Transitions in Prehistory

Essays in Honor of Ofer Bar-Yosef

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American School of Prehistoric Research, Peabody Museum, Harvard University,
11 Divinity Avenue, Cambridge, MA 02138, USA

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Edited by
John J. Shea and Daniel E. Lieberman

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The Dynamics of Pleistocene and Early Holocene Settlement Patterns and Human Adaptations in the Levant: An Overview

Nigel Goring-Morris, Erella Hovers, and Anna Belfer-Cohen

A common thread of Ofer's research on Levantine Prehistory has been his interest in the geographic aspects of hominin adaptations. The three of us have agreed with Ofer on many issues and debated with him on many others. Nevertheless, we share with our mentor the significance of understanding the landscapes that hominins occupied and in which they ultimately survived. We have therefore combined forces to bring together our individual interests in the geography of diverse periods of Levantine prehistory to present this essay in Ofer's honor.

Introduction

The Levant is a principal geographical bridge between Africa and Eurasia. Though limited in size, the region forms a mosaic of microenvironmental settings, from Mediterranean through hyper-arid zones. The intensity of prehistoric research in the Levant over the past century enables the systematic investigation of diachronic trends in settlement patterns from the Lower Paleolithic through to the Neolithic against the backdrop of hominin adaptations to environmental changes.

In the context of such an attempt, obvious difficulties concern the changing resolution of the archaeological record. A truism shared by all historical sciences is that time depth by itself is an active agent influencing the potential visibility of the material record. The fraction of present landscapes that can be dated to the Lower Paleolithic is miniscule in comparison to that which can be attributed to the Neolithic. Indeed, even the meaning of "site" changes when we discuss data pertaining to various archaeological entities along the chronological sequence. The circumstances of discovery influence our perceptions of the record, so that the further back in time we go, the more difficult it becomes to provide meaningful middle-range accounts.

Our familiarity with the archaeological record is colored by the vagaries of chance discoveries as well as the paradigms and biases that shaped the history of research. The focus of the first researchers on the "Holy Land" and adjacent areas probably had more to do with their occidental attitudes than with the archaeological record per se, although this situation later changed. Indeed, in the last four decades the potential of more desertic areas of the Levant has been recognized and explored, and systematic study of other parts of the region began, i.e., Transjordan and the northern Levant.

Ecological Background

The most distinctive feature of the Levant is its diversity. This small region is enclosed between the Taurus-Zagros mountains to the north, the Mediterranean to the west, the Sinai peninsula to the south, and the Syro-Arabian desert to the east

(ca. 1,000 km N-S by up to 400 km E-W). The topography of the Levant is characterized by longitudinal series (in a north-south direction) of alternating elevated and low regions: the coastal plain and western piedmont, the central hill range reaching up to 2,000 m asl in places, the Dead Sea Rift lying below sea level, and the Transjordanian plateau (the central-south Levant), which rises steeply to elevations between 800 and 2000 m asl, followed by a gradual descent eastwards into Saudi Arabia. Today there are relatively few perennial rivers or streams in the region, the most notable being the Tigris, Euphrates, Orontes, and the Jordan. Almost all other drainages are seasonal and ephemeral. Springs are common in the Mediterranean zone but are widely dispersed throughout the more arid areas. Obviously, the specifics would have changed at various times depending upon the particular climatic conditions.

The major determinants of the seasonal climatic pattern (cold, short, and relatively rainy winters, and dry, hot, and long summers) are global atmospheric conditions. Located between Africa and Eurasia, Levantine climate has been influenced by two major climatic systems, one originating in the west, the Atlantic system, and the other in the southeast, the African/West Asian monsoonal system (Almogi-Labin et al. 2004 and references therein). In addition, there are seasonal influences from the northeast. Climatic fluctuations portrayed in both marine and land records depict changes regulated by orbital-driven maximum summer insolation cyclicity over the last 400,000 years. According to these records, the entire region was subjected to humid and rainy climate during warm interglacial periods, when the Atlantic and monsoonal systems nearly overlapped. During glacial times, the whole region became cool and dry, as synoptic configurations shifted. Milder conditions occurred over shorter intervals in between these two extremes, contributing to a highly variable climate.

