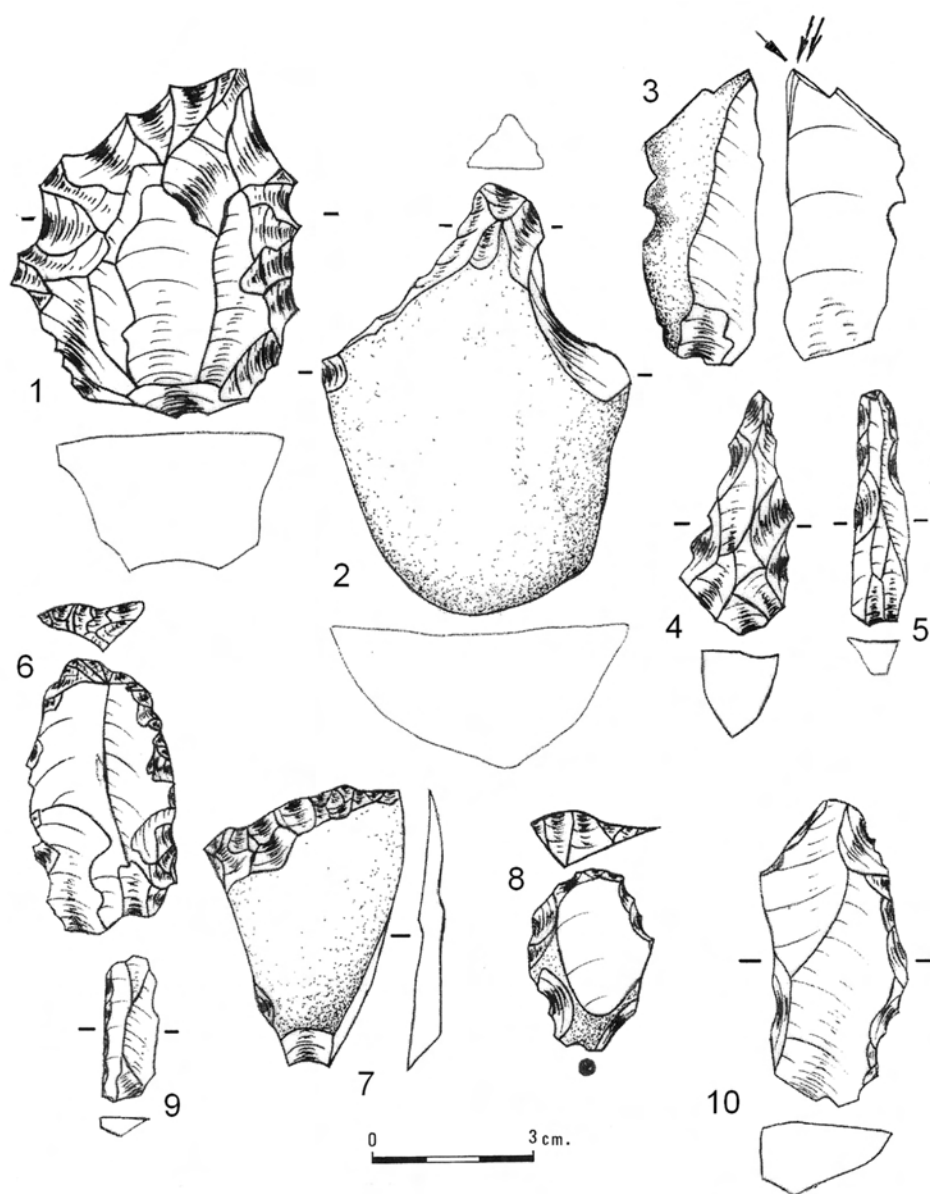
Stratum B1: Loci 407, 413 and 466 yielded many chips and only a single tool. As no cores were found in these loci it seems convincing that secondary shaping of tools from prefabricated blanks included in group B was carried out at these locations. Despite the fact that tools in each locus of Stratum B1 were few, the percentage of these in the assemblage is quite high due to the fact that much of the excavated sediment was not sieved and small artifacts were not retrieved. Loci 429 and 431, which are close to each other, yielded a relatively large variety of tools including handcraft, food processing, and reaping tools. Various working activities were possibly carried out at this location.

Stratum B2: The excavated area was very small and does not provide evidence for any handcraft, food preparation, or agricultural activities. Apparently there is some evidence for secondary shaping of flint tools at this level.



Area B: 1 – Core, L. 415; 2 – Core, L. 443; 3 – Bladelet core, L. 411;
4 – Notch, L. 431; 5 – Axe-Adze, L. 415.

Figure 30. Area B: 1-3 Cores; 4-5 Tools.



Area B: 1 - Denticulate L.459; 2 - Borer, L.433; 3 - Burin, L.431;
 4 - Borer, L.426; 5 - Borer, L.433; 6 - End-scraper, L.431;
 7 - Fan scraper (fragment), L.459; 8 - Thumbnail scraper,
 L.406; 9 - Backed bladelet, L.406; 10 - Side-scraper, L.126.

Figure 31. Area B: 1-10 Tools.

Table 6. Ein Hilu Flint – Area B – Summary of general Groups

Area: B	Group A		Group B		Group C		Total	
Stratum	N	%	N	%	N	%	N	%
1	198	57.8	102	29.7	43	12.5	343	100
2	79	84.0	15	16.0			94	
Total	277	63.4	117	26.8	43	9.8	437	100

Area C (Table 7; Figs. 32: 1-9; 33: 1-7; 35: 7-9)

Stratum C1: The excavated area was small and tools (Group C) were few, but their percentage was relatively high due to the fact that most small waste (Group A) was not retrieved. That neither cores nor hammer-stones were found, and small waste was scarce, indicates that no flint knapping or secondary modification of flint tools took place at most loci of Stratum C1. Exceptions were at locus 112 where both tool blanks and a wider variety of shaped tools were retrieved, although no waste was present. At locus 128 all products for secondary modifying processes were present.

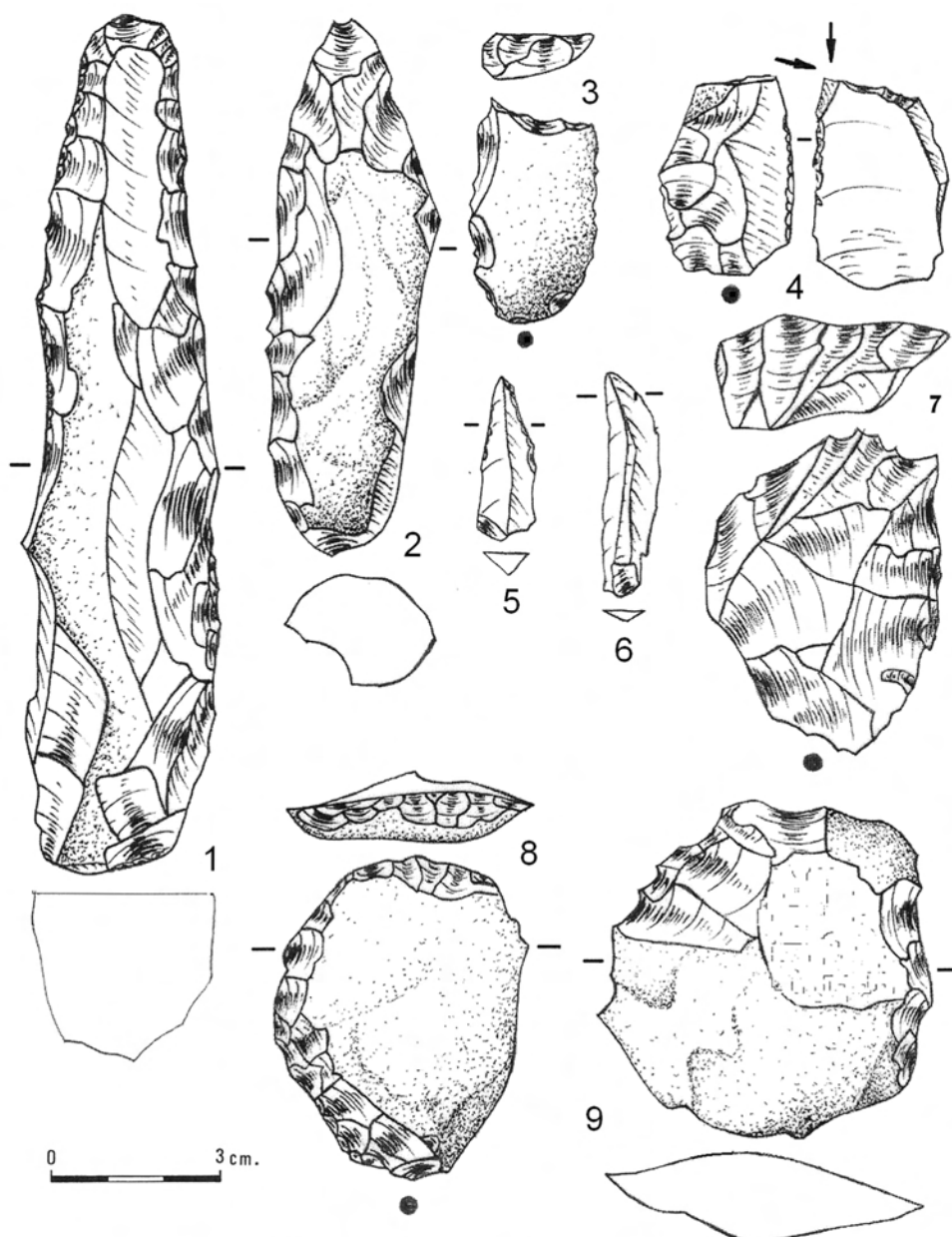
Stratum C2: The sediment from loci 136 and 143 was sieved thus presenting a more accurate picture of percentages of the main artifact groups. Even though only a single core was retrieved at locus 143 the high quantity of waste indicates that some secondary modification of tools took place at this locus. Loci 143 and 143a were apparently an open-air working area. The scarcity of cores and hammer-stones, artifacts which can be located easily without sieving, in Strata C1 and C2 provides firm evidence that initial knapping was carried out elsewhere or at unexcavated locations.

Stratum C3: The three cores and one hammer-stone found indicate apparently that some primary flint knapping took place on a floor (locus 145). The sediment from this floor was sieved. There seems to be a similarity between Loci 145 and 143 from Stratum C2 above it.

The excavation at area C was limited in area and as the exact chronology of the structures is unknown it would be speculative to draw conclusions about this area. The previous excavation and the surface collection yielded more tools thus indicating a wider range of activities.

Table 7. Ein Hilu Flint – Area C – Summary of general groups

Area: B	Group A		Group B		Group C		Total	
Stratum	N	%	N	%	N	%	N	%
1	22	25.3	45	51.7	20	23.0	87	100
2	205	84.0	34	13.9	5	2.0	244	
3	71	71.0	20	20.0	9	9.0	99	
Total	298	69.1	99	23.0	34	7.9	431	100



Area C: 1 - Chisel, L.128; 2 - Chisel, L.408; 3 - End notch, L.134;
 4 - Burin, L.102; 5 - Backed bladelet-point, L.143a;
 6 - Bladelet, L.146; 7 - End-scraper, L.129;
 8 - Rounded scraper, L.144; 9 - Rounded scraper, L.139.

Figure 32. Area C: 1-9 Tools.

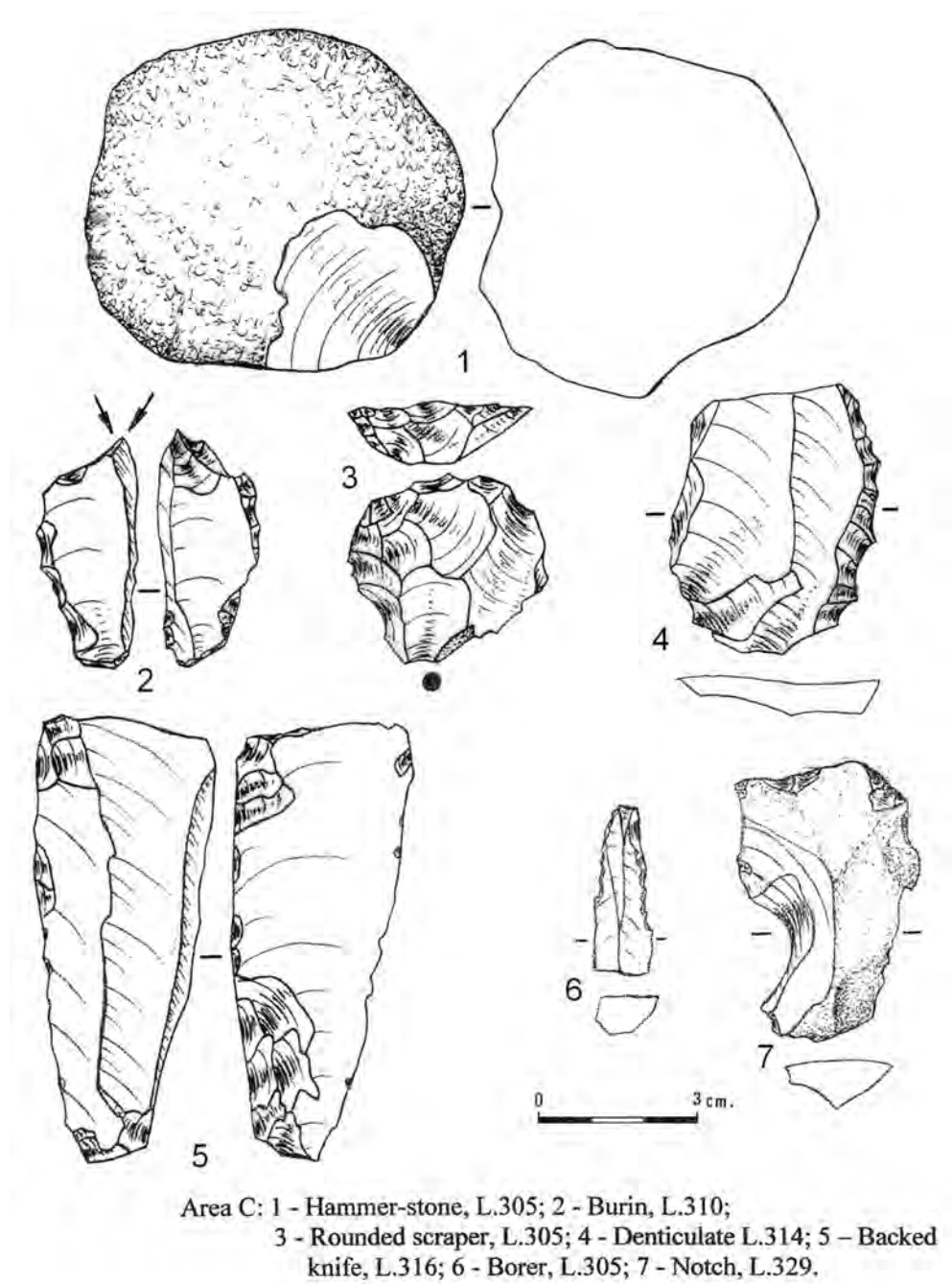


Figure 33. Area C: 1-7 Tools.

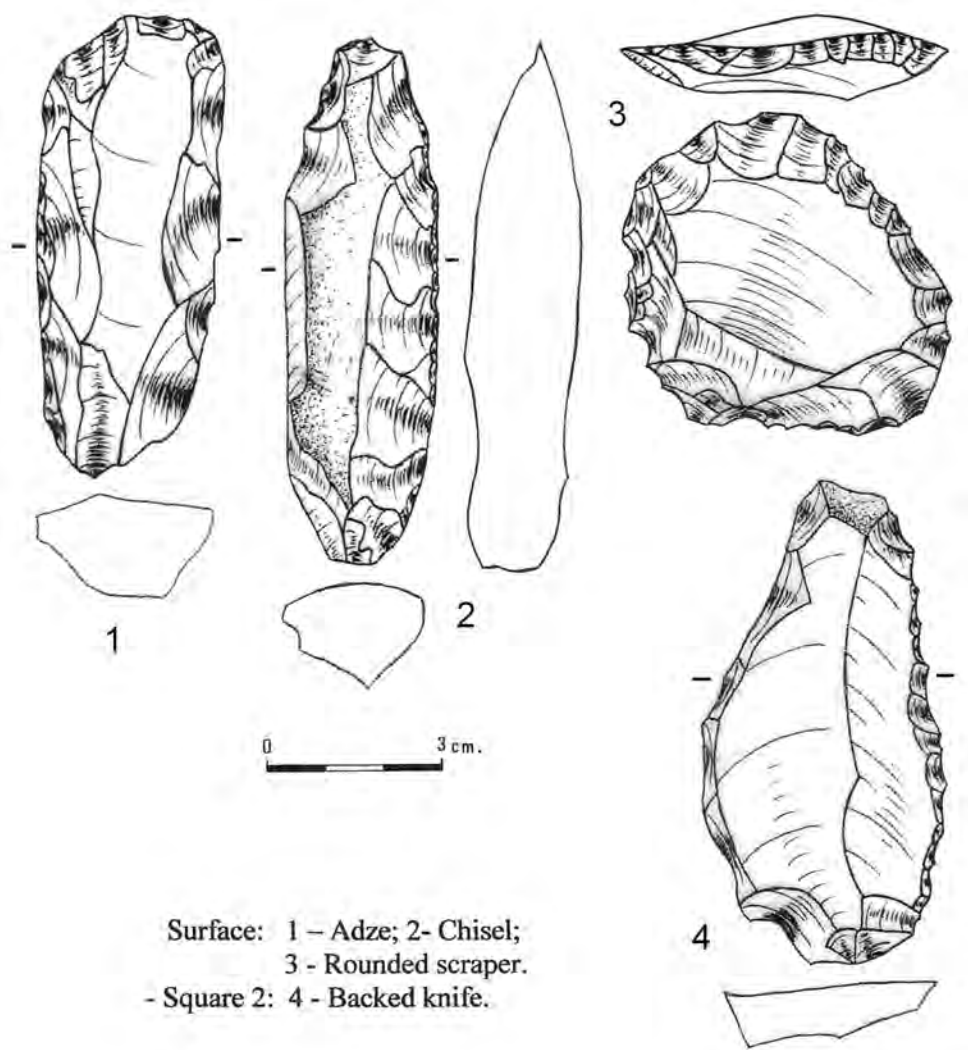
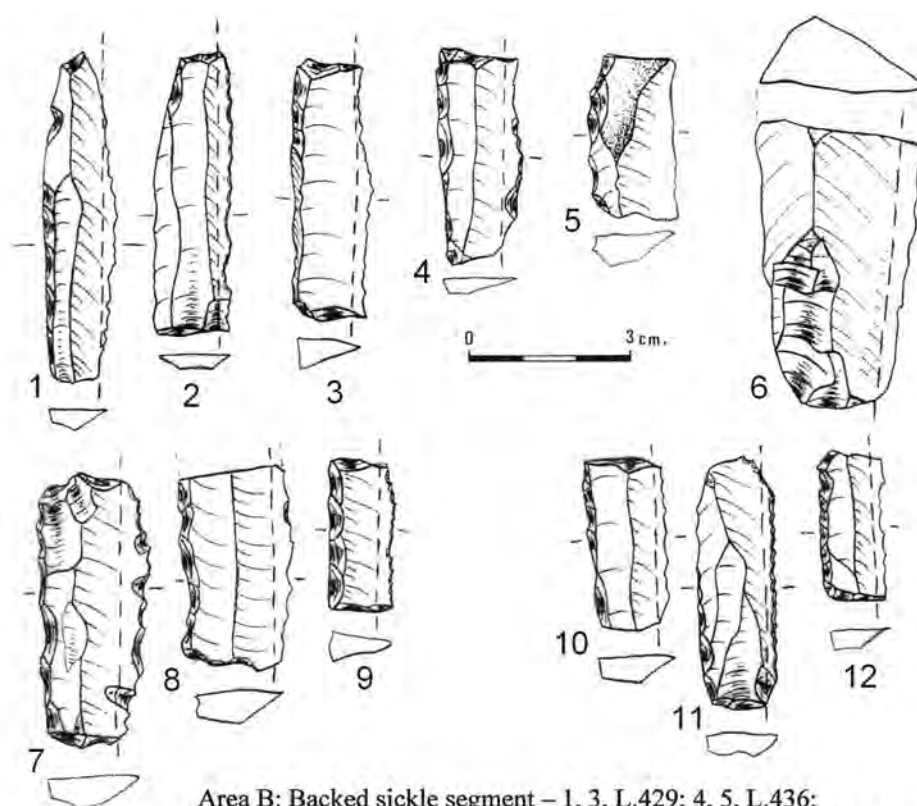


