Chapter 14
The Acheulo-Yabrudian – Early Middle Paleolithic Sequence of Misliya Cave, Mount Carmel, Israel

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Abstract Misliya Cave, Mount Carmel, Israel was occupied between 250 and 160 ka. During this time the site was inhabited by bearers of the Acheulo-Yabrudian and Early Middle Paleolithic (Mousterian) techno-complexes. The Acheulo-Yabrudian industry is characterized by production of thick and wide flakes and shows no evidence of laminar or Levallois methods. The varied assemblage encompasses true bifaces, artifacts fully worked on one face and only partially on the other, unifaces and scrapers. All these morphological groups were produced using the same flaking and retouching modes. The emergence of the Early Middle Paleolithic is manifested by a technological break, marked by the disappearance of bifaces and thick-flake production technology and the introduction of blade manufacture using laminar and Levallois production methods, and Levallois points and triangular flakes. The mean TL ages of the Acheulo-Yabrudian assemblage indicate production of this cultural complex 257 ± 28 ka – 247 ± 24 ka. The mean TL ages of the Early Middle Paleolithic industries range from 212 ± 27 to 166 ± 23 ka. The pronounced differences in lithic technology together with TL chronology indicate that the transition from the Lower to the Middle Paleolithic in the Levant was rapid and may imply the arrival of a new population around 250 ka.

Keywords Acheulo-Yabrudian • Early Middle Paleolithic • Levant • Lower-Middle Paleolithic transition

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Introduction

One of the hottest issues in current prehistoric and evolutionary research is that of the emergence of modern humans. While various scenarios have been postulated based on skeletal and cultural material dating to the later part of the MP (Middle Paleolithic), human remains from the Early Middle Paleolithic (EMP) and the very end of the Late Lower Paleolithic (LLP) are still rare and mostly amount to dental finds (e.g., Hershkovitz et al. 2011). Moreover, their taxonomic affiliation, whether to modern humans or other hominin' evolutionary paths is still not fully resolved.

Until additional, more indicative human remains are unearthed, emphasis has been given to various behavioral indicators of the different cultural phases that may constitute useful tools when aiming to characterize the holders of the various cultures. These are mostly derived from stone-tool typology and technology, spatial site arrangement and animal remains (e.g., Marks and Friedel 1977; Bar-Yosef 1998; Hovers 2001, 2006, 2009; Henry 2003; Shea 2003; Alperson-Afil and Hovers 2005; Meignen et al. 2006; Yeshurun et al. 2007).

In this discourse, sites that contain both Late Lower Paleolithic and EMP layers may prove most promising for delineating such cultural developments. Misliya Cave, Mount Carmel, is one such rare occasion. In this paper we present the cultural characteristics of the Late Lower Paleolithic (Acheulo-Yabrudian) and EMP cultural assemblages found at the site. The special attributes of the latter will be further highlighted against the picture emerging from the study of Late MP sites in the region.

The Site

Misliya Cave is located on the western slopes of Mount Carmel, slightly to the south of Nahal (Wadi) Sefunim, at an elevation of ca. 90 m, some 12 km south of Haifa

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(Fig. 14.1a). Situated ca. 7 km north of Nahal Me'arot (Wadi el-Mughara) and the caves of Tabun, Jamal, el-Wad and Shkul (Garrod and Bate 1937; McCown 1937; Jelinek et al. 1973; Weinstein-Evron and Tsatskin 1994; Zaidner et al. 2005) it was found to contain rich Middle Paleolithic (Mousterian) and Lower Paleolithic (Acheulo-Yabrudian) layers (Weinstein-Evron et al. 2003a; Zaidner et al. 2006).

Today the site appears as a rock shelter or an over-hang (Fig. 14.2) carved into the limestone cliff of the western escarpment of Mount Carmel. Several small caves (or niches) extend eastward from the rock shelter and from the continuation of the cliff northward and southward (Weinstein-Evron et al. 2012). The morphologic features of the caves, the remnants of ancient, inactive, flowstones and the form of the central part of the rock shelter indicate that the overhang is a remnant of a large collapsed cave or cave system. Detached blocks of flowstone appear some 20 m west of the cliff within collapsed debris and cemented archaeological sediments. Th/U dating of one of these collapsed flowstone blocks shows that it is older than 650 ky (H. Schwarcz, personal