The amount of precipitation and its geographical distribution are directly impacted by orographic effects. Relatively smooth north-south and east-west gradients of rainfall are coupled with the "rain shadow" effect on the eastern side of the mountain range and in the Rift Valley (Figure 10.1). The outcome of this interplay between climate and topography leads to distinct phytogeographic zones, culminating in a mosaic pattern of numerous interfacing ecological niches over relatively small distances (Figure 10.2).

The described topographic and climatic configuration was already in place when the first hominins reached the region. Tectonic events, volcanic eruptions, and a plethora of fluvial, limnic, and aeolian processes as well as attendant erosion further modified local landscapes throughout the Pleistocene. Two major recurrent changes in the landscape were the formation and disappearance of a series of lakes within the Rift Valley and on the eastern margins of the Transjordanian/ Syrian plateau, as well as changes in the size of the coastal plain (more marked in the south than in the north) due to fluctuations of sea levels. It is only from the later Upper Paleolithic onwards that the physical landscape more closely approaches the one that is visible today.

Vegetation communities have been fundamentally Mediterranean and steppic in nature, being primarily influenced by precipitation and topography, and underlying bedrock to a lesser degree. This has caused significant changes in the relative distributions, compositions, and densities of the floral elements throughout the Quaternary. Having said that, it is important to remember that the effects of such changes on

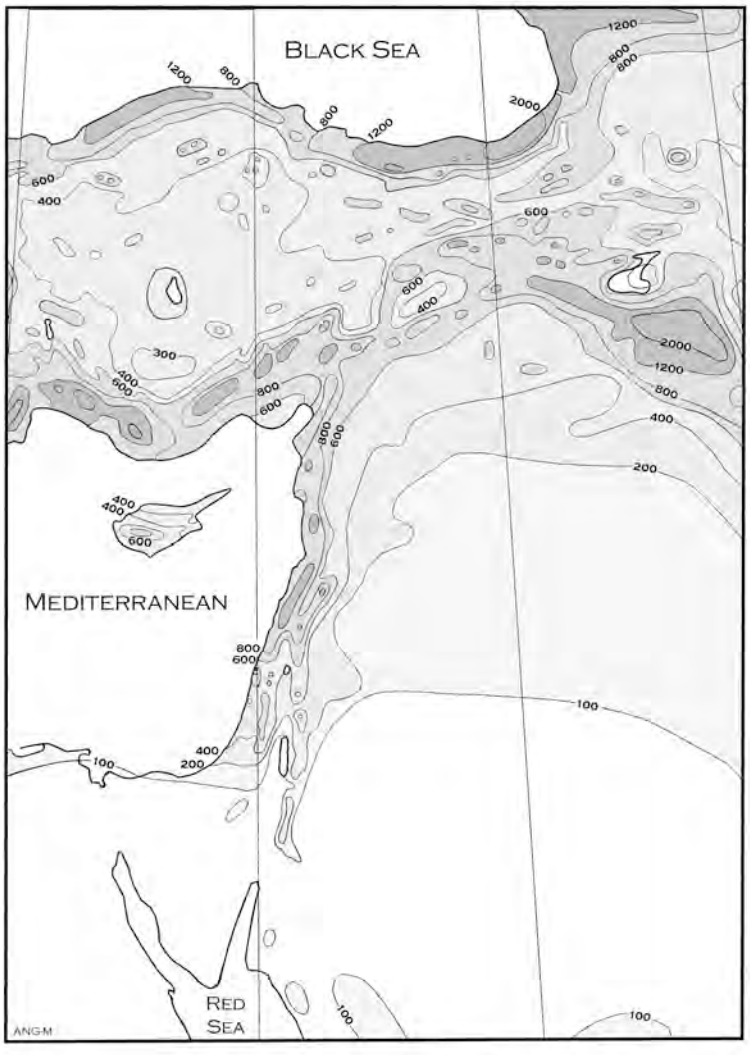

Figure 10.1. Mean precipitation in the Levant.

vegetal and faunal communities in the low middle latitudes (i.e., the Near East) would have been less crucial than on those in higher latitudes.