Figure 34. Surface: 1-3 Tools; Square 2: 4 Tool.

Area E (Table 8)

Again, similar to Areas B and C, small waste was not retrieved resulting in a higher proportion of tools (group C). Only a single core and a single hammer-stone and very few primary elements were found thus indicating that primary flint knapping was mainly carried out elsewhere. Only in the closed rooms loci 305, and 307, is there some evidence for this process. Locus 316, apparently part of an internal courtyard, produced a relatively high number of cutting implements, perhaps a location for butchering and food preparation.



Area B: Backed sickle segment – 1, 3, L.429; 4, 5, L.436;
 Cananean sickle segment - 2, L.443; Reaping knife - 6, L.412.
 Area C: Backed sickle segment - 7, L.101; 8, L.100; 9, L.143a.
 Surface: Backed sickle segment – 10; 11.
 Square 2: Backed sickle segment – 12.

Figure 35. Area B: 1-6 Sickles; Area C: 7-9 Sickles; Surface: 10-11 Sickles; Square 2: 12 Sickle.

Table 8. Ein Hilu Flint – Area E – Summary of general groups

Area: E	Group A	Group B	Group C	Total
Total	41 (28.9%)	64 (45.1%)	37 (26.0%)	142 (100%)

Table 9. Ein Hilu Flint –Summary of general groups by area

Area	Group A		Group B		Group C		Total	
	N	%	N	%	N	%	N	%
B	227	63.4	117	26.8	43	9.8	437	43.3
C	298	69.1	99	23.0	34	7.9	431	42.7
E	41	28.9	64	45.1	37	26.1	142	14.0
Total	616	61.0	280	27.70	114	11.3	1010	100

Excavation Results and Intra-site Comparison

Tables 10-13 present the character of the assemblages. The fact that only a part of the retrieved sediment was sieved produces an obstacle for the evaluation of the figures. Furthermore the overall numbers of tools were modest and percentages refer in many cases to very few or even to a single artifact, and thus conclusions should be regarded with caution.

At Ein Hilu cores and primary elements were few in most areas, especially in Stratum C2 (Table 10). Exceptions are Strata B1 and C3 with similar frequencies of cores, primary elements, and debris suggesting that primary flint knapping took place here only occasionally. For all the other strata probably only secondary shaping of artifacts was carried out. This is confirmed by the core / debris ratio – in Stratum B1 it is 1 / 19, at Stratum C3 it is 1 / 20.3 while in Stratum B2 it is 1 / 75 and at Stratum C2 it is 1 / 200.

Table 11 points to different blade / flake ratios in areas and strata. Apparently the output of blades was higher in area B. In strata C2 and especially C3, flakes were definitively dominant. Whether this phenomenon should be explained by a chronological shift, changed knapping modes, or change in raw flint sources is still an open question. Bladelet output was similar at all areas 13.3% - 17.2%. Despite the different blade / flake ratios, the debris percentages were similar in all areas.

Table 10. Ein Hilu Flint – Cores, primary elements and debris (included in group A)

Category \ Area	B1		B2		Total B		C1		C2		C3		Total C		E		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Cores	9	4.5	1	1.3	10	3.6			1	0.5	3	4.2	4	1.3	1	2.4	15	2.4
Primary elements	18	9.0	3	3.8	21	7.6	4	18.2	4	2.0	7	9.9	15	5.0	6	14.6	42	6.8
Debris	14	7.0	9	11.4	23	8.3	5	22.7	23	11.2	4	5.6	32	10.7	12	29.3	67	10.9
Chips	157	79.5	66	83.5	223	80.5	13	59.1	177	86.3	57	80.3	247	82.9	22	53.7	492	79.9
Total	198	100	79	100	277	100	22	100	205	100	71	100	298	99.9	41	100	616	100
Core / debris ratio	1 / 19		1 / 75						1 / 200		1 / 20.3				1 / 34			

Table 11. Ein Hilu Flint – Flakes, blades, bladelets and ridge-blades (included in group B)

Category \ Area	B1		B2		Total B		C1		C2		C3		Total C		E		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Flakes	46	45.1	5	33.3	51	43.6	24	53.3	23	67.6	14	70.0	61	61.6	32	50.0	144	51.4
Blades	41	40.2	8	53.3	49	41.9	14	31.1	6	17.6	1	5.0	21	21.2	18	28.1	88	31.4
Bladelets	15	14.7	2	13.3	17	14.5	7	15.5	5	14.7	5	25.0	17	17.2	11	17.2	45	16.1
Ridge blades															3	4.7	3	1.1
Total	102	100	15	99.9	117	100	45	99.9	34	99.9	20	100	99	99.9	64	100	280	100
Blade / Flake ratio	1 / 1.12		1 / 0.63		1 / 1.04		1 / 1.71		1 / 3.83		1 / 14.0		1 / 2.9		1 / 1.22		1 / 1.64	

Table 12 is arranged according to tools present in the assemblages of Ein Hilu. Hammering tools were few in all areas and adzes and chisels (gouges) were present in Areas B and E only. It seems possible that some activities carried out by these tools, such as heavy woodworking,

were executed in these areas. Opposed to this situation, handicraft tools (Table 12, categories c and d) were high in Stratum B1 (in Stratum B2 no tools were found) and Area C, and extremely high in Area E. Cutting and butchering tools (Table 12, category h) were present in Strata B1 and C1 in reasonable numbers but higher in area E. Apparently the mentioned activities were most important in these strata and carried out during the preparation of household utensils and butchering. Scrapers and reaping tools (Table 12, categories e and g) were present in medium frequencies only in Stratum B1 and the strata of Area C. Tools with undefined function (Table 12, category j) were about equal in all areas.

All areas and strata were attributed to the Chalcolithic but to date it is not known whether the site was populated without interruption, or there were significant time gaps between areas and strata. Thus it is impossible to determine whether the differences in tool kits reflect a change in economy over time or different activity areas. The low numbers of agricultural tools such as picks and hoes along with sickle segments in moderate numbers in Areas B and C and high figures of cutting, butchering and handicraft tools could point to a sedentary community of pastoralists combining exploitation of wild or cultivated grain.

Table 12. Ein Hilu Flint- Tools by area and stratum (included in group C)

Area Tools	B 1	B 2	B Total	%	C 1	C 2	C 3	C Total	%	E	%	Total	%
a. Hammering:													
Hammer-stone	2		2				1	1		1			
Total a.	2		2	4.6				1	2.9	1	2.7	4	3.5
b. Heavy / core tools:													
Adze	2		2							1			
Chisel	1		1							1			
Total b.	3		3	7.0						2	5.4	5	4.4
c. Carving and shaping:													
Burin	7		7		3	1		4		3			
Notch	5		5		4	1	4	9		9			
Denticulate	1		1							5			
Total c.	13		13	30.2	7	2	4	13	38.2	17	45.9	43	37.7
d. Perforating:													
Borer	4		4							2			
Awl					1			1					
Total d.	4		4	9.3	1			1	2.9	2	5.4	7	6.1
e. Scraping:													
Endscraper	4		4		1			1					
Sidescraper					1			1					
Rounded scraper						1		1					
Fan scraper	1		1				1	1					
Total e.	5		5	11.6	2	1	1	4	11.8			9	7.9
f. Tilling:													
Pick					1			1					
Total f.					1			1	2.9			1	0.9

Area Tools	B 1	B 2	B Total	%	C 1	C 2	C 3	C Total	%	E	%	Total	%
g. Reaping:													
Sickle segment	5		5		3	2		5					
Reaping knife	1		1										
Total g.	6		6	14.0	3	2		5	14.7			11	9.6
h. Cutting:													
Retouched (or backed) blade	4		4		2			2		2			
Retouched (or backed) flake	2		2		1			1		6			
Retouched fragment										1			
Backed knife					1			1		1			
Total h.	6		6	14.0	4			4	11.8	10	27.0	20	17.5
i. Food preparing:													
Chopper										1			
Total i.										1	2.7	1	0.9
j. Undefined function:													
Microolithes (retouched)	1		1		1		1	2					
Truncation	2		2		1		2	3		3			
Ad hoc + multiple + trimmed	1		1							1			
Total j.	4		4	9.3	2		3	5	14.7	4	10.8	13	11.4
Total	43		43	100	20	5	9	34	99.9	37	99.9	114	99.9

Table 13. Ein Hilu Flint – Summary of main artifact groups by area and stratum

Area Category	B1		B2		Total B		C1		C2		C3		Total C		E		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
A. Waste	198	57.7	79	84.0	277	63.4	22	25.3	205	84.0	71	71.0	298	69.1	41	28.9	616	61.0
B. Debitage	102	29.7	15	16.0	117	26.7	45	51.7	34	13.9	20	20.0	99	23.0	64	45.1	280	27.7
C. Tools	43	12.5			43	9.8	20	23.0	5	2.0	9	9.0	34	7.9	37	26.0	114	11.3
Total	343	99.9	94	100	437	99.9	87	100	244	99.9	100	100	431	100	142	100	1010	100

The tool totals (Table 14) for Ein Hilu surface collections suggest that they differ from overall figures only marginally. In the surface collections there were somewhat fewer handcraft tools, and scraping tools were a little more abundant. No different mode of activities is indicated.

Remarks on the Sickle Segment Collection (Table 15)

Generally, the shape, dimensions, and technological details are close to those from other contemporaneous sites. Dorsal backing is most common and double truncation frequent, found in about half of the cases, while other pieces have at least one truncation and one snap. All pieces except one had sickle sheen and most of them show fine dorsal retouch on the cutting edge. No coarse retouch on the cutting edge was found. Mean values of width and thickness are larger than at the northern Negev sites, Gilat and Giv'at Haoranim. Mean values of the length are larger than at Negev sites and Gilat and slightly less than at Giv'at Haoranim (Gilead et al. 1995, 279; Rowan 2006, 511; Barkai 2004, 93). The reason for the differences

between the assemblages can be explained either by the small sample size, local tool making traditions, or raw materials.

Discussion

This study is a preliminary attempt to introduce an analytical approach based on the functional aspects of diverse groups of flint artifacts and tools. This approach should in future be developed on a wider base in cooperation with use-wear and residue analyses, and experimental archaeology. The proportions among the different activity groups within the assemblage reflect clearly the economy of this community. The result of such an undertaking would be a better understanding of past life ways and economies.

Most tool categories were present in the assemblage, and only few artifact types were not found (e.g., axes, punches, choppers). The low quantity of core tools, axes, adzes and chisels (axes were missing completely) is surprising. These are more frequent in contemporaneous sites (Tel Teo VI-VII, Gopher and Rosen 2001: Table 4.2; Giv'at Haoranim, Barkai 2004: Table 7.4; Grar, Gilead *et al.* 1995: Table 5.8; Shiqmim, Levy and Rosen 1987: Table 10.1; Gilat, Rowan 2006: Table 11.1a; figures in Table 11.15 differ slightly from Table 11.1a). The high percentage of handicraft tools used for the production of ordinary household utensils points to a permanent settlement. Architectural features unearthed at the site support this thesis. The rather high share of cutting, butchering and dismembering tools indicate a society where herding was an important factor in its economy.

Table 14. Ein Hilu Flint – Summary of Ein Hilu tool collections

Site Selected Category	1996 Surface		2007 Ein Hilu B, C, E		2007 Surface		2007 Square I		2007 Square II		2007 Square III		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
a. Hammering:														
Hammer-stone			4											
Total a.			4	3.5									4	2.5
b. Heavy tools:														
Adze	2		3		1									
Chisel			2		1									
Total b.	2		5	4.4	2								9	5.5
c. Carving and shaping:														
Burin			14				3							
Notch	7		23				1		1					
Denticulate			6											
Total c.	7		43	37.7			4		1				55	33.7
d. Perforating:														
Borer	1		6											
Awl	1		1				1							
Total d.	2		7	6.1			1						10	6.1
e. Scraping:														
Endscraper	7		5				1		1		2			
Sidescraper			1								1			
Rounded/transversal scraper			1		1									
Fan scraper			2											
Total e.	7		9	7.9	1		1		1		3		22	13.5

Table 15. Ein Hilu Flint – Sickles segment details (L=Length; W=Width; Th=Thickness; *Broken thus not included in calculations; **Broken, length not defined; ***Canaanean blade)

[illegible]

Lithic Summary and Conclusions

Ein Hilu is a site located at the fringes of the desert in a setting very different from sites in more temperate areas. Despite the rather small flint assemblage, the study raises some important points. The economy was apparently based on herding and agriculture (Cereal cultivation as indicated by the presence of sickle segments and grinding tools – see below). The relative scarcity of bifacial core tools and missing axes intended for heavy wood work such as tree felling compared to sites located in different ecological niches may point to an environment with fewer trees. The sources of raw flint were not located, but the scarcity of cores and primary elements may indicate that primary flint knapping rarely took place in the excavated areas.

THE GROUND STONE ASSEMBLAGE (D. Rosenberg)

The ground stone tool assemblage of Ein Hilu encompasses 48 items (Tables 16-20), of which the majority are grinding implements. These were retrieved from all excavation areas, and were found on floors, in fills, and on the surface. In this report we describe the general outlines of the stone assemblage with hope that future excavation and further studies will contribute to our understanding of the roles of ground stone tools in the Chalcolithic communities of the desert fringes of Samaria. Despite its size and preservation, this assemblage is the only published Late Chalcolithic assemblages from this area.

Grinding Tools (Tables 16-19)

The vast majority of the tools found at the site are grinding tools. They were divided, based on the characteristics of the grinding surfaces into two main types: lower, “passive” grinding tools and upper, “active” grinding tools. Further division into subtypes was done according to general morphology.

Table 16. Breakdown of the Stone tool Assemblage

Type/Raw material	Compact Basalt	Porous Basalt	Limestone	Sandstone	Unidentified	Total	%
Lower Grinding Stones		12	2	3	1	18	37.5
Upper Grinding Stones	2	6	4	2		14	29.15
Vessels	2	1	1			4	8.35
Perforated Items			2			2	4.16
Flaked Pieces			2			2	4.16
Various Items	2		3	1	2	8	16.68
Total	6	19	14	6	3	48	
%	12.5	39.57	29.15	12.5	6.28		100

Lower Grinding Tools (Fig. 36:1-5; Tables 17-18)

The lower grinding stones (n=18; 42.85% of the stone assemblage) are made primarily of porous, vesicular basalt (n=12, 66.6%). Other raw materials include limestone (n=2, 11.1%), sandstone (n=3, 16.6%) or unidentified raw material (n=1, 5.5%). These were found whole (n=3) or fragmented (n=15). Only a small portion seem to represent large items.

Most of the broken lower grinding stones were broken both across their width and length (Fig. 36:1-2) and this was probably the reason for their discard. A few show smoothing or other modification on their bases (non-active surfaces) and some still bear pecking marks. Most items exhibit smoothing on their grinding surfaces. These include a quern fragment (n=1, 5.5%), grinding slabs (n=12, 66.6%, Fig. 36:1-4), a polishing slab (n=1, 5.55%) and three pallets (n=3, 16.6%, Fig. 36:5). Most of the grinding surfaces are convex while a few tend to be flat. Two of the pallets are whole and these are 5.6-5.8 cm long, 3.6-4.2 cm wide and 1.3 cm thick. Both weigh 100 g and have convex-concave cross-sections. Grinding/smoothing appears on 80-100% of the grinding face.

Table 17. The Stone Assemblage – Preservation Rates among the Grinding Tools

Preservation	Whole	%	Broken	%
Lower Grinding Stones	3	16.6	15	83.3
Upper Grinding Stones	4	28.57	10	20.8
Vessels			4	100
Perforated Items	1	50	1	50

Table 18. Lower Grinding Tools – Sub-Types

	Lower Grinding Stones					
Sub-Type	Quern	Grinding Slab	Large, Plano-Convex Grinding Slabs	Polishing Slab	Rectangular Pallets	Total
N	1	10	3	1	3	18
%	5.55	55.56	16.67	5.55	16.67	100

Upper Grinding Tools, Manos, Mullers and Burnishers (Fig. 36:6, Fig. 37:1-4; Tables 17, 19)

The upper grinding elements (n=14; 29.1% of the stone assemblage) include items made of compact, fine-grained basalt (n=2, 14.28%), porous basalt (n=6, 42.85%), limestone (n=4; 28.57%), and sandstone (n=2, 14.28%). These were found whole (n=4) or damaged (n=10). Damaged tools are fragments lacking large parts of the original tool (usually transversally broken across the width of the item) or items missing small parts.