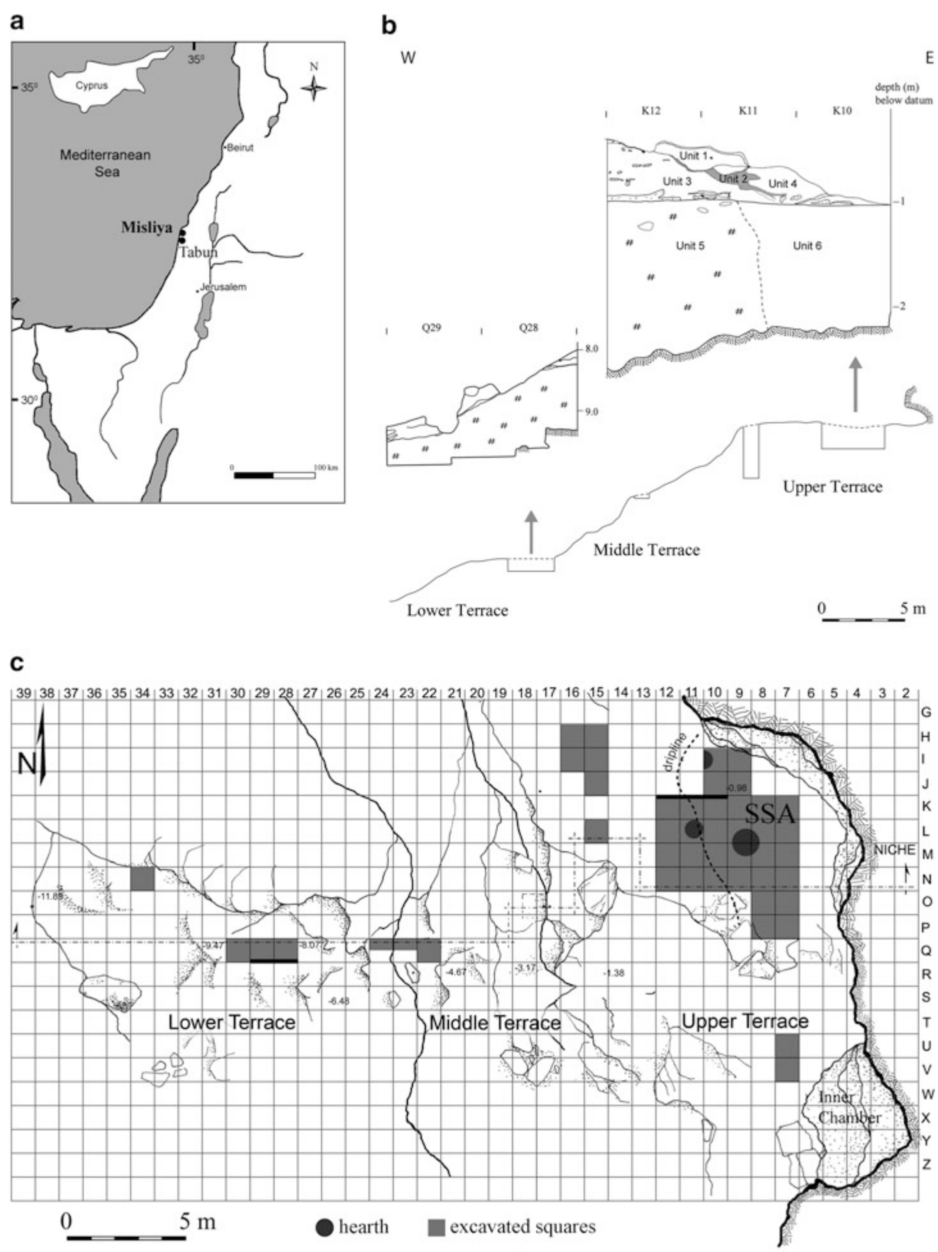

Fig. 14.1 **a**. Location map. **b**. Site section. **c** Site plan

communication 2003). While the date cannot be associated with the archaeological layers, it indicates that cave formation was already in process prior to that time.

Strongly cemented archaeological sediments (breccia) are found on three terrace-like surfaces at the base of the cliff, all sloping gently to the west (henceforth Upper, Middle, and Lower Terraces; see Fig. 14.1b, c; Fig. 14.2). Sub-vertical exposures between the terraces were formed in the course of natural collapse of the cave, and cementation and erosion of its deposits.

Cave collapse was gradual. Its very latest stages occurred during EMP times, as concluded from a detailed geo-archaeological study of a deep sequence in Square L15. During most of the Middle Paleolithic occupation, the Upper Terrace was still enclosed by the cave walls and covered by a roof; the last collapse occurred at the close of hominin habitation of the cave (Weinstein-Evron et al. 2012).

The archaeological excavations were conducted on all three terraces of the cave (Fig. 14.1c). On the Lower Terrace only Acheulo-Yabrudian artifacts were found *in situ*. A small area was excavated on the Middle Terrace of the site but the few unearthed artifacts are not diagnostic. On the Upper Terrace both Acheulo-Yabrudian and Mousterian finds were discovered. The Mousterian layers cover an area of ca. 70 m^2 on the Upper Terrace. They occur mostly in its northern part, while bedrock is exposed on its southern part, apart from isolated breccia patches. According to a geophysical survey that was conducted at the site prior to excavation the thickness of the sediments on the northern part of the site is about 4 m (Weinstein-Evron et al. 2003b). This observation was validated during excavation with the unearthing of a 3.5 m-deep archaeological sequence in Square L15 on the western part of the Upper Terrace (Fig. 14.1c); the archaeological sediments become shallower towards its eastern part. In the north-eastern area of the Upper Terrace, cemented layers change laterally into softer sediments, forming an area of about 20 m^2, designated as the "Soft Sediments Area" (SSA; Fig. 14.1c). The limit between the lithified and softer sediments lies within the present-day dripline, with the SSA located below the roofed part of the cave. Lying above the natural bedrock, the soft sediments are quite shallow (1.5–2.5 m), apart from the northern part of the excavation near the wall of the cave (squares I9–10) where the layers are deeper (3–3.5 m).

The archaeological sequence of the SSA was divided into six stratigraphic units (Fig. 14.1b). Units 1 and 2 represent eroded surface breccia and later *terra-rossa* intrusion,

Fig. 14.2 Photo of the site, view from the north

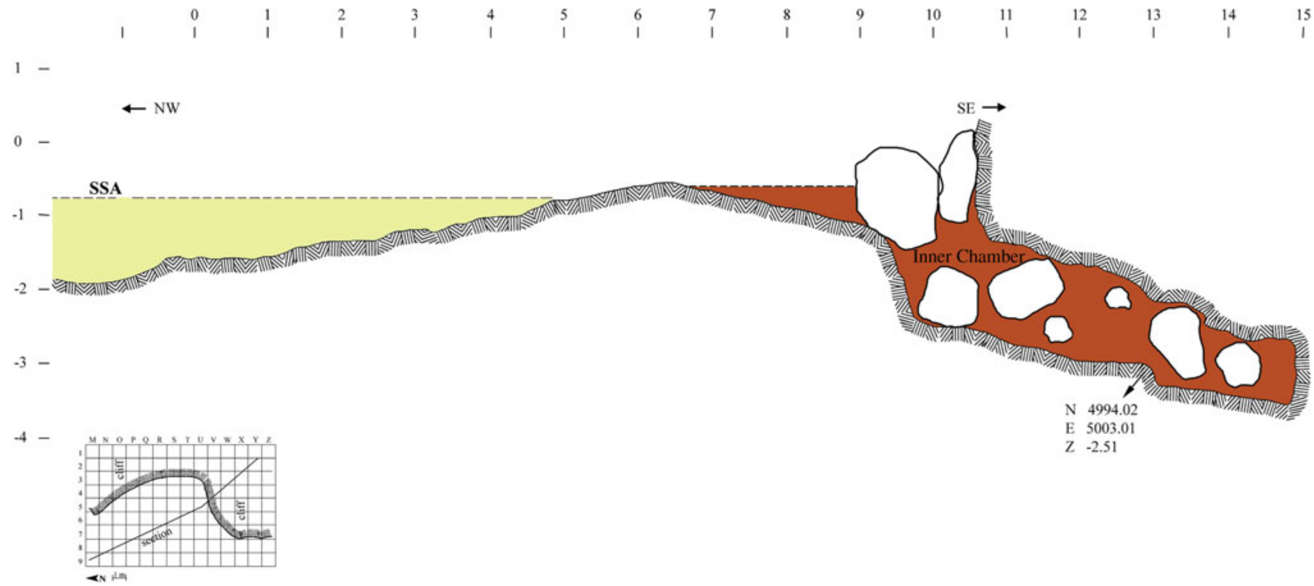

Fig. 14.3 NW-SE section along the Upper Terrace. Note the deep underground Inner Chamber on the SE part of the site

respectively. Units 3-4 represent well-preserved but rather residual MP habitation layers rich in lithics and faunal remains and containing combustion features. Units 3 and 5 that lie slightly to the west of the drip-line are somewhat more lithified than Units 4 and 6. Unit 6 is the richest and best preserved EMP unit of the site. At the bottom of Unit 6, a mixed Acheulo-Yabrudian/Mousterian unit was found in the easternmost squares (K-N/7–9). The unit occurs in the lower part of the SSA within sediments that accumulated in-between large rocks below the MP layers. The unit is ca. 10 cm thick and lays on a rock surface which either constitutes the bedrock or a huge collapsed rock shelf.

On the south-eastern corner of the Upper Terrace, a small underground cavity (henceforth the Inner Chamber) was discovered (Figs. 14.1c, 14.3). It measures ca. 5 × 5 m, with heights varying between 0.7 and 1.5 m, and is filled with mixed archaeological sediments. More than 10,000 artifacts and thousands of bone fragments were retrieved from the coarsely sieved deposits of the Inner Chamber. In spite of the great depth (at the southern end we have reached a depth of 3.40 m below datum) no *in situ* archaeological deposits were found to date. The chamber contains hundreds of Acheulo-Yabrudian handaxes and scrapers mixed with artifacts of Mousterian origin.

The Inner Chamber is the only place on the Upper Terrace where Lower Paleolithic finds occur in significant numbers. Since no *in situ* Lower Paleolithic material was detected on the Upper Terrace, the origin of handaxes and scrapers in the Inner Chamber remains an enigma. It may be postulated that the Upper Terrace originally contained rich Acheulo-Yabrudian layers that were eroded and washed into the Inner Chamber by post-depositional processes. Since the highest topographical point of the Upper Terrace is located between the SSA and the Inner Chamber, creating a natural barrier that prevented mixture of sediments and finds from both areas (Fig. 14.3), it is clear that artifacts and bones found in the Inner Chamber could not have originated from the SSA. Therefore, it seems that during the Lower Paleolithic (and probably the beginning of the MP) the main living area of the site was located not in what we call now the SSA but at different location/s in the cave. A possible location could be at the south-western part of the Upper Terrace near the entrance to the Inner Chamber, where massive rockfalls and brecciated layers are still present today.

The Lower Paleolithic – Acheulo-Yabrudian

In Misliya Cave, Acheulo-Yabrudian artifacts were found in three contexts: *in situ* layers on the Lower Terrace; mixed Acheulo-Yabrudian/Mousterian material under Unit 6 of the SSA; and mixed Acheulo-Yabrudian/Mousterian material in the Inner Chamber on the southern corner of the Upper Terrace.

In situ Acheulo-Yabrudian layers were excavated on the Lower Terrace of the site. Here the lithified archaeological layers extend over an area of ca 40 m^2 and contain only Acheulo-Yabrudian artifacts. Four square meters were excavated in this part of the site with a total volume of ca. 4.7 m^3 (Fig. 14.1c). A deep section was exposed within the

Table 14.1 Density of artifacts in the Acheulo-Yabrudian of Misliya Cave

Square	Volume	Quantity	Density (m^3)
Q28	1.64	768	468
Q29	1.53	397	259
Q30	0.91	180	197
Total	4.08	1345	329

Table 14.2 General breakdown of the Misliya Acheulo-Yabrudian assemblage

Category	N	%
Flake	859	65.3
Blade	37	2.8
CTE	9	0.7
Biface thinning flakes	35	2.7
Retouch/resharpening flakes	35	2.7
Handaxes	14	1.1
Core	51	3.9
Chunk	195	14.8
Retouched tool	82	6.2
Sub-total	**1317**	**100.0**
Microdebris	1728	
Microdebris (burnt)	740	
Total	**3785**	

strongly lithified layers in squares Q28-Q30 (Fig. 14.1b) and an additional square (N34) was excavated close to the northern limit of the archaeological sediments. The cemented sediments were excavated in 0.5 m^2 squares and 5 cm spits with an electrical hammer, coupled with hand-chiseling. In addition to items collected in the field, this procedure produced lumps of cemented sediments which were further excavated in the laboratory for extraction of archaeological material. Only isolated bone fragments were spotted in the Acheulo-Yabrudian sediments but due to the hardness of the layers we were not able to extract them. Therefore, there is no available faunal data from the Acheulo-Yabrudian layers of the cave.

The Acheulo-Yabrudian layers from Squares Q28-30 were dated using the TL method. In total nine dates were obtained showing a relatively short occupation range (between 273 ± 21 and 238 ± 21 ka). The mean ages are 247 ± 24 ka for Square Q28 and 257 ± 28 ka for Square Q29 (Valladas et al. 2013). These dates place the Acheulo-Yabrudian finds of Misliya Cave at the very end of the Levantine Lower Paleolithic.

The Acheulo-Yabrudian lithic assemblage from the Lower Terrace contains 3785 artifacts. Among them 1317 artifacts are larger than 2.5 cm and 2468 are microdebris. The average density of finds is 329 artifacts larger than 2.5 cm per m^3 (Table 14.1). The assemblage (Table 14.2) is dominated by flakes (859). Blades are rare and Levallois products are absent altogether. Side-scrapers constitute the dominant tool type, with simple, *déjeté*, transverse and bifacial scrapers being the dominant types. The Misliya handaxes are small (Fig. 14.4: 1), closely resembling handaxes from Layer E of Tabun Cave and probably those of Yabrud I, but differing from Upper Acheulian sites (Chazan and Horowitz 2006; Zaidner et al. 2006). Whether the small size is a common feature of Acheulo-Yabrudian bifaces as a whole, or represents a special trend in handaxe production at the end of the Lower Paleolithic on the Carmel ridge, is still an open question. Many of the Misliya handaxes are made on flat flint pebbles and retain parts of at least one of the cortex surfaces. As a rule, the Misliya knappers focused on shaping the handaxe tip rather than on its entire circumference. In this, the Misliya handaxes differ from some Late Acheulian bifaces that were bifacially flaked all around their circumferences (Zaidner et al. 2006). The presence of biface thinning flakes indicates that handaxes were shaped on site.

One of the most striking features of the Misliya Cave biface assemblage is a continuous range of variation from "true" bifaces (Fig. 14.4: 1), through artifacts fully worked on one face and only partially on another (Fig. 14.4: 3, 5, 8), to real "unifaces" and scrapers (Fig. 14.4: 7). This phenomenon was also observed in Bezez Cave, where "…difficulty was experienced with 36 pieces, which seemed to be intermediate between bifaces and bifacial racloirs" (Copeland 1983: 109). In Misliya Cave, most of the partial bifaces were made on flakes. Usually the dorsal face is almost completely covered by removals, most of which were made after the flake was detached from the core. The ventral face, on the other hand, was poorly retouched, and usually only a few removals were made close to the tip of the handaxe (Fig. 14.4: 3, 8).

While no combustion features were found in the excavated sediments, the evidence for use of fire is inferred from the presence of burnt lithics (16.8% burnt artifacts according to the visual inspection). TL analysis reinforces visual observations, clearly indicating that some of the artifacts were burnt. Among the microdebris, ca. 30% are burnt pot-lids, fragments and chips (Table 14.2), also indicating that fire was used quite intensively.

The Middle Paleolithic – Early Levantine Mousterian

The SSA was the major focus of the excavations. Here approximately 20 square meters of Middle Paleolithic layers were excavated (Fig. 14.1c). The soft sediments were excavated using a three-dimensional recording system for all artifacts and bones larger than 2.5 cm. The squares with hard sediments to the west of the drip-line were excavated using hammers and chisels as well as electric hammers. The artifacts in the brecciated sediments were recorded in sub-squares excavated by 5 cm deep spits. A small area was opened in the brecciated sediments on the north-western part of the Upper Terrace (Squares H-J15; H-I16) and two squares were dug to bedrock immediately to the west of the Inner Chamber (squares U-V/7). In addition, one square meter deep-sounding was excavated in the brecciated sediments of the western part of Upper Terrace (Square L15) (Fig. 14.1c).

The Middle Paleolithic layers of the Upper Terrace were dated using the TL method. In total 23 dates were obtained from squares L15, J15, N12 and L10 (Valladas et al. 2013). The mean ages of the Middle Paleolithic layers range from 212 ± 27 to 166 ± 23 ka, broadly assigning the site to marine isotope stage (MIS) 7 and the early part of MIS6 (Valladas et al. 2013). The lithic analysis of the Middle Paleolithic assemblages of Misliya cave shows that they all belong to the Early Levantine Middle Paleolithic (e.g., Garrod and Bate 1937; Jelinek 1982; Bar-Yosef 1998). The same cultural phase is dated to ca. 250−170 ka in both caves and open-air Levantine Middle Paleolithic sites (Grün and Stringer 2000; Mercier and Valladas 2003; Rink et al. 2003; Mercier et al. 2007). Thus the lithic evidence and TL dates are in general agreement with the known record of the Early Levantine Middle Paleolithic.

Table 14.3 presents data from the initial sorting of ca. 70% of the lithic assemblage of the SSA and the entire assemblage of the deep-sounding (L15). The density of Middle Paleolithic artifacts in the SSA varies between 2000 and 4000 pieces per cubic meter in different squares; the average density is 3017 pieces per cubic meter. Although the assemblages are dominated by flakes (Table 14.3), the industry is blade-oriented. The lithic evidence reveals the use of two major technological systems in Misliya Cave: Levallois and Laminar. Products of both systems occur throughout the site's stratigraphy. The laminar system consists of bi-directional twisted cores, half-pyramidalic cores, crested blades and blades with thick triangular or trapezoid sections. The Levallois system consists of elongated products, with blades comprising ca. 25% of the Levallois assemblage (Zaidner and Weinstein-Evron 2014). Levallois flakes are commonly triangular, similar in shape of the butt and in the use of a unipolar convergent method of core reduction to the Levallois points. A number of true Levallois blades are also present in the assemblage. They are wider and thinner than blades produced by the laminar system and are often produced by a bidirectional method.

The high proportion of elongated retouched points and preference of blades as blanks for tool production are the most characteristic features of the Misliya tool-kit distinguishing it from those of the later MP (Zaidner and Weinstein-Evron 2014; Table 14.4). Points include a variety of well-standardized types (i.e., Levallois, elongated Mousterian, Abu-Sif and Hummal points). In addition, a new type of point was identified at Misliya Cave, the Misliya Point. This is a small point that is characterized by oblique truncation on the distal end (Fig. 14.5: 5−7). The notable metrical and morphological differences between different point types suggest that they likely have been used differently. Some of the pieces of all types exhibited diagnostic impact fractures indicating that they were used as tips of weapons (Yaroshevich et al. 2016). The differences in size may indicate differences in hunting technologies employed by Misliya hominins (Yaroshevich et al. 2016).

The faunal assemblage of Misliya Cave shows similar characteristics in both the SSA and Square L15 and is overwhelmingly dominated by ungulate taxa, especially Mesopotamian fallow deer (*Dama mesopotamica*), mostly prime-aged individuals, and mountain gazelle (*Gazella gazella*) while carnivore remains are absent (Yeshurun et al. 2007; Weinstein-Evron et al. 2012). Aurochs (*Bos primigenius*), wild boar (*Sus scrofa*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), wild goat (*Capra* sp.) and ostrich (*Struthio camelus*; egg-shell fragments) are present in small numbers. Multivariate taphonomic analysis of the SSA assemblage demonstrated that the assemblage was created solely by humans occupying the cave and was primarily modified by their food-processing activities (Yeshurun et al. 2007). Gazelle carcasses were transported complete to the site, while fallow deer carcasses underwent some field

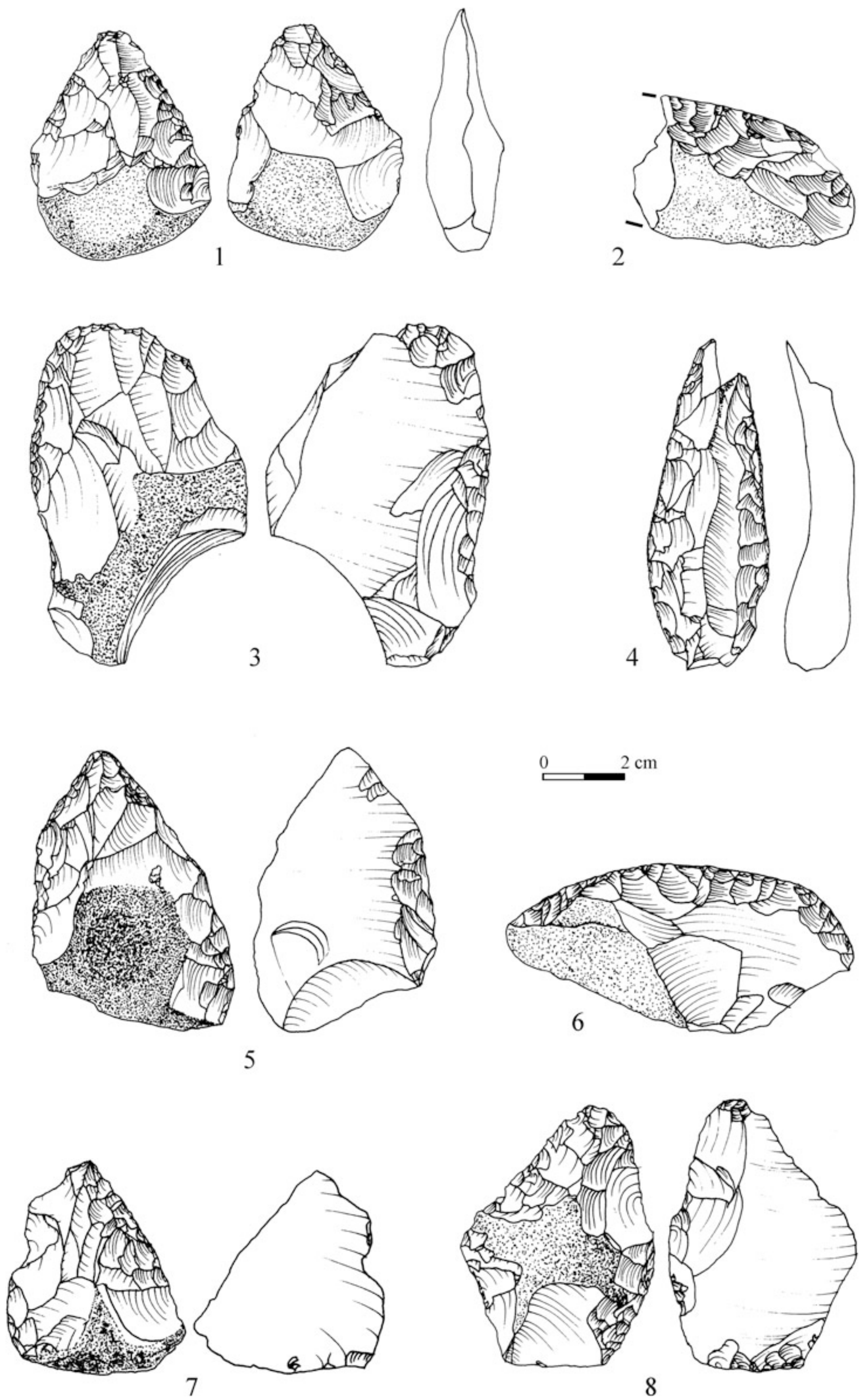

Fig. 14.4 Acheulo-Yabrudian artifacts. 1 – handaxe; 2, 6 – transverse sidescrapers; 3, 5, 8 – sidescrapers with bifacial retouch; 4 – limace; 7 – convergent sidescraper

Table 14.3 General breakdown of the Misliya EMP assemblage

	SSA		L15 (deep sounding)	
Flake	36516	59.3%	1818	71.8%
Blade	10582	17.2%	175	6.9%
Levallois flake	4350	7.1%	109	4.3%
Levallois blade	2038	3.3%	9	0.4%
Levallois point	1331	2.2%	74	2.9%
CTE	665	1.1%	18	0.7%
Burin Spall	121	0.2%	8	0.3%
Core	423	0.7%	14	0.6%
Core (Levallois)	176	0.3%	11	0.4%
Core-on-flake	81	0.1%	10	0.4%
Chunk	2473	4.0%	145	5.7%
Retouched tool	2810	4.6%	142	5.6%
Total	61566	100.0%	2533	100.0%

butchery. Abundance of meat-bearing limb bones that display filleting cut-marks and the acquisition of prime-age prey suggest that the Early Middle Paleolithic people acquired their prey by active and systematic hunting.

During the excavation of the SSA three distinct hearths were discovered. Two of them were found in the soft sediments of Unit 6 (Squares K-L9 and L11), while a small hearth was unearthed in the brecciated Unit 5 (Square I11). An exceptionally well preserved hearth was found in square L11. It is ca. 35 cm in diameter and is clearly differentiated from the surrounding sediment in color (Fig. 14.6 a, b). The hearth lies on a large limestone boulder and consists of three distinct levels, from top to bottom (Fig. 14.6c):

1. Chunks of indurated gray ashes.
2. Black layer 1−2 cm thick rich in burnt bones and flints.
3. Orange (3a) to brown (3b) layer up to 10 cm thick with a lens-like section.

The large hearth found in square L9 is still under micromorphological, mineralogical and archeo-botanical study. In addition to visible hearths, micromorphological and mineralogical evidence points to intensive use of fire in both the SSA and lithified layers, as evident in the geo-archaeological study of the deep sequence in Square L15 (Weinstein-Evron et al. 2012). In the latter, the evidence includes blackened and calcined burnt bones, bedded humified/charred plant material arranged in micro-laminae, reddish lenses probably derived from burnt clayey *terra rossa* and cemented calcite lenses probably originating from partial dissolution and re-precipitation of calcitic wood ash.

The exceptional preservation of vegetal tissues at Misliya is noteworthy. The charred remains were micromorphologically identified in a central part of the collapsed cave, associated with wood ash, burnt bones, and phytoliths (Weinstein-Evron et al. 2012). Similar attributes were recently reported from later MP and Middle Stone Age sites

Table 14.4 Composition of the tool-kit in Early, Middle and Late Levantine Mousterian sites*

	Site	N of retouched tools	Retouched points (%)	Side-scrapers (%)	UP types (%)	Notches/Denticulates (%)	Retouched blades (%)
Early	Misliya Cave*	498	40.4	11.3	8.9	4.2	21.9
Levantine	Hummal (Hummalian)[h]	416	35.3	0.2	10.3	7.7	37.0
Mousterian	Tabun Cave[g]	70	18.6	15.7	12.9	15.7	–
	Rosh Ein Mor[b]	2554	5.3	8.6	27.0	43.7	–
	Qafzeh XV[f]	323	1.2	14	17	24.2	–
Middle	Qafzeh XIII[f]	222	0.5	38.3	6.8	29.3	–
and Late	Hummal (Mousterian)[e]	362	10.5	31.2	8.3	9.7	–
Levantine	Quneitra[d]	3011	1.1	31.7	12.5	31.0	–
Mousterian	Amud Cave[a,c]	251	4.0	13.9	16.7	29.5	
	Tor Faraj	348	6.6	3.7	17.0	11.8	–

*(data from: Alperson 2001[a]; Crew 1976[b]; Goder 1997[c]; Goren-Inbar 1990[d]; Hauck 2010[e]; Hovers 2009[f]; Jelinek 1975[g]; Wojtczak 2011[h]). *Only complete artifacts

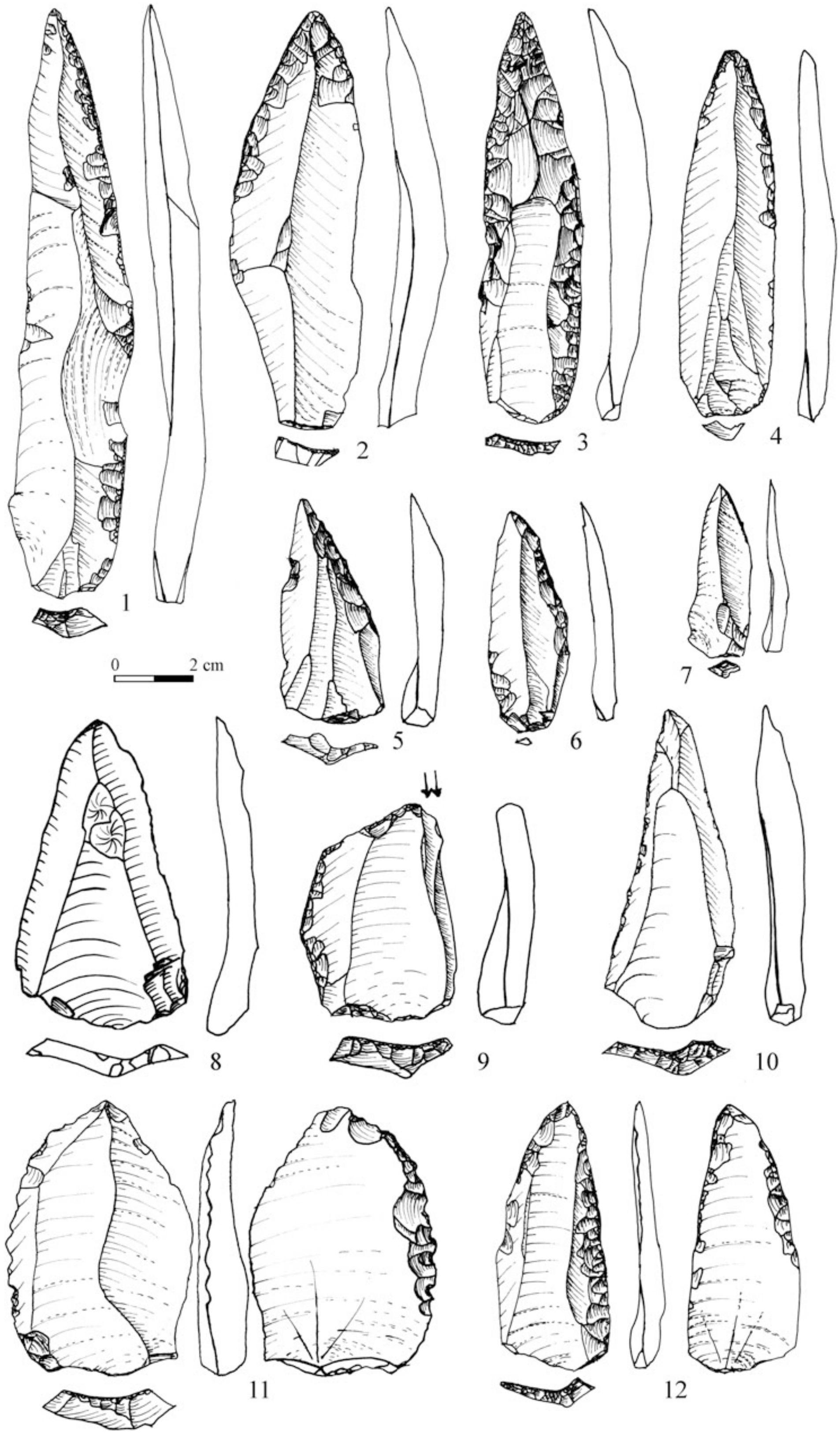

Fig. 14.5 EMP artifacts. 1–2, 4 – Hummal points; 3 – Abu-Sif point; 5−7 – Misliya points; 8, 10 – elongated Levallois points; 9 – burin; 11 – sidescraper on ventral face; 12 – point with bifacial retouch

Fig. 14.6 Small hearth in Square L11

in Spain (Esquilleu Cave; Cabanas et al. 2010) and South Africa (Sibudu rockshelter; Goldberg et al. 2009; Wadley et al. 2011). At Esquilleu Cave, bedded phytoliths have been identified in the central part of the site, associated with remains of wood ash, burnt clay and charred vegetal matter (Cabanes et al. 2010; Mallol et al. 2010). At Sibudu rock-shelter, the bedded phytoliths have been identified along the shelter's wall, associated with wood ash, charred vegetal fibers and burnt bones (Goldberg et al. 2009). Given their early age and cultural affiliation, the Misliya remains of bedding represent the earliest such example to date.

Misliya Cave and the Lower-Middle Paleolithic Levantine Record

The most abundant evidence retrieved from Misliya Cave concerns the EMP. However, it contains significant data regarding the Lower Paleolithic as well. The study of the Lower Paleolithic lithic assemblages, both from the different contexts on the Upper Terrace and the excavated squares on the western edge of the site, clearly indicates that the Acheulo-Yabrudian and the EMP represent different cultural traditions. The Lower Paleolithic Acheulo-Yabrudian industry of the cave is characterized by the production of thick short flakes from cores with unprepared platforms. The flakes were shaped by intensive Quina retouch into typical Acheulo-Yabrudian side-scrapers and bifaces (Weinstein-Evron et al. 2003a; Zaidner et al. 2006). There is no evidence for Levallois or laminar production in the Misliya Acheulo-Yabrudian assemblage. In contrast, the EMP assemblage is dominated by Levallois and laminar reduction sequences (Weinstein-Evron et al. 2003a, 2012; Zaidner and Weinstein-Evron 2014), with elongated points of different types and variably retouched blades dominating the toolkit (Zaidner and Weinstein-Evron 2014).

The dating of the sequence at Misliya, based on a series of dates obtained from 32 burnt flints retrieved from both the Acheulo-Yabrudian and EMP industries and conducted by a single method (TL) places the boundary between these two distinct cultural units at around 250 ka, i.e., at the end of MIS 8, beginning of MIS 7. The marked technological break between these two cultural complexes could have been associated with the arrival of a new population: the bearer of a new laminar blade technology. This new EMP cultural complex developed during MIS 7 and persisted for some 100,000 years.

Major collapses of the cave occurred between these two main episodes of human occupation, thus masking the actual boundary between them. The collapses are attested by the terrace-like configuration of the site (that may be related to a series of now-collapse chambers), the large rock-falls that occasionally include ancient flow-stones, and the maximum extent of the brecciated layers that indicate the extent of the ancient cave. Other rock-falls may be evident at the bottom of the deep L15 sequence (Weinstein-Evron et al. 2012) and below the EMP layers of the SSA, where Acheulo-Yabrudian finds, mixed with EMP material, are typically found. Together with the mixed material washed into the Inner Chamber, these mixed Acheulo-Yabrudian/EMP artifacts most probably indicate the occurrence of an Acheulo-Yabrudian layer that was heavily eroded before the EMP phase of human habitation took place, this time only on the Upper Terrace of the cave.

This major erosional phase may be related to the one postulated for the Mount Carmel at large (Weinstein-Evron 2015). The LP is poorly known on Mount Carmel because of the paucity of sites. The rare occurrence of Lower Paleolithic sites, essentially in caves (Tabun, Jamal, Misliya), may indicate that the ancient Lower Paleolithic landscape had been eroded from the top of the mountain and its upper slopes. Occurrences of Lower Paleolithic finds in taluses underlying those with Middle Paleolithic remains (Weinstein et al. 1975) may indicate repeated processes of erosion and down-sloping. Moreover, the many patches of Middle Paleolithic breccias, habitually found at some distance below extant cliffs, mainly across the western slope of the Mountain, but also within some wadi channels (Olami 1984) attest to a previously much extended cave-system heavily utilized by the Middle Paleolithic inhabitants of the mountain. Cave deterioration continued during the long EMP habitation of the cave, until the final collapse towards its end. Significantly, EMP layers occur immediately on the surface of the Upper Terrace, indicating that the last collapse rendered the cave unattractive for further habitation.

Data about the EMP of the cave are much richer, both concerning the site's layout (mainly related to hearths) and the rich lithic and faunal assemblages. The substantial evidence of the use of fire is one of the outstanding features of Misliya Cave. The site is one of the earliest cases providing solid evidence for the use of fire during the Middle Paleolithic of the Levant. In the Lower Paleolithic the evidence for the use of fire is usually limited to burnt flint artifacts or concentrations of burnt flint micro-flakes (Goren-Inbar et al. 2004; Alperson-Afil and Goren-Inbar 2010). At the end of the Lower Paleolithic the use of fire became more intensive (Karkanas et al. 2007; Shahack et al. 2014; Shimelmitz et al. 2014). In the EMP, remains of hearths were found at Hayonim and Tabun Caves (Garrod and Bate 1937; Goldberg and Bar-Yosef 1998; Stiner 2005). At Misliya, the use of fire is attested in both the Acheulo-Yabrudian, with large numbers of burnt flint flakes and micro-debris and the Early Mousterian, with its abundant, well-defined hearths and ample evidence of burning. The early evidence of bedding or matting, derived from the EMP hearths is also noteworthy.

Besides the apparent break from the Acheulo-Yabrudain, the composition of the Misliya Cave toolkit is also significantly different from Late Mousterian assemblages. It was previously suggested that the major behavioral and cultural change in the course of 200,000 years of the Levantine Middle Paleolithic occurred ca. 160−140 ka during the transition between the early and later Levantine Mousterian (Hovers 2001, 2006, 2009; Shea 2003; Meignen et al. 2006; Hovers and Belfer-Cohen 2013). One facet of this change is in lithic technology that shifted from a system based on a combination of laminar and Levallois reduction strategies (EMP) toward an emphasis on flake and point production, predominantly by the Levallois method in the later MP (Bar-Yosef 1998; Meignen 1998; Kaufman 1999; Hovers 2009; Hauck 2011; Wojtczak 2011). The laminar technological system of the EMP reported from a few sites in the region (Akasawa 1979; Meignen 1994, 1998; Marks and Monigal 1995; Wojtczak 2011) is not yet fully described. At Misliya and Hayonim caves and Hummal spring, the laminar products were obtained from unidirectional prismatic cores or cores with two opposed twisted platforms. Levallois points and triangular flakes produced by unidirectional convergent method are the major products of the Levallois reduction strategy in EMP sites.

The second facet is the possible demographic increase and a change in settlement patterns. On the basis of comparative evidence from Early and Late Middle Paleolithic sites in the Mediterranean zone of the southern Levant and the Judean desert, it was hypothesized that mobility and settlement patterns changed considerably. Drawing on data from Hayonim Cave, Abu Sif, Sahba, Hummal 1 and Tabun Cave, it was suggested that during the EMP the region was occupied by groups with larger home ranges which visited specific localities infrequently and only briefly (Hovers 2001, 2009; Meignen et al. 2006). The data from Hayonim Layer F and lower Layer E suggest that occupations were ephemeral and opportunistic. The occupations at Hayonim Cave are characterized by low densities of artifacts and bones, a high frequency of micromammals, lack of evidence for systematic collection of wood, lack of observed, long-term spatial differentiation in the use of the cave, thin short-lived fireplaces and low intensity exploitation of ungulates and tortoises (Weiner et al. 1995, 2002; Bar-Yosef 1998; Goldberg and Bar-Yosef 1998; Stiner et al. 2000; Albert et al. 2003; Meignen et al. 2006). The pattern of use of raw material reflects a large exploitation territory (Delage et al. 2000). It was suggested that EMP occupations in Hayonim Cave reflect “residential camps of short duration within a strategy of high mobility” (Meignen et al. 2006: 155). The less-detailed available data from other sites (Abu Sif, Sahba, Hummal 1 and Tabun Cave) indicate low artifact densities and high blank to core and waste ratios, which seem to fit the proposed model of high mobility with short-term occupations (Hovers 2001; Meignen et al. 2006).

By contrast, the LMP record is considered to represent systems of low residential mobility with sites either resembling longer-term repetitive occupations or task-specific localities. The former exhibit thicker deposits, denser clusters of lithics and faunal remains, recurrent use of space over time for similar purposes, and intensification of animal exploitation (Bar-Yosef 1998; Hovers 2001, 2006, 2009; Speth 2004, 2006; Meignen et al. 2006; Speth and Clark 2006; Bar-Yosef and Meignen 2007). Kebara Cave, for example, was reconstructed as a seasonal base camp inhabited during the autumn-spring with a variety of activities performed *in situ* and with a clear partitioning of the domestic space. Amud Cave shows evidence for repetitive use of specific areas as a depository of human remains, for knapping and for activities connected to the hearths (Hovers et al. 1995; Alperson-Afil and Hovers 2005; Shahack-Gross et al. 2008), while in Tor Faraj knapping activities and processing of organic material show consistent spatial patterns (Henry 1998; Henry et al. 2004).

On the basis of the modeled change in settlement pattern, demographic increase from the EMP to the LMP was suggested. It was hypothesized that during the LMP, the Levant was inhabited by larger numbers of people that visited the sites more frequently and stayed for longer periods of time (Hovers 2001; Meignen et al. 2006). This settlement model seemed to hold true for most of the Levant with the exception of the central Negev (Munday 1976; Marks and Freidel 1977; Marks 1988).

Misliya Cave, however, is exceptional in the EMP mainly in the high density of lithic and faunal remains and the presence of a large hearth. The site was occupied during ca. 50,000 TL-years (ca. 212−166 ka), during which between 1.5 and 3.5 m of deposits accumulated, with an average density of ca. 3,000 artifacts per square meter. This density is much higher than those reported from Hayonim Cave, where 300 artifacts were excavated in each cubic meter (Bar-Yosef 1998) and Tabun Cave, where densities of artifacts are generally low (from total 90 m^3 excavated, 44.000 artifacts were unearthed, giving an estimation of 448 artifacts per m^3; Jelinek et al. 1973, 1977). The large hearth in squares K-L9 is ca. 30 cm thick attesting to long-term, repeated use compared to the shallower and more ephemeral hearths of Hayonim and Tabun caves. The wide array of technological systems identified at Misliya Cave, compared, for example, with the nearby Tabun Cave, with its small EMP assemblage, which is dominated by the Levallois reduction system and characterized by a high frequency of retouched tools (Jelinek et al. 1973, 1977; Meignen 2011; Shimelmitz and Kuhn 2013), indicates that Misliya Cave was used intensively and for various tasks. Given the ephemeral nature of occupation in the majority of other known sites, the evidence for intensive and repeated occupations at Misliya Cave is unique in the framework of the proposed settlement and mobility model suggesting that the cave may have been used as an aggregation site for EMP hominin groups of the region, thus indicating that the EMP settlement pattern of the Levant was more varied than previously thought.

The third major facet of the change is in toolkit composition that in EMP sites differs considerably from those of Late Mousterian sites. The composition of the Misliya Cave toolkit is very similar to that of the EMP layers of Hummal (Table 14.4) and possibly also Abu Sif (Neuville 1951: 55). In both sites a variety of point types was found with the most common being Abu Sif and Hummal points (Neville 1951; Copeland 1985). The high frequency of points in the Early Levantine Mousterian sites is especially noticeable in comparison with the later Mousterian sites in which only retouched Levallois points occur in some numbers while Mousterian points are very rare or absent (Table 14.4; e.g., Henry 2003; Hovers 2009), or with preceding Lower Paleolithic techno-complexes in which points were not systematically produced (Garrod and Bate 1937; Rust 1950; Copeland 1983; Hovers 2009; Shimelmitz et al. 2011). This marked change in the toolkit suggests that the range of activities or the way similar activities were carried out changed between the EMP and later MP. Detailed use-wear analysis of the Misliya toolkit is underway and will shed important light on this issue.

The use of laminar and Levallois technology, the high intensity of occupation, the composition of the lithic assemblage that indicates high variety of activities, the complex long-term hearths and large-game hunting, carcass transport and meat processing behaviors altogether highlight the high sophistication of the EMP inhabitants of the cave, more than 160 ka ago. Thus, in many behavioral characteristics, the EMP hominins of Misliya Cave are similar to their late Mousterian counterparts. While the discrete affiliation of the Misliya Cave's inhabitants still eludes us, much is known about their behavior and modes of exploitation of their environments. The stage is all set for their appearance.

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