The composition of the vegetation associations was broadly similar to what would have been the natural associations in the region today had it not been altered by human activities. Differences between the present-day vegetation and that of the Middle and Upper Pleistocene (notably in the north and central Levant), like those of the faunal resources, are suggested to have been more of degree than of kind. The record suggests that faunal elements from both Africa and Europe intermittently entered the

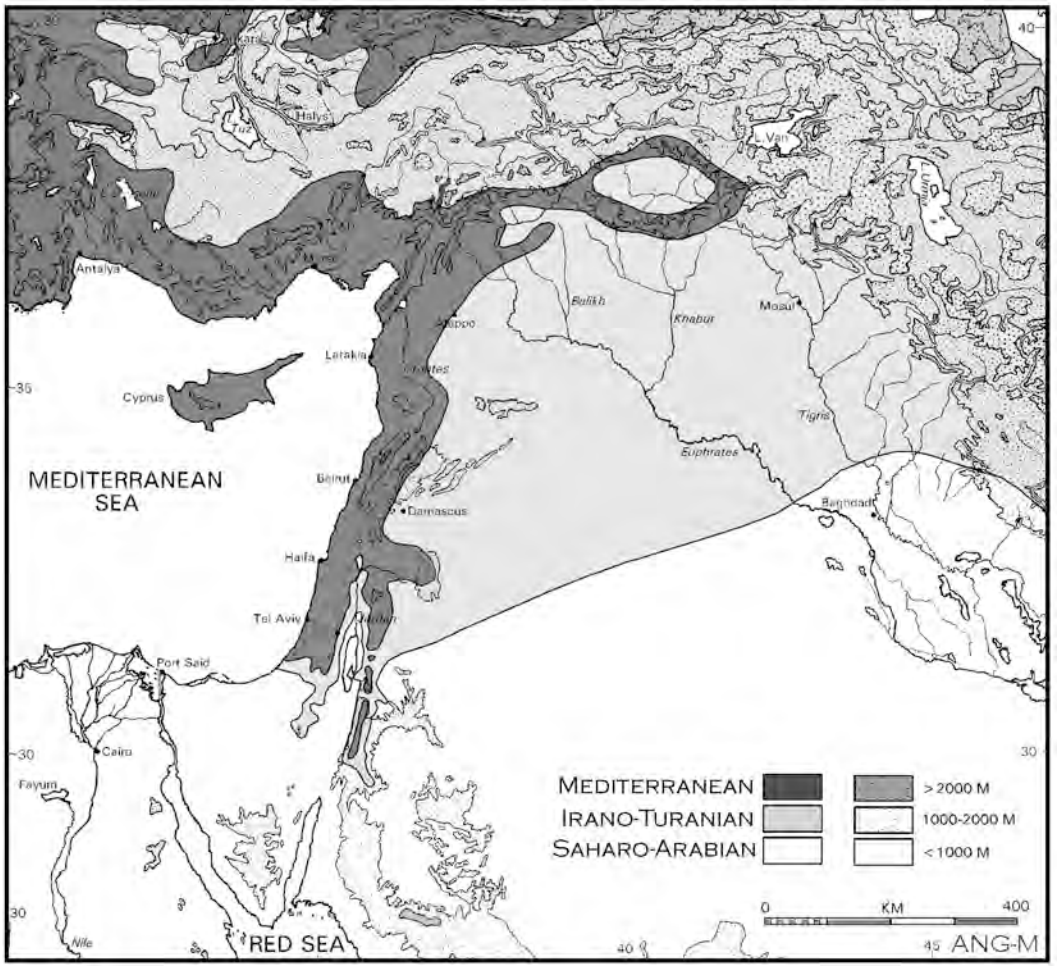

Figure 10.2. Phytogeographic zones of the Levant.

Levant at various times throughout the Pleistocene. This process seems to have terminated at the onset of OIS 4, during the later Middle Paleolithic (Tchernov 1998 and references therein). The incoming faunal elements seem to have been integrated into an essentially Mediterranean vegetal landscape.

The distributions of most faunal elements are dependent upon a combination of topography and different ecological zones. Within the Mediterranean zone, the vast majority of game species are territorial, and/or exploit small annual home ranges (Baharav 1974; Nowak and Paradiso 1983), adapting to seasonal resource fluctuations by exploiting diverse habitats, e.g., the gazelle (Baharav 1981). Hence, their territories do not shift considerably in response to changes of resource distributