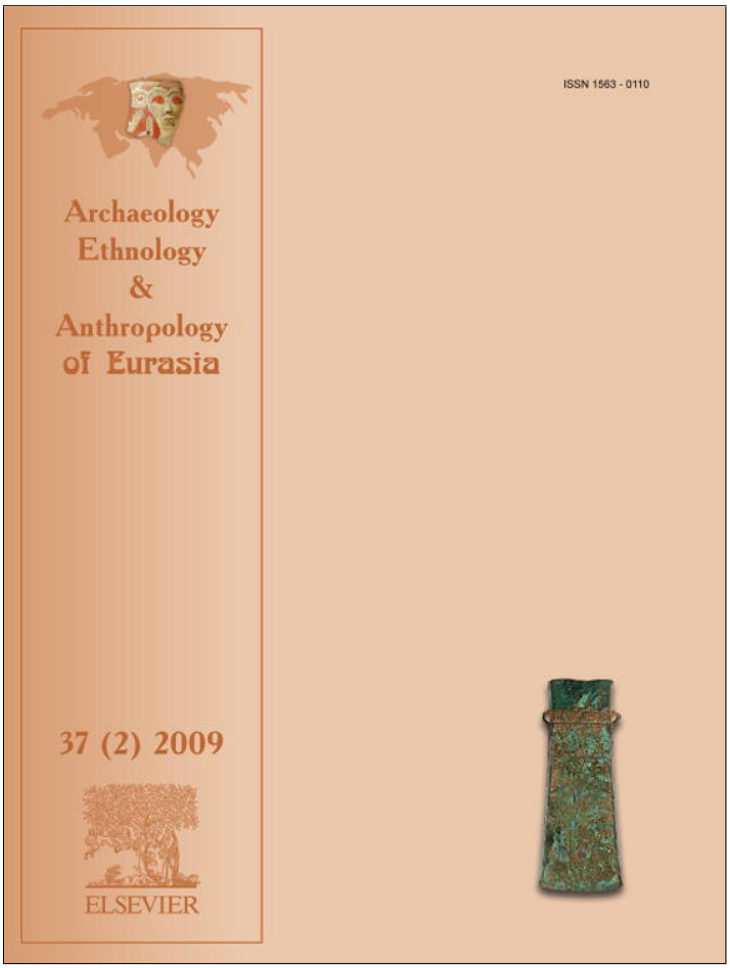

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PALEOENVIRONMENT. THE STONE AGE

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HUMAN-MADE BEDROCK HOLES (MORTARS AND CUPMARKS) AS A LATE NATUFIAN SOCIAL PHENOMENON

A concentration of 77 Late Natufian Human-made Bedrock Holes (mortars, cupmarks, etc.) hewn into the Raqefet Cave floor and terrace (Mt. Carmel, Israel) has been recently exposed. Some appear to be associated with human burials, and several had stone and flint objects buried in them. The variety of HBH types, in terms of dimensions and morphology is very wide, so the new classification system is suggested. The deep narrow specimens do not appear to have been used for any kind of processing, storing or quarrying. Yet, their manufacture must have been very costly in terms of time, energy, carving tools, and personal skills. The paper presents the Raqefet Cave HBHs as a case study, and cautiously suggests that some of them may have been incorporated into the Late Natufian social and spiritual worlds.

Key words: *Natufian, human burials, Human-made Bedrock Holes, Raqefet Cave.*

Introduction

Rock-cut holes/cavities (such as mortars and cupmarks) have been reported from the very beginning of Natufian research, from sites such as el-Wad Cave in Mt. Carmel (Garrod, Bate, 1937: 11) and Jericho in the Lower Jordan Valley (Kenyon, Holland, 1981: 272). Today there are many hundreds of known specimens, from a wide geographical range.

A recent excavation at Raqefet Cave (Mt. Carmel, Israel) exposed a concentration of 77 Late Natufian Human-made Bedrock Holes (henceforth HBHs, see definition below) hewn into the cave floor and terrace. One had a human burial at the top, several others had stone and flint objects buried in them. The relatively limited available data regarding the Levantine HBHs (though see (Nadel et al. 2008; in press)), as well as other Natufian food processing stone tools is frustrating, as they may be a major source of information concerning the Natufian shift to intensive cereal/acorn processing, and even to incipient agriculture (e.g. (Bar-Yosef, 2002; Belfer-Cohen, Hovers, 2005; Dubreuil, 2004; Hillman et al., 2001; Wright, 1991)*. It is the aim of this paper to use the Raqefet complex as a case study, and to suggest that certain types of bedrock features functioned within the social sphere of the Late Natufians, rather than in food or mineral processing.

Many site reports and syntheses regarding the Natufian culture are available and will not be repeated here. Noteworthy are the Natufian innovations in the realm of inhumations, "art" manifestations, and the use of stone in constructing walls and pavements (e.g. (Bar-Yosef, 1998, 2002; Belfer-Cohen, 1991; Byrd, Monahan, 1995; Hayden, 2004; Garrod, 1957; Hardy-Smith, Edwards 2004; Valla, 1995)). The innovations in stone working

*See also: **Rosenberg D.** The Pestle: Characteristics and Changes of Stone Pounding Implements in the Southern Levant from the Early Epipalaeolithic through the Pottery Neolithic Period. M.A. Thesis, Tel Aviv University (Hebrew), 2004.

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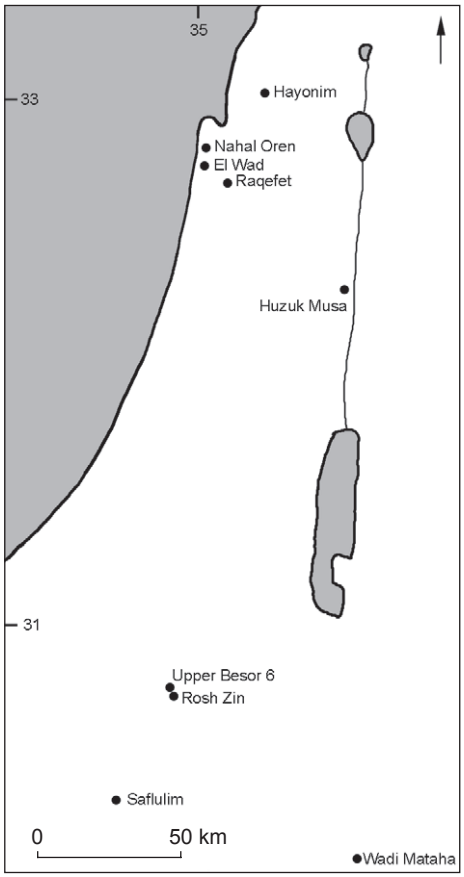

Fig. 1. Map of the southern Levant with Late Natufian sites containing Human-made Bedrock Holes.

include the shaping and decoration of very large stone objects (Edwards, 1991: fig. 10; Henry, 1976: fig. 11–14; Perrot, 1966: fig. 15); the production of human and animal figurines (Boyd, Cook, 1993; Garrod, Bate, 1937: pl. XII, XIII; Weinstein-Evron, 1998: 99–105; Weinstein-Evron, Belfer-Cohen, 1993); and the manufacture of hundreds of high-quality bowls, portable mortars/cupmarks, pestles, etc. This group of ground stone tools is one of the hallmarks of Natufian technology, and such implements are rare in earlier sites (e.g. (Belfer-Cohen, 1988; Belfer-Cohen, Hovers, 2005; Wright, 1991, 1992)*.

Within this sphere of stone working and use, HBHs appear for the first time, and in large numbers. Most bedrock features that have been described to date are commonly termed 'mortars' (large) or 'cupmarks/cupholes' (small). A new general term should be considered, because 'mortar' and 'cupmark' do not cover the entire typological range documented in Natufian and later sites, as there are many specimens that are definitely too large or too small to fit either of the two (Nadel et al., 2008; in press). Also, the first term is interpretive in nature (suggesting grounding/pounding activities), while some cavities were used in very different ways – probably even for flint quarrying (see (Grosman, Goren-Inbar, 2007)). We suggest a neutral term, 'Human-made Bedrock Holes' (HBHs), for the entire range of hole types hewn into bedrock surfaces. However, the range of types of portable specimens is not as wide, and most objects are similar to ethnographic mortars and cupmarks. Accordingly, we use HBH for the entire bedrock group, and still use the 'cupmark' and 'mortar' terms for the portable specimens and for bedrock features which are clearly one of the two.

*See also: **Rosenberg D.** The Pestle: Characteristics and Changes of Stone Pounding Implements in the Southern Levant from the Early Epipalaeolithic through the Pottery Neolithic Period. M.A. Thesis, Tel Aviv University (Hebrew), 2004.

The Raqefet Cave bedrock features

Raqefet Cave is situated in an inner wadi within a southeastern projection of Mt. Carmel (Ramot Menashe) (Fig. 1). *In situ* Late Natufian remains were exposed in Chamber 1 and on the terrace in front of the cave (Fig. 2–4). The excavations during 1970–1972 exposed most of the bedrock floor in Chamber 1, including burials and HBHs (Noy, Higgs, 1971). Two Late Natufian ^{14}C dates are available from the early excavations: 10,980 ± ± 260 uncal. BP and 10,580 ± 140 uncal. BP (Lengyel et al., 2005). We exposed additional parts of the floor, and found several large HBHs with *in situ* Natufian remains, as well as seven additional burials. Altogether, in the cave, we documented 50 HBHs and two large mortars hewn into limestone boulders (pipe mortars). There were also 27 HBHs hewn into the terrace bedrock (Table).

Preparation and preservation

Sophisticated technology was required for the manufacture of the usually symmetrical bedrock holes. This included knowledge of the local rock and its qualities, preparation of tools adequate for rock carving, high stone carving skills, patience and strength for many hours of hard work. However, direct evidence of carving is rare. In most cases, massive erosion and a variety of crusts and tufa obliterate the original rock surface and limit observations regarding production signs such as pecking, flaking, and drilling (Fig. 5–10). The rock-surface damage probably prevents the identification of additional small and shallow HBHs, and questionable specimens are not included here.

Several very small holes (2–3 cm across) in the bedrock surface may represent the first step in bedrock carving, possibly using a hard stone drill (Fig. 5, 11) (Grosman, Goren-Inbar, 2007). Also, two pecked circular

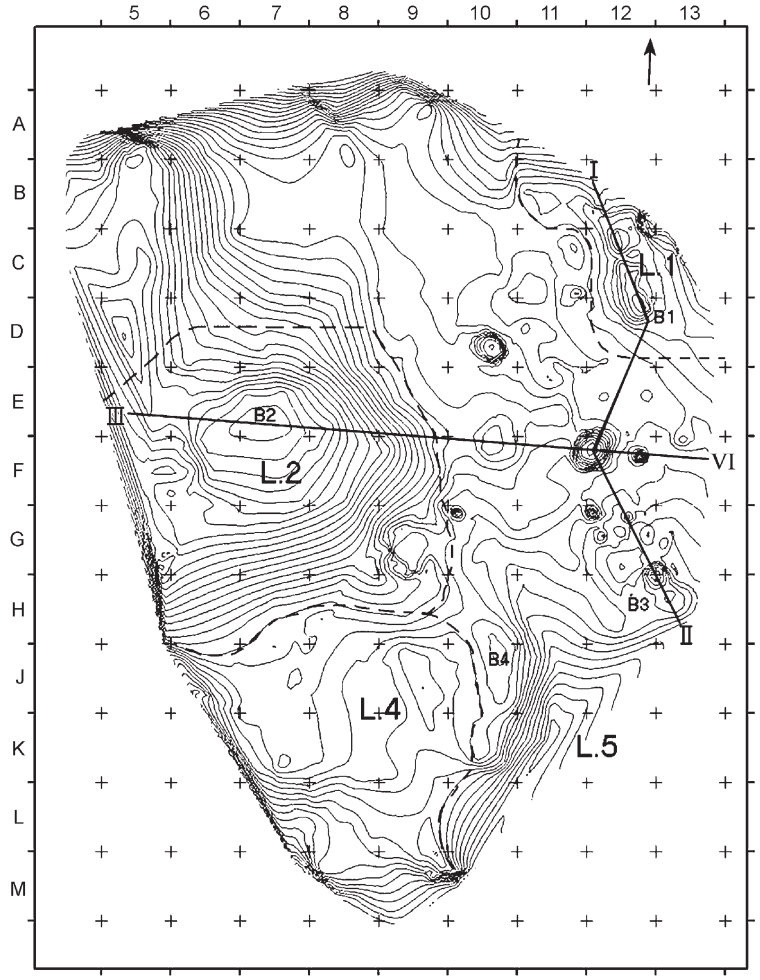

Fig. 2. Topographic plan of Chamber 1 in Raqefet Cave, prepared using photogrammetric techniques. Note location of four rock basins and the larger HBHs.

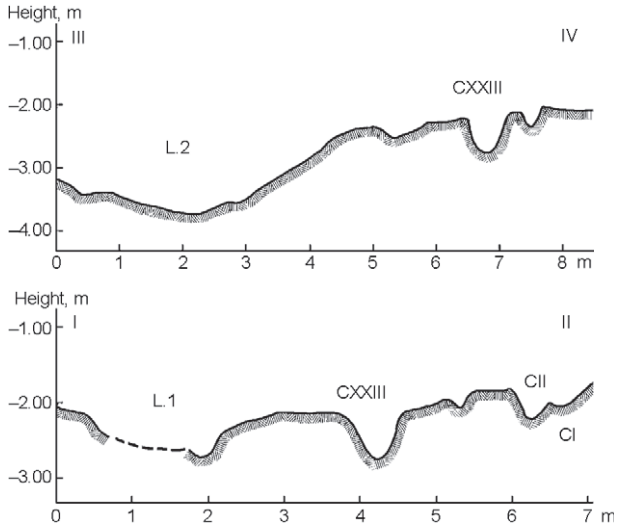

Fig. 3. Two sections through major bedrock features of Chamber 1.

Fig. 4. General view of Chamber 1 looking south. HBH CXXIII is in the center; basin 3 is below the large rock, top center.

Types of Human-made Bedrock Holes at Raqefet Cave and on the terrace

Type	Description	Total	Including		Figure
			Cave	Terrace	
A	Small, round shallow holes, 2–5 cm across and 2–5 cm deep, width : depth = ± 1	2	2	–	Fig. 11
B	Small, round shallow holes, 5–10 cm across, 2–5 cm deep, width : depth = > 1	4	2	2	Fig. 5, 11
C	Medium round holes (cupmarks), usually bowl-shaped, 10–15 cm across, 5–10 cm deep, width : depth = ± 1	24	13	11	Fig. 11
D	Large round holes (cupmarks), usually bowl-shaped, 15–30 cm across, 5–30 cm deep, width : depth = ± 1	35	22	13	Fig. 10, 16
E	Deep narrow round cylinders (mortars), 10–20 cm wide along most of the shaft and very narrow at the bottom, 20–80 cm deep, width : depth = < 1	3	3		Fig. 14
F	Deep narrow round cylinders, funnel-shaped, 10–20 cm wide along most of the shaft and very narrow at the bottom, 20–80 cm deep, width : depth = < 1. A clear shoulder/break is present between the wider top and the narrow bottom	2	2		Fig. 7, 14
G	Deep wide round/oval cylinders, wider than 20 cm, 20–80 cm deep, the top is much wider than the bottom	6	5	1	Fig. 5, 6, 15, 16
H	Oval shallow features, width : depth = > 1	1	1		–
I	Elongated features, including short “channels, width : depth = > 1 (The specimen here is associated with a cupmark and not counted separately)	*1	1		–
J	Composite sets of a pair (or more) features combined together				–
K	Varia (specimens that do not fit any of the above categories)				–
	Total	77	50	27	–

Fig. 5. Floor in center of chamber 1, with HBH CXXIII at t he left, and adjacent HBHs. Note the small holes immediately to the right of HBH CXXIII (scale bar, 20 cm).

Fig. 6. HBH CXXIII (top view) with a 10 cm scale placed at the bottom.

Fig. 7. HBH CXVI (top view) with a 5 cm scale placed on the top of the inserted stone. Note the eroded surface of the rock.