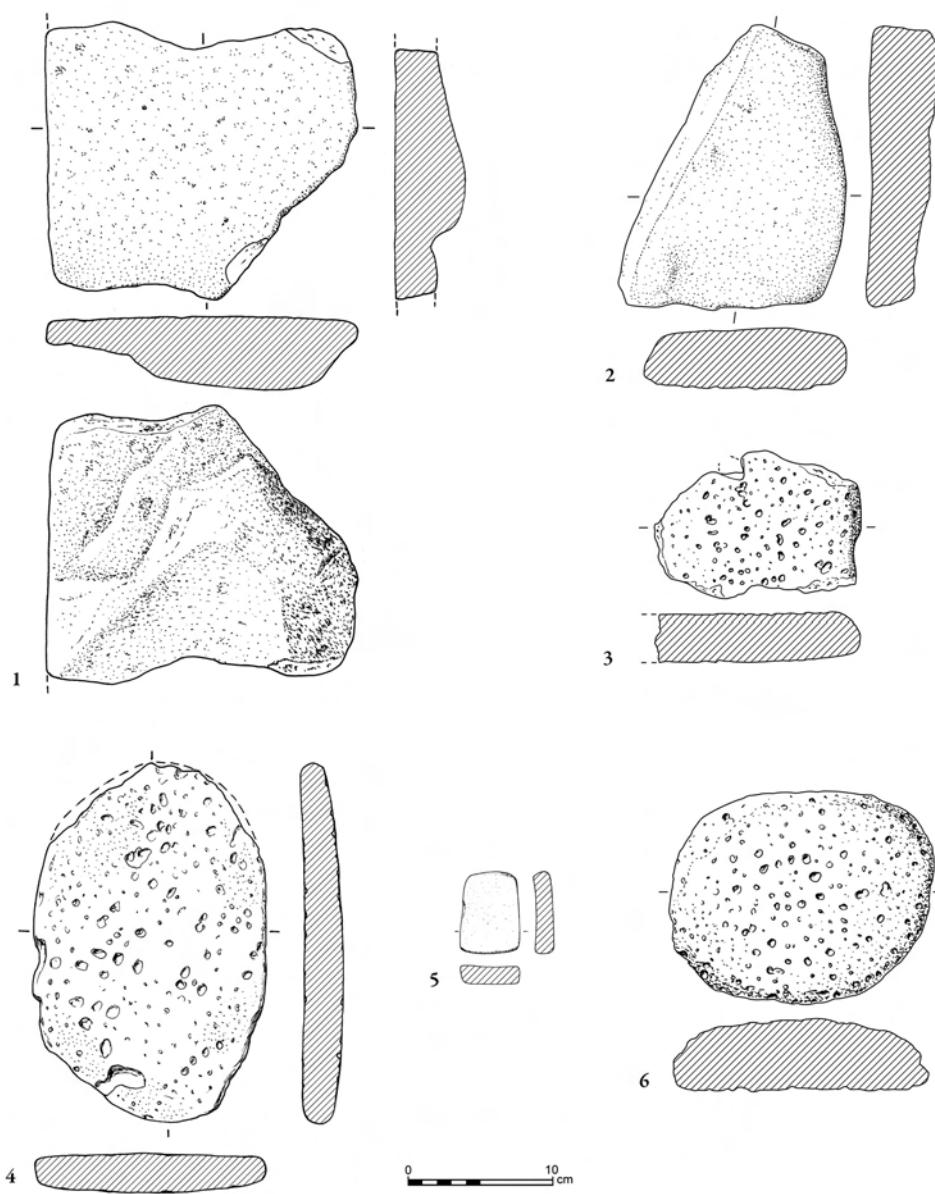


Figure 36. The Stone Assemblage of Ein Hilu.

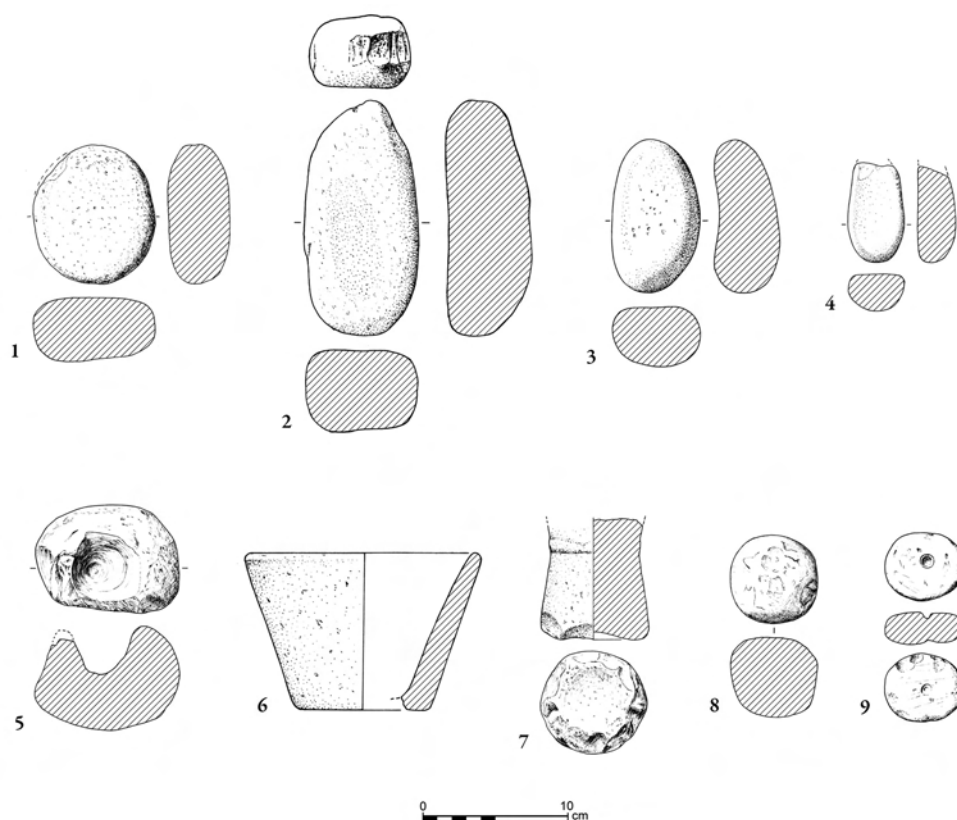


Figure 37. The Stone Assemblage of Ein Hilu.

Typologically, seven subtypes were distinguished: 1. One-hand (18.5X14.5 cm) oval manos with plano-convex cross-sections (n=2, 14.28%, Fig. 36:6), 2. a small round, bi-plano rubbers/burnisher (n=1, 7.16%, Fig. 37:1), 3. plano-convex mano fragments (n=3, 21.42%), 4. fragments of bi-plano manos (n=2, 14.28%), 5. amorphous rubbers (n=2, 14.28%), 6. a short squat pebble-muller/burnisher (n=1, 7.16%) and 7. elongated, thick pebbles-muller/burnisher (n=3, 21.42%, Figs. 37:2-4). While some of these show a greater degree of modification, finish, and possibly standardization (Fig. 36:6) others, specifically muller/burnishers, are pebbles modified probably through use only (Fig. 37:1-4). Most items have one grinding surface (n=12, 25.7%) while two items have two. Most grinding surfaces are flat (n=10, 71.4%), three are convex, and one is amorphous. For all items length ranges between 18.5 and 7.2 cm, width between 14.8 and 3.7 cm and thickness between 6 and 2.1 cm. Only two items bear clear polish on their active surface. The sandstone items are made

on yellow or pinkish sandstones. One burnisher has flaking scars and it is possible that this item was utilized for pounding as well.

Table 19. Upper Grinding Tools – Sub-Types

	Upper Grinding Stones							
Sub-Type	Medium-small (one hand), Plano-Convex Manos	Round-Small, Bi-plano Manos	Amorphous Rubbers	Short, Squat-Thick Pebble	Elongated-Thick Pebble	Fragments of a Plano-Convex Manos	Fragments of Bi-Plano Manos	Total
N	2	1	2	1	3	3	2	14
%	14.28	7.16	14.28	7.16	21.42	21.42	14.28	100

Vessels (Fig. 37:5-7; Tables 16-17)

The four vessels found are made of fine-grained compact basalt (n=2), limestone (n=1) and an unidentified raw material (n=1). All were found broken. These include a crudely made and finished globular vessel/door-socket (Fig. 37:5), a V-shaped bowl bearing flat outer base and rounded rim (Fig. 37:6), and a solid-base pedestal (Fig. 37:7). The latter lacks most of its upper part and thus the specific characteristics of the bowl are missing. It has a raised or protruding line encircling the neck at the point where the bowl and base meet. Both bowl and base widen from the neck outwardly. A shaped depression characterizes the lower part of the base and it bears flaking scars. Both these characteristics are typical of similar items from other Chalcolithic sites in Israel (e.g., Rowan 1998).

Perforated Items (Tables 16-17)

Two perforated objects were encountered. These include a weight fragment and a whorl, possibly of a spindle. The weight is crudely made of limestone and the break cuts through the aperture. The aperture, with a minimum diameter of 1.2 cm, was drilled from the opposed facets, with drilling marks still apparent.

The other item is a rounded whorl with a shaped flat facet, made of pinkish limestone. The aperture is slightly off-center and has relatively straight sides. This was probably a modification of the original bi-conic drilling. Thus, the middle of the drilled hole has the about the same diameter as the openings. Smoothing is apparent on both faces.

Flaked Pieces (Table 16)

Two flaked pieces were found, made of limestone. These are thick and squat pebbles bearing flaking marks. One is whole, 2.8x4.6x5.7 cm and the other is broken bearing scars on its perimeter.

Various Items (Fig. 37:8-9, Table 16)

The eight items in this group are made of fine-grained, compact basalt (n=2), limestone (n=3), sandstone (n=1), and an unidentified raw material (n=2). These include a rounded pebble, probably a hammerstone (Fig. 37:8), a flat pebble bearing two, opposed drillings (Fig. 37:9), a small oval pebble bearing one concave active face (3-4 mm deep) and a shaped convex, slightly flattened base, a basalt pebble that may have used as a small anvil (9.8x7.6x3.6 cm), an oval basalt pebble pointed at one end (16x7.8x5.8 cm), a limestone slab bearing flaking marks, a sandstone piece, probably part of an abrading tool (11.1x4.8x2.9 cm) and a fragment of an unidentified purplish raw material.