Fig. 8. HBH CXVIII (top view).

Fig. 9. HBH CXVIII (close-up view of the top of the shaft). Note the preserved smooth surface. Top diameter is 30 × 25 cm and the total depth of the shaft is 54 cm.

Fig. 10. Bowl-like HBH (type D).

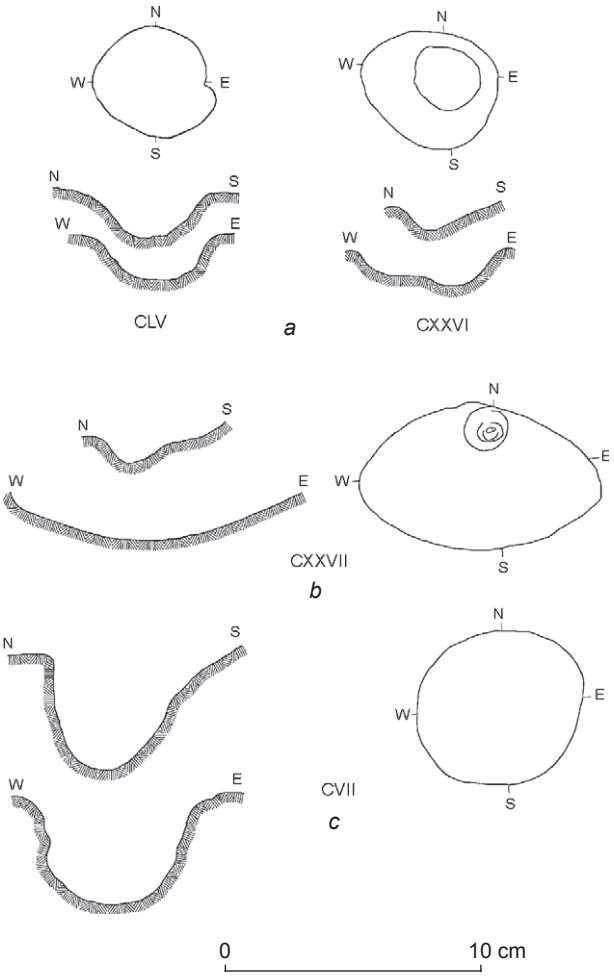

Fig. 11. Plans and sections of the smallest HBHs (types A, B, and C).

areas in basin 4 suggest that pecking was used, at least during the marking and beginning of hole carving. Several elongated crude stone tools which were recovered from graves and other locales, may have been used at the advanced stages of hole carving.

Fig. 12. General view of basin 1 (central segment). Note the slab with cupmark at the north end, the large HBH CXLIV at the south, and small HBHs above to the west. Human skeletons are visible, including one at top of HBH CXLIV.

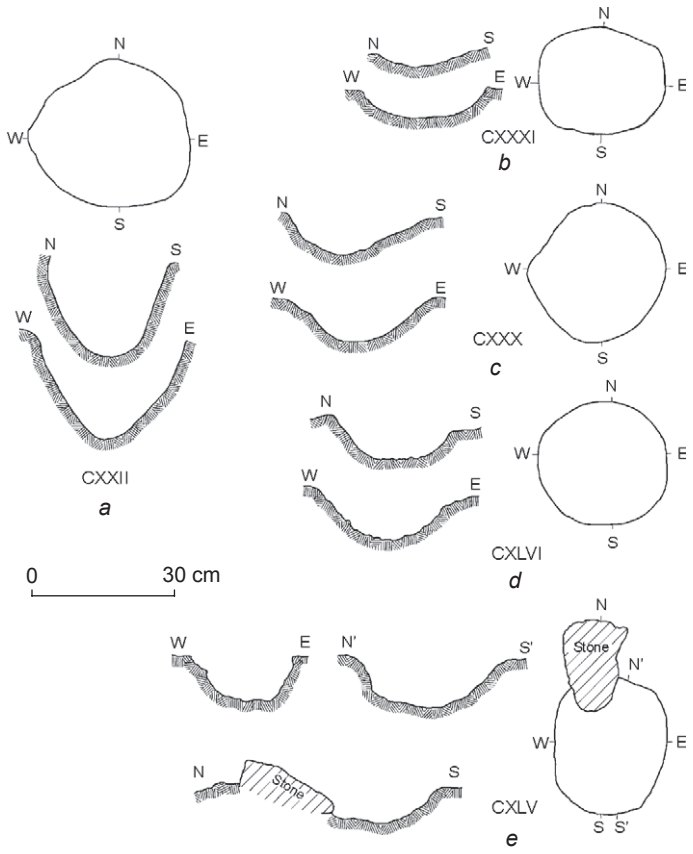

Fig. 13. Plans and sections of various HBHs.

Basins

The bedrock floor is very uneven (Fig. 2–4). Within the larger natural depressions (at least 1 m long), there are four basins that have regular contours. They all appear to be the outcome of natural processes, later modified or at least used by the Natufians. Basin 1 (Locus 1) was used for burial by the Natufians, and in one part of it stones, were set on edge and a body was placed on them (Lengyel, Bocquentin, 2005). In another, a limestone slab with a cupmark was set at the northern end and a large round HBH was hewn in the southern end (Fig. 12). Within the same basin, a small stone circle contained two very long conjoinable limestone "blades" set on end and facing each other. In basin 2, two large boulder mortars and remains of a Natufian burial were found. Basin 3 contained two large HBHs (CI and II). Basin 4 had two shallow circles of chiseled areas on its floor.

Human-made bedrock holes

The bedrock floor is undulating, and the HBHs are located in various uneven positions. In terms of size and shape, there is a wide variety of types (Fig. 4–15). No type list for such bedrock elements in Levantine prehistory has been assembled so far. The work of Wright (1992) focused on portable implements, and thus her type list is not sufficient for describing and analyzing the remains discussed here. We hereby provide a type list to be used as a framework for description and discussion of such remains. The HBHs are grouped into ten main categories, though the boundaries are somewhat arbitrary in some cases, and each category will be further subdivided in future works (Table).

To date, there are 77 HBHs exposed in the cave and on the terrace. In the cave, there are 44 on the floor of Chamber 1 and 6 on a huge fallen rock further inside. As some parts of the floor are not exposed yet, the numbers are not final. On the terrace there are 27 specimens. There, too, may be additional unexposed specimens as large parts of the terrace are still covered by colluvium. There follows a description of chosen specimens with *in situ* remains (most of the HBHs were found empty and are not described here).

HBH CXVI (type F) was found with a firmly wedged stone 30 cm below rim (Fig. 7, 14). There were no stones above or below it. Under it, there was fine sediment containing small animal bones, 3 complete lunates, 3 blade/lets, and 2 minute flints.

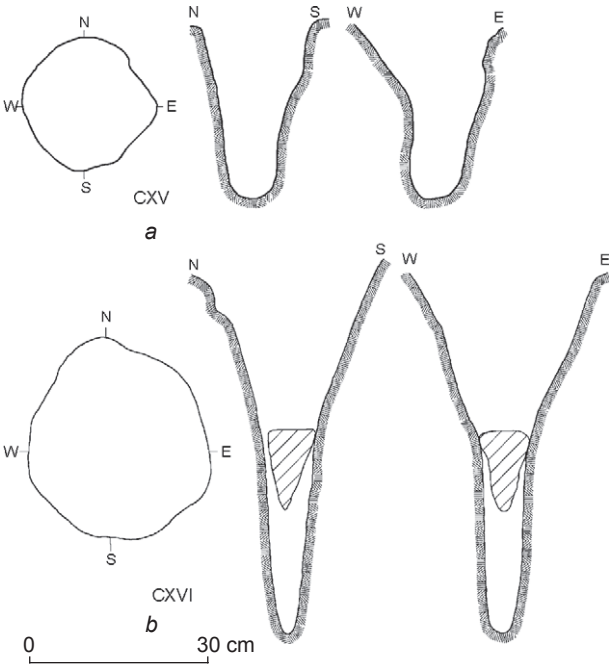

Fig. 14. Plans and sections of deep narrow HBHs CXV and CXVI (type E). Note the location of the inserted stone in HBH CXVI.

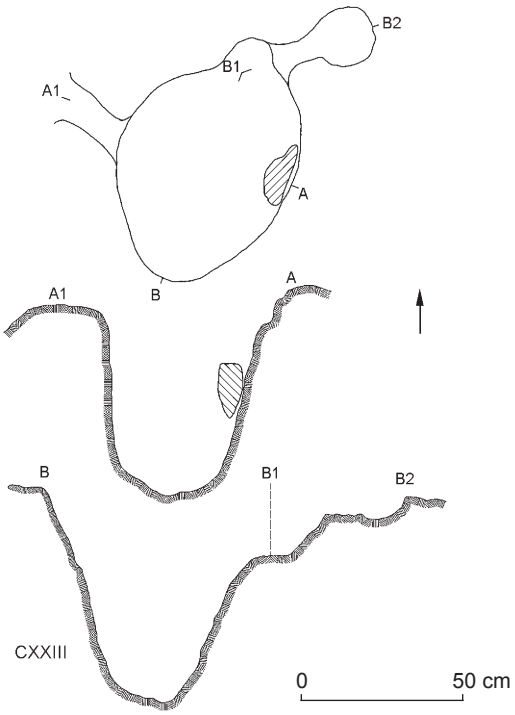

Fig. 15. Plan and sections of the large HBH CXXIII.

HBH CXXIII (type G) is by far the largest at the site, and probably the largest HBH known from any Natufian site (65 cm at the deepest point and 80 cm wide at the top) (Fig. 5, 6, 15). There is one tiny hole (type A) and two type B holes adjacent to it (Fig. 5). It contained brown sediment with Natufian flints and bones. The bottom was covered by tufa with adhering Natufian objects. Two flat stones set on edge were encountered within it. The flints (289 specimens) are dominated by blades/bladelets (53.6 %), accompanied by 29 tools (lunates, 34.5 %).

A pair of juxtaposed HBHs (CI and CII) was exposed in basin 3. An angular stone block was set on edge on the western rim of CI (type D) (Fig. 16, 17). The bottom of CI is covered by tufa containing flints and small stones. A child's parietal bone fragment (5 cm in diameter) was found lying horizontally and may have been buried there (Lengyel et al., 2005). CII is one of the largest HBHs excavated so far (type G). Four parallel stones were set on edge deep within it, two of which are conjoinable fragments of one stone. The four stones had to have been buried deliberately, in order to remain as found. The flint assemblage (561 specimens) includes 69 cores, 38 tools (lunates, 24 %), and 106 bladelets.

The two flint assemblages from HBHs CI–II and CXXII are generally similar (Ibid.). The lunates are typical Late Natufian, with abrupt and bipolar retouch, and an average length of 15.2 mm. The main differences are in the numbers of cores, 69 in CI–II and only one in CXXIII, though they derive from similar volumes and similar size

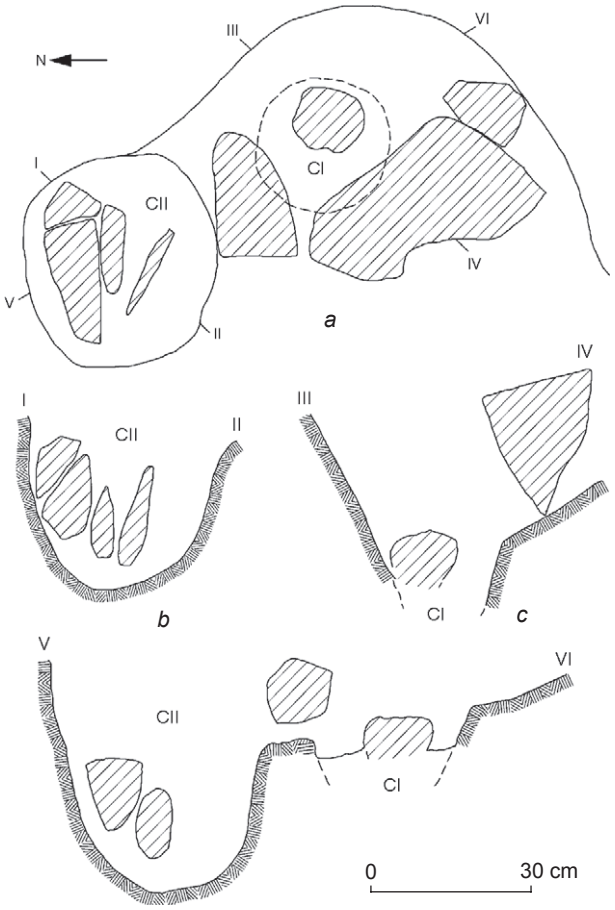

Fig. 16. Plan and sections of the CI–II complex.

Fig. 17. CI–II complex. Note the stone on the edge above CI and the flat stones set on edge within CII.

Fig. 18. Ribs and skull of H.9 at the top of HBH CXLIV.

of assemblages. We suggest that many cores were placed in CI–II on purpose, while other flints may be no more than the general typical Natufian background "noise."

HBH CXLIV (type G) is located in basin 1 where the highest concentration of burials was encountered (Fig. 2, 3, 12, 18). Several small and medium HBHs are located immediately above the basin (less than 50 cm away). The bottom and the lower parts of the walls are covered by tufa containing flints and bones. One individual (H.9) was buried horizontally at the top of the hole, with the body (ribs) below the rim level (Fig. 18). The basin was used to burry the dead at least five times.

In addition to the bedrock features, two boulder mortars were found in Locus 2, with their tops at the same level as the rims of the nearby HBHs. The largest has a tiny hole (3 × 2 cm) at the top, near the rim of the mortar. One skeleton was found near the object, at the level of its base. The second specimen had several human adult limb bones near the base. Similar stone objects were found in burial association at other Late Natufian sites.

HBHs were recorded at various Late Natufian sites, el-Wad being exceptional, with five large cavities and several small holes hewn into a leveled bedrock surface, dated to the Early Natufian period (Garrod, Bate, 1937: 10–11). At Hayonim, bedrock cupmarks were found in the vicinity of the cave (Belfer-Cohen, 1988: 167). At the Natufian layer of Jericho, there were several deep and shallow "post-holes" cut into the soft bedrock (Kenyon, Holland, 1981: 272, pl. 145a, b). At the entrance to Nahal Oren Cave, there are several HBHs. At Hatula, hundreds of (mostly) small HBHs can be seen on exposed bedrock surfaces (Samzun, 1994). However, their types and the presence of Pre-Pottery Neolithic A (henceforth PPNA) structures at the site suggest that they are Neolithic. Such features were recently interpreted as remains of flint quarries (Grosman, Goren-Inbar, 2007). At Huzuq Musa (Lower Jordan Valley), there are tens of HBHs of various dimensions and types dated to the final Natufian Period (Eitam, 2005: 686–689).

At Rosh Zin 18, HBHs were exposed in the past (Henry, 1976). A renewed survey revealed several additional specimens, totaling 25 (Nadel et al., in press), including five with one stone inserted in each shaft. At Saflulim, there are more than 150 HBHs (Goring-Morris, 1999) with additional dozens at the nearby Romam and Rosh Horesha sites. At Upper Besor 6, Early Natufian HBHs were also used by Late Natufian occupants (Goring-Morris, 1998; Horwitz, Goring-Morris, 2001). At Wadi Mataha (Edom Mountains, southwest Jordan), "several bedrock mortars are present on a sandstone ledge… the deepest mortars (up to 72 cm) are grooved from heavy use," probably of the Late Natufian period (Janetski, Chazan, 2004: 164).

Remains inside HBHs are known from several sites, and can be grouped into two categories: stones set on edge and buried objects. At Raqefet, stones set on edge were found inside graves and in three HBHs. At el-Wad, "a rough lump of limestone was firmly wedged into Basin 2, and two blocks of the tabular variety into Basin 3" ((Garrod, Bate, 1937: 11); note that Garrod's "basins" are HBHs in our terminology).

Stones placed in the shafts of deep narrow HBHs were found in CXVI and CXXI. At Rosh Zin, Henry reported that "exhausted mortars, hewn through into nonlithic substratum, were rejuvenated by the positioning of a quartzite cobble in the shaft to seal again the bottom of the mortar" (1976: 337). We have recently encountered five such cases at the site. Henry's interpretation may be incorrect, as the top of these "rejuvenation" stones are still angular – and not rounded from continuous work within the mortars (Nadel et al., in press). Interestingly, at Raqefet and Rosh Zin, the stones were placed inside both complete and perforated specimens. They were usually not at the very bottom of the shaft, and in some cases they were set near the top. Each shaft had only one stone inside, and it seems unreasonable to assume that one stone fell into each, fitting exactly the contour of the

shaft. Furthermore, some of the stones had flaking scars on them. These stones appear to represent a deliberate action of insertion, after which the HBH was not available at its full depth anymore.

Flint cores were also set at the bottom of deep narrow HBHs. A flint core was set at the bottom of mortar 17 at Rosh Zin (Henry, 1976: 337). This mortar was carved into the bedrock near a large pavement with a monolith incorporated in it. Several unique objects, including five large symmetrical pyramidal cores, were found there. Henry suggested that these finds were part of "ritual activity…" (Ibid.: 319–320, fig.11–17.). At el-Wad, Garrod found "a complete limestone mortar… with a hole through its base into which was jammed a flint core" (Garrod, Bate, 1937: 10). At Nahal Oren, a high-quality long pyramidal core was encountered at the bottom of a small conical ash pit within the graveyard (Nadel et al., 1997). A very large concentration of flint cores was found in the CI–II complex at Raqefet, and within the graves in basin 1.

Indeed, chosen stones and flint cores were repeatedly set in HBHs. The stones did not function as a bottom seal to rejuvenate the mortar, and the flint cores within the shafts are not a random phenomenon. In most cases, these deliberate actions do not appear to represent depositories or cashes (why store one stone or one flint core?), and thus should be viewed as part of the Late Natufian symbolic behavior.

Discussion

The first clearly dated HBHs appeared in the Levant during the Natufian period, though ground stone implements were manufactured in small numbers since the late Upper Paleolithic (Wright, 1991). HBHs became common in the Late Natufian, with deep narrow specimens and smaller cavities (cupmarks) being the dominant types. During the PPNA, the exclusive type was the small HBH (cupmark), commonly found on slabs set on house floors. During the PPNB, when there is evidence for wide-scale agriculture based on domesticated cereals and legumes (Bellwood, 2005; Lev-Yadun, Gopher, Abbo, 2000), bedrock and portable cupmarks/mortars become rare in the southern Levant, and flat or somewhat concave grinding types are prevalent.

The ecological setting of Late Natufian sites with HBHs is wide, and they are found in the Carmel – Ramot Menashe range (el-Wad, Nahal Oren, and Raqefet caves, as well as other sites), in the Lower Jordan Valley (Huzuk Musa and Jericho), in the Negev (Rosh Zin, Saflulim and adjacent sites, Upper Besor 6), and in mountainous southern Jordan (Wadi Mataha).

The Natufians modified their physical environment in many ways, by adding three non-perishable landmarks (Boyd, 2006) or features to their landscape. First are the stone-built structures. Second are the graveyards, with the cleared areas and built graves, including large stones and boulder mortars set vertically with their tops above ground. Third are the concentrations of HBHs, in caves, on cave terraces or on open-air bedrock exposures. Possibly, the Late Natufian HBHs were territorial markers of groups exercising high mobility, placing graveyards and associated features on the landscape – with an emphasis on caves (Ibid.; Goring-Morris, Belfer-Cohen, 2002; Grosman, 2003).

The smaller HBHs are not the early stage of manufacture or utilization of the bigger ones, as they form distinct categories in terms of size – and not a continuum of dimensions. Depending on size and shape, utilization for mineral processing, storage and even flint quarrying (Grosman, Goren-Inbar, 2007) may have taken place during the Natufian period. Interestingly, there is no correlation between the number of bedrock holes (77) and stone pestles (less than 5) at Raqefet.

However, food preparation is the most common documented use of mortars and cupmarks, with similar techniques being used for millennia all over the world (e.g. (Adams, 1999; Basgall, 1987; Kluckhohn, 1971) among many others). In the Levant, it has become common knowledge, though not always clearly stated, that the Natufians were processing cereals or acorns in stone mortars (e.g. (Bar-Yosef, 2002; Goring-Morris, 1987: 439; McCorriston, Hole, 1991; Wright, 1991)).

If indeed certain types were used for cereal processing, why are there big differences in numbers and types of HBHs and portable mortars/cupmarks at Late Natufian sites? A recently published model suggests that the beginning of cereal and pulse cultivation was a local endeavor on a trial and error basis, and not a widespread phenomenon (Weiss, Kislev, Hartmann, 2006). Thus, the uneven inter-site distribution of HBHs and portable mortars at Natufian sites may be at least partially correlated to local attempts of agriculture.