The Stone Assemblage – Discussion

Albeit small, the stone assemblage of Ein Hilu suggests several observations bearing implications to the understanding of life in the hilly flanks of the eastern Samaria fringes during the Late Chalcolithic period. The stone assemblage seems to be an echo of the well known stone industries of the Ghassulian-Beer-Sheva cultures known from many sites in Jordan and Israel. Nonetheless, several components seem to be missing here (fenestrated stands, decorated bowls and others) and this does not appear to be an outcome of the scale or methods of the excavations. Furthermore, it seems that this assemblage also bears some affinities to the stone industry of the Golan (See Epstein 1998).

Selection for raw materials suggests the predominant use of locally available stones, although stone from greater distances are present as well. Grinding dominates the assemblage and evidence for pounding is rare. Within the grinding paraphernalia a distinction should be made between large (probably food processing) grinding tools made of basalt and limestone and the usually smaller items, frequently made of limestone pebbles and sandstone. The latter were probably used for a variety of tasks, not necessarily related to food preparation. Other items represented in the stone assemblage suggest that additional tasks may utilize stone implements.

Table 20. Breakdown of the Stone tool Assemblage for Loci

Loci/Type	Lower Grinding Stones	Upper Grinding Stones	Vessels	Perforated Items	Flaked Pieces	Various Items	Total
1	2						2
14	2						2
19	1			1			2
24					1		1
104		1	1				2
128		2					2
129				1			1

Loci/Type	Lower Grinding Stones	Upper Grinding Stones	Vessels	Perforated Items	Flaked Pieces	Various Items	Total
135	1						1
142		1					1
199		1					1
300	1						1
305	1		1				2
306		2					2
307		1					1
311	1						1
314		1					1
316		1	1				2
329						1	1
429	2					2	4
431	2						2
433	2	1					3
438		1				1	2
443					1	2	3
447			1				1
455		1					1
457	1						1
460		1					1
468	1						1
470	1					1	2
4007						1	1
Total	18	14	4	2	2	8	48
%	37.5	29.6	8.3	4.16	4.16	16.6	100.32

THE FAUNA FROM EIN HILU (N. Raban-Gerstel and G. Bar-Oz)

Animal bones were collected by hand during excavation, while dry and wet sifting in 6 mm. meshes took place in selected loci¹⁴. Zooarchaeological and taphonomic analytic procedures follow Raban-Gerstel *et al.* (2008). Identified specimens were examined and scanned for preliminary taphonomic observations and coded in an electronic database anatomically and taxonomically. Morphological markers aided to differentiate closely related species. Separation of sheep (*Ovis aries*) from goat (*Capra hircus*) was based on morphological

14. The complete research protocol, faunal analysis procedures, and dataset for each identified zooarchaeological specimen may be acquired from the authors.

criteria of selected bones (following Boessneck 1969). Sheep and goat skeletal elements that could not be identified to species were combined in a sheep/goat category. Separation of wild boar from domestic pig was based on metrical analysis of selected cranial elements (data from Haber 2001 and Hongo and Meadow 1998). Similarly, the separation of aurochs from domestic cattle was based on morphometric analyses. Measurements of fully ossified bones were taken following von den Driesch (1976).

The faunal remains of Ein Hilu encompass domesticated livestock and wild game. The distribution of identified animal bones from Stratum 1 at both excavated areas is provided in Table 21. Table 22 presents the animal bones found in Stratum 2.

Table 21. Number of identified specimen (NISP), minimum number of element (MNE) and minimum number of individuals (MNI) of each taxon represented in stratum 1 from the Chalcolithic site of Ein Hilu

	<i>Bos taurus</i>		<i>Ovis aries</i>		<i>Capra hircus</i>		<i>Capra/Ovis</i>		<i>Gazella gazella</i>		<i>Sus scrofa</i>		<i>Lepus capensis</i>		
	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	
Head:															
Horn							4	2	1	1					
Occipital					1	1									
Mandible Ramus	1	1					4	3							
Mandible Teeth							6	3	1	1	2	1			
Maxilla Teeth							8	2	1	1					
Body:															
Ver: Atlas							1	1	2	2					
Ver: Axis									2	2					
Ver: Cervical							1	1	1	1					
Ver: Thoracic							2	1							
Ver: Lumbar									3	1					
Forelimb:															
Scapula Glenoid Fossa	1	1					1	1	1	1	1	1			
Humerus Proximal									1	1					
Humerus Distal							2	1	4	3					
Radius Proximal			1	1											
Radius Distal					1	1									
Ulna Proximal									1	1					
Metacarpus Proximal III											1	1			

	<i>Bos taurus</i>		<i>Ovis aries</i>		<i>Capra hircus</i>		<i>Capra/Ovis</i>		<i>Gazella gazella</i>		<i>Sus scrofa</i>		<i>Lepus capensis</i>		
	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	NISP	MNE	
Hindlimb:															
Pelvic acetabulum							3	2	1	1					
Femur Distal							1	1							
Tibia Shaft							1	1							
Tibia Distal							2	2							
Astragalus									1	1					
Calcaneus							3	1							
Metatarsus Proximal							2	2	2	1					
Toes:															
Phalanx 1			1	1			2	1	2	1	1	1	1	1	
Phalanx 2	2	1			2	1	1	1			1	1			
Phalanx 3									1	1					
Metapod cond.							2	2							
NISP	4		2		5		47		26		6		1		91
%NISP	4.4%		2.2%		5.5%		51.6%		28.6%		6.6%		1.1%		100%
MNI	1		1		1		3		3		1		1		11

Table 22. Number of identified specimen (NISP), minimum number of element (MNE) and minimum number of individuals (MNI) of each taxon represented in stratum 2 from the Chalcolithic site of Ein Hilu

	<i>Capra hircus</i>		<i>Capra/Ovis</i>		<i>Sus scrofa</i>		
	NISP	MNE	NISP	MNE	NISP	MNE	
Head:							
Horn			1	1			
Occipital					1	1	
Mandible Ramus					1	1	
Mandible Teeth			2	2	1	1	
Forelimb:							
Humerus Distal			1	1			
Radius Proximal	1	1					
Hindlimb:							
Pelvic acetabulum			1	1			
Femur Distal			1	1			
Toes:							
Phalanx 1	1	1					
Metapod cond.					1	1	
NISP	2		6		4		12
%NISP	16.7%		50.0%		33.3%		
MNI	1		1		1		3

A total of 107 complete and fragmentary identified bones were recovered from the different strata and areas of excavation of Ein Hilu. Most of the bones retrieved are from Area B (NISP=77). Area C contained 26 identified bones and Area E had the smallest number of identified bones (NISP=4). The most significant occupational stratum at all areas of excavation is Stratum 1. This stratum was found to contain the most abundant bone assemblage (91 of the identified bones, 85% of total NISP). On the other hand, Stratum 2 consists of only 12 identified bones (11% of total NISP) while Stratum 3 is even more meager and contained only 4 identified bone (an unfused distal femur and scapula of sheep/goat, the proximal ulna of cattle, and a molar tooth of pig). The absence of apparent functional differences between strata, and the small sample sizes of Strata 2 and 3 do not allow detailed study of intra-site patterning of species distribution. Nevertheless, a striking difference is apparent in the distribution of mountain gazelle (*Gazella gazella*) that are the second most abundant taxa in Stratum 1 and absent from Stratum 2.

As in many Chalcolithic sites from the central and northern parts of the Jordan Valley (cited in Grigson 1995a: Table 1; see also Lev-Tov 2000) the subsistence of Ein-Hilu was based predominantly on four domesticate ungulate taxa: cattle, sheep, goat, and pigs (not present in this order). In addition, it includes a significant representation of game species, predominantly of gazelle bones which compose almost 30% of the Late Chalcolithic assemblage (Fig. 38). The only other game animal is represented by a single bone of Cape hare (*Lepus capensis*). The relatively high representation of gazelle bones in the assemblage indicates the significant role of hunting for the Late Chalcolithic occupants of the site.

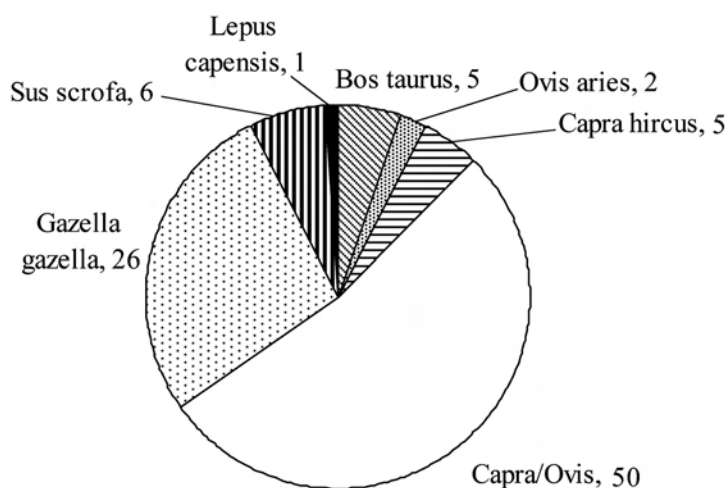


Figure 38. Distribution of animal taxa from the Late Chalcolithic site of Ein Hilu (Stratum 1; NISP is given for each taxon)

The most abundant livestock species at both phases are sheep and goat (*Ovis aries*, *Capra hircus*). Cattle constitute only a minor portion of the Late Chalcolithic assemblage. On the basis of taxonomically distinctive features both sheep (*Ovis aries*) and goat (*Capra hircus*) are represented in Stratum 1 and it appears that goat remains outnumber sheep. In Stratum 2 only two goat bones were identified, but this most probably results from the small sample size.

Pig remains were identified in all occupational strata. Only a single third molar of a mandible enabled distinguishing whether the pig originated from a wild or domesticated individual. The length of the tooth (33.27 mm) was shorter than the length of a small wild boar female from Anatolia, Turkey (39.36 mm; data from Hongo and Meadow 1998). This may suggest that the pigs of Ein Hilu were domesticated (i.e., *Sus scrofa domesticus*). Similarly, comparison of the pig tooth length from Ein Hilu with tooth measurements of modern wild boar (5 females and 14 males) from Northern Israel strengthens this observation (Haber 2001; Table 3). Also this comparison reveals that Ein Hilu pigs fall below the lower range of the recent wild boar population (Table 23).

Table 23. Measurements of the single swine tooth from Ein Hilu compared to modern wild boar from Northern Israel (5 females and 14 males) teeth measurements as was taken by Haber (2001)

	N	Range	Average
	L	L	L
Ein Hilu	1	33.27	33.27
Modern wild boar	19	34.29-45.38	39.83

The current sample is too small for a detailed morphometric analysis of cattle remains. Still, the few measurements that could be taken indicate the presence of at least a single small-sized animal. Since the mean and range of the measurements are smaller than those of recent domestic cattle (*Bos taurus*) it seems reasonable to assume that Ein Hilu specimens represent fully domesticated animals, a pattern that was fully accomplished in the southern Levant by the later phases of the Pre-Pottery Neolithic (e.g., von den Driesch and Wodtke 1997; Horwitz 2003; Horwitz et al. 1999).

The small samples from the Ein Hilu bone assemblages preclude rigorous reconstructions of livestock and wild game demographic profiles. Nevertheless, it seems that the Late Chalcolithic occupational phase (Stratum 1) is overrepresented by adult sheep and goat. The bone assemblage completely lacks deciduous teeth and only a few unfused bone specimens were found (Table 24). A different trend appears for the pig remains. Of the six identified bones from Stratum 1, two belonged to young individuals under the age of 24 months. However, keeping in mind the small assemblage, it seems that pigs were culled differently

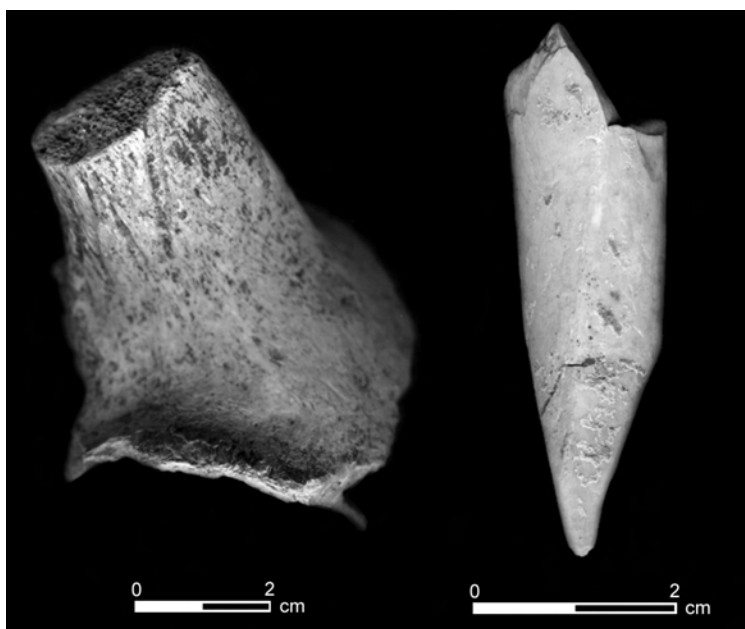


Figure 39. Sawed horn of sheep/goat and a bone point made of sheep/goat tibia from Ein Hilu (Stratum 1)

from sheep and goat and were slaughtered at a young age. This indicates that pig raising was oriented toward meat while sheep and goat seem to be more related to a secondary product-based economy (Grigson 1995a).

Table 24. Number of unfused bone and the total identified bones of each species represent in stratum 1, Ein Hilu

Species	Unfused Bones	no.	Total Identified Bones	%
Gazella gazella	Humerus proximal	1	26	4%
Capra/Ovis	Calcaneus	2	57	7%
	Metapod distal	1		
	Phalanx 1proximal	1		
Sus scrofa	Metacarpal III proximal	1	6	33%
	Phalanx 1proximal	1		

Bone surface modifications found include two cases of carnivore gnawing or chewing that was found on a mandible and humerus of sheep/goat. These traces were most probably caused by dogs. Evidence of butchery marks were found on three specimens, metacarpal

and horn of sheep/goat and an ulna of cattle. In addition, a single sawed horn of sheep/goat and a bone point made on a sheep/goat tibial shaft (Fig. 39) were found in the same context in Area B, Stratum 1. Finally, burnt bones are almost completely absent and were observed only on two identified bone specimens, a gazelle humerus from Stratum 1 and a sheep/goat femur from Stratum 2.

Conclusions

The faunal sample from the excavations at the Late Chalcolithic site of Ein-Hilu is small but significant as it provides new data from a well-stratified site. The bone assemblage includes the remains of both livestock and wild game species, indicating that the Late Chalcolithic economy was based on both hunting and husbandry. The almost exclusively hunted species in the assemblage is the mountain gazelle.

The small percentage of young individuals of sheep and goat and the fact that the few cattle remains derive from only adult individuals suggest that livestock animals were raised and exploited primarily for their secondary products (i.e., dairy products and wool for sheep and goat; milk and labor for the cattle). Similar data are known from additional Chalcolithic sites in the Negev (e.g., Grigson 1995a, 1995b, 2007). The fact that dairying was a major component of the Ein Hilu Late Chalcolithic economy is supported by the presence of ceramic churns that were found across the site. On the other hand, it seems that the culling strategy of pigs was different. As they lack any secondary products they were raised solely for their meat and, therefore, slaughtered at a young age.

The economic strategy attested from the analysis of Ein Hilu Late Chalcolithic assemblage combines both hunting activities and raising of livestock including pigs. The latter result may be a consequence of the fact that it was feasible to raise pigs in addition to herding sheep, goats, and cattle. Therefore, it seems that the site was a permanent settlement. Significantly, raising of pigs attest to the presence of water sources in the vicinity of the site (see discussion in Hesse 1990). In addition, the abundant of gazelle remains demonstrates the role of hunting among the inhabitants.

THE MALACOLOGICAL REMAINS (E. Dan)

The excavation yielded the remains of three bivalve species (Table 25): one sea shell of *Glycymeris incubrica* (*Glycymeridae* family), one right bivalve of *Unio Terminalis* (*Unionidea* family), and a number of small fragments identified as mother of pearl (Nacre). Due to their fragmentary state it was difficult of identify the species. None of the identified remains exhibit any indications of human manipulation.

Table 25. The Malacological finds from Ein Hilu

Origin	preservation	Remarks	layer	locus	Area	Spec.
Mediterranean	Naturally abraded	Large specimen, natural holed umbo	1	316	E	<i>Glycymeris incubrica</i>
Fresh-water	Slightly broken outer lip	Right bivalve	1	16	B	<i>Unio terminalis</i>
Fresh-water/ Red sea	Dozens of fragments	Species cannot be identified	1	139	C	Mother of Pearl

Molluscs found in archaeological sites may provide useful information concerning the cultural and culinary habits of the former inhabitants (Claassen 1998). However, in the case of this assemblage, the small number of finds provides little information. There is only one sea shell of Mediterranean origin: *Glycymeris incubrica* well known from other Chalcolithic sites across Israel such as Grar (Bar-Yosef Mayer 1995), Gilat (Bar-Yosef Mayer 2006), and Shoham-North (Mienis 2005). Although we are dealing with only one specimen, we may suggest that this shell was probably collected by the site's inhabitants while visiting the Mediterranean seashore, which is some 65 Km from the site, or by means of exchange. Since the *Glycymeris incubrica* was collected dead from the seashore, it was not used as any kind of food. However since it was naturally perforated it may have served as a bead.

The fresh-water shells were probably collected from the spring of Ein El-Hilu (500 m from the site), the Jordan river (4.5 Km from the site) or perhaps from the Sea of Galilee. *Unio terminalis* is known from the Chalcolithic site of Gilat (Bar-Yosef Mayer 2006).

Mother of pearl originating in different sources including local fresh-water creeks, the Nile River and the Red sea is known from other Chalcolithic sites such as Shoham-North (Mienis 2005), Grar (Bar-Yosef Mayer 1995), Abu Matar (Perrot 1955), and others (Bar-Yosef Mayer 2006). However, due to the paucity of malacological remains, it is not possible to draw any kind of conclusions concerning their origin or function at the Ein Hilu site.

RADIOCARBON DATES (E. Boaretto)

Two charred wood samples were collected from two different excavation areas and submitted for radiocarbon dating. Sample RTT 5442 was collected from a sealed locus (L 468) below a floor (L 407) in area B. Sample RTT 5443 was collected from the primary deposition of organic remains on floor 145 in area C.

The samples, both charred wood, were pretreated to remove possible environmental contamination represented by inorganic carbon and humid substances according to the procedure presented in Yizhaq *et al.* (2005). After pre-treatment the loss of material was quite high with only 28% and 14% (by weight) material left from RTT 5442 and RTT 5443 respectively. Such low sample recovery indicates that the charcoal had undergone sever

diagenesis. The cleaned material was oxidized in vacuum to CO₂. The content of carbon in the pre-treated material, determined after the oxidation step, was as high as 70% carbon by weight. Due to the small size the samples were prepared as graphite for the measurement using the accelerator mass spectrometry technique.

In Table 26 the information about the sample type, collection position, radiocarbon age, calibrated age and stable carbon isotopes ratio are given. Radiocarbon ages are given in the third column of the table and are expressed in ¹⁴C year BP (Before Present) according to the convention (Stuiver and Polach 1977) with the standard deviation ($\pm 1\sigma$). Calibrated ages are determined for $\pm 1\sigma$ (68.2% probability that the correct age is included in that interval) and for $\pm 2\sigma$ (95.4% probability that the correct age is included in that interval). The calibrated intervals are determined using the OxCal v. 3.10 of Bronk Ramsey (Bronk-Ramsey 1995; 2001) and the calibration data in (Reimer *et al.* 2004). The probability distributions of the calibrated ages are presented in Figure 40.

Based on the radiocarbon age and the standard deviation the two samples are the same age and the calibrated age ranges include the third quarter of the 5th millennium in both cases for the $\pm 2\sigma$. Both samples are wood charcoal and therefore because of the “old wood effect” the dates can be treated only as “terminus post quem”. The time effect due to the nature of the samples can be different in the two cases. A possible conclusion that can be driven based on the two radiocarbon dates is that the site was most probably occupied during the second half of the 5th millennium.

Table 26. Ein Hilu Radiocarbon Dates

	#	TYPE	¹⁴ C age $\pm 1\sigma$ year BP	Calibrated age	Collection Site	$\delta^{13}\text{C}$ ‰ PDB
RTT	5442	charcoal	5515 \pm 75	68.2% probability 4450BC (63.3%) 4320BC 4290BC (4.9%) 4260BC 95.4% probability 4530BC (95.4%) 4230BC	Ein Hilu. Area B, L 468, B 4066	-24.2
RTT	5443	charcoal	5535 \pm 75	68.2% probability 4460BC (68.2%) 4330BC 95.4% probability 4540BC (95.4%) 4240BC	Ein Hilu. Area C, L 144a, B 1051	-26.2

GENERAL CONCLUSIONS

The excavation of Ein Hilu uncovered the remains of a Chalcolithic settlement in the northern desert fringes of Samaria. As this is the only site to have been excavated in this area, our report sheds new light on the lifestyle and subsistence economy of the Chalcolithic people who inhabited this virtually unexplored region. The site includes at least three distinct

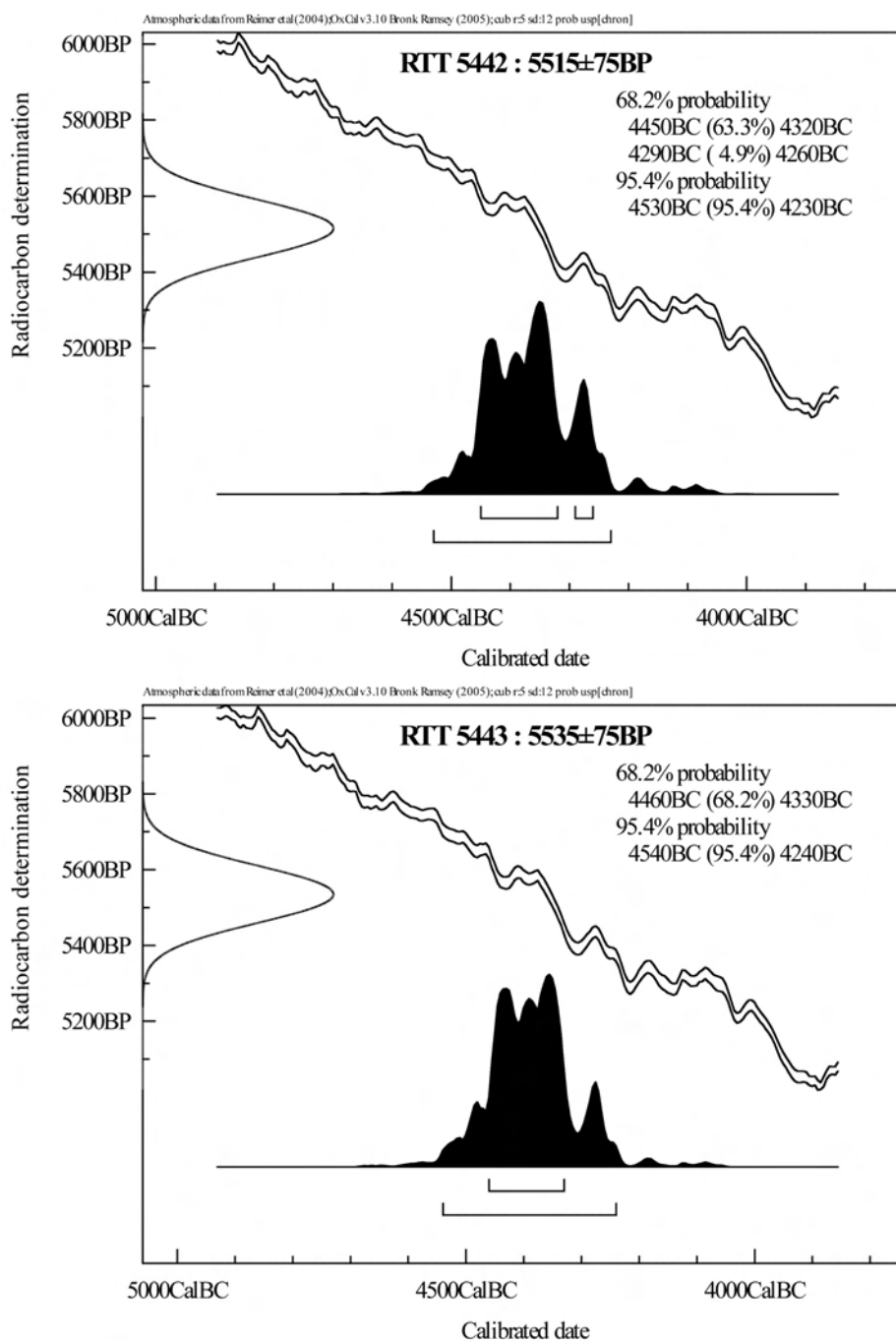


Figure 40. Probability distribution of the calibrated age for samples RTT 5442 and RTT 5443

habitation strata dating to the Chalcolithic period. Stratum 1, the main habitation strata, dates to the third quarter of the fifth millennium B.C.E. Lower phases date a little earlier, but within the same cultural horizon.

The inhabitants of Ein Hilu were permanent settlers employed in a subsistence economy based mainly on agriculture and herding, with some hunting. This conclusion is based upon the following evidence and analyses:

1. Ein Hilu is distinguished by its massive, planned architecture. The fact that pigs were raised at the site further support this conclusion, as does the prevalence of handicraft flint tools, used for the production of household utensils.
2. The bone assemblage includes both livestock and wild game species. This indicates a possible combination of both hunting (mountain gazelle – though the absence of arrowheads in the flint assemblage remains an enigma) and livestock husbandry economy. Herding seems to be an important activity, as indicated by the high share of cutting and butchering tools in the flint assemblage. The small percentage of young sheep and goats, and the few remains of cattle derived only from adult individuals, suggest that livestock were raised and exploited primarily for secondary uses. These include dairy and wool production for sheep and goats, and labor and milk production for the cattle. This is further supported by the churns and weights in the ceramic assemblage. Contrastingly, the culling strategy of pigs leads to the conclusion that they were raised probably for their meat only.
3. Cereals, either wild or cultivated, were exploited. Since the waters of Wadi Malih are saline, the most suitable land for agriculture was located within the 300 dunam valley to the south of the site. We presume that only seasonal, annual varieties were exploited due to the limited availability of freshwater and fertile soil.

The location of Ein Hilu differs from the pattern present in other Chalcolithic sites in the lower Jordan Valley and the desert fringes of Samaria. While other villages tended to develop along valley fringes, near water sources, and at low geographic positions, Ein Hilu is situated high above the Wadi Malih Valley, and about 500 m from the nearest water source. Probable advantages to the site's unusual location includes the collection of stones from the neighboring rocky hilltop that could have been used as building materials for the local houses; and the high position offering distant views, and a cooling breeze in the hot summer. Another possible reason is the location half way between the large sites of the Beit-Shean and Jordan valleys to those of the Zababdeh –Tubas valleys in the Samaria Mountains.

The excavation exposed a number of architectural features unknown (or rare) in the southern Levant, though other common traits are found in the site. The broad house is a known architectural feature in Chalcolithic societies. However, unique to Ein Hilu is the partition of these houses into many smaller units (as found in area B Stratum 1) and the addition of more than two rooms to the sides of the broad room (as found in area E). Floors were made of flat

slabs (whose underlying niches were probably used for storage) or packed earth. The walls of the buildings stand to a height of up to three stone courses. In several places, the clay bricks preserved on the stone courses indicate brick walls. In most cases, floors were situated at the upper level of the first stone course. Thus, we can assume that the bottom part of the wall was built of stone and its upper reaches were made of brick (stone construction was found up to a height of c. 0.5 m above the level of the floors).

The width of most of the exterior walls ranged between 0.8 m and 1.00 m, with identical construction in most cases: two rows of large and medium stones with a fill of soil and cobbles deposited between them.

The unique diagonal opening to the broad room in area E is paved with large stones arranged along a bias. Its door socket location indicates an inner position of the door, which was opened inwards.

The ceramic corpus of the excavation shed new light on the types and forms of household utensils in the Chalcolithic society in this unexplored region.

Further exploration of the lower Jordan Valley initiated by the author in the site of Fatzael 2 will extend our knowledge of the Chalcolithic in this vast area.

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