However, the diversity and details of the Raqefet bedrock features call for a wider consideration of their past utilization. These do not appear to be a part of a workshop or a production area (food or minerals) for several reasons. First, some specimens are tiny (volume, < 5 cm^3). Second, several HBHs are located on steep rock surfaces, uncomfortable for work. Third, the deep HBHs are so narrow (types E and F) that if functioned in material processing, working in them, and especially extracting the worked products would have been very difficult. Fourth, some HBHs were used for burying selected objects such as stones set on edge and flint cores. Another large HBH was used for a human burial at its top. Thus, at least during one stage of their history, these HBHs were not part of a production or processing activity. Fifth, the two highest concentrations of HBHs are near bedrock basins, one of which was used for multiple burials (the other was found

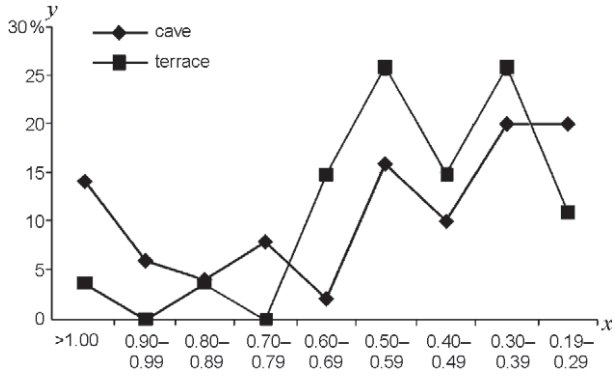

Fig. 19. Depth/top diameter ratio for the cave (n=50) and the terrace (N=27) HBHs.

empty, though it may have been used in a similar manner but disturbed by later human activities at the site).

Thus, we cautiously suggest that a substantial portion of the Raqefet HBHs was not part of a workshop or a production process. They were not quarries (nothing to extract from the local bedrock) and they do not form a pattern of postholes (see (Kenyon, Holland, 1981: 272, pl. 145a, b)). We propose that at Raqefet (and most probably at other Late Natufian sites), HBHs were directly associated with human burials and related ceremonies. Naturally, it is possible that certain HBHs were used for food production or even storage, before or during their incorporation into the cult of the dead. It is also possible that several specimens had a long utilization history, involving more than one function.

The association of stone tools utilized in food preparation (both of the grinding and the pounding types) with the dead is documented for pre-Natufian sites such as Neve David (Kaufman, 1989), and for Natufian sites such as el-Wad (Garrod, Bate, 1937), Eynan (Perrot, Ladiray, 1988), and Hayonim (Belfer-Cohen, 1988). Bocquentin has recently suggested that there were three kinds of associations in Natufian graves: (a) small tools as a kit for the next world, (b) standing deep mortars, as symbols or as tombstones, and (c) broken mortars (Bocquentin, 2003: 325). Now we can add another category – the carving of HBHs adjacent to graves. In some of these cavities objects and even humans were buried.

The incorporation of mortars in burials was commonplace in many past and recent societies, reflecting their economic importance, continuity between generations, and means of food preparation in the world beyond (e.g. (Gamble, 1957; Treganza, 1950: 118)).

We believe that the deep narrow HBHs were the most difficult to make; they could not have served for production or storage, and yet they were directly linked to burials, either by location or by demonstrating elements present in the human graves. Did they have a ceremonial role, providing means to feed the dead (Stekelis, Yizraeli, 1963), used as ceremonial pole holders (Kenyon, Holland, 1981: 272, pl. 145a, b), grave markers (Bocquentin, 2003; Stekelis, Yizraeli, 1963) or symbolic landmarks? Could they represent the dead in the graves? Could they be used to symbolize the female reproduction organs? Mithen has recently stated that "pestles and processors are phallic in form and the manner of their use, insertion into the deep cup-hole mortars… lends itself to a sexual metaphor, … plant-processing equipment, procedures and products have been frequently associated with sexual symbolism throughout human history" (2007: 715–716). Could stones set on edge inside HBHs support this avenue of interpretation? Relevant here is the fact that the Natufians produced iconography representing distinct human males and females, sometimes in very schematic ways (Boyd, Cook, 1993; Weinstein-Evron, 1998: 99–105; Weinstein-Evron, Belfer-Cohen, 1993).

Another potential avenue of interpreting the large HBHs could be the costly signaling theory (CST). The CST is mostly used to explain ethnographic examples of males hunting "hard to get" species, providing rare meat and thus gaining social advantages (e.g. (Hawkes, Bliege Bird, 2002; Smith, Bliege Bird, Bird, 2003)), and not commonly used in archaeological explanations (e.g. (McGuire, Hilderbrandt, Carpenter, 2007) and references therein). We tentatively suggest that the "hard to produce" deep narrow HBHs could have been a means of gaining social benefits. Indeed, these bedrock features were costly and hard to produce: their manufacture required high skills, wide knowledge of bedrock characteristics and stone working, adequate tools, strength, and patience. No free-riders could have faked and exhibited a well carved specimen.

One of the principles of CST is that the signaling was done in a public place, or that the signaler had an audience. The Raqefet Cave complex of HBHs is directly associated with human burials. The acts of burial, and possible later memorial events, were central to Natufian life and thus the bedrock features were set in a public location visible to many of the community members.

If indeed used for social communication, why choose bedrock holes? Could the pestle and mortar technology have reached a new and high level of importance during the Natufian period, as some groups shifted to mass production of cereal or acorn foods (Weiss, Kislev, Hartmann, 2006)? It is well established that exactly at that time some of these tools began to be buried with the dead. Stone (non-flint) use and stone technology was fundamental in Natufian life, and if there was a social drive to provide a costly and hard-to-fake product (social signal) by certain individuals, one of the archaeologically visible results was the manufacture of deep bedrock holes (economically useless), exactly at the center of where a social gathering would have taken place (burial, memorial, etc.).

The incorporation of the CST in the reconstruction of past Natufian social behavior is one of several interpretation directions. Evidently, additional evidence is needed for a better understanding of both the concentrations of HBHs in certain sites, and the characteristics of the deep narrow specimens. However, even at this stage these specimens should be viewed as yet another manifestation of the increasingly growing Natufian social complexity.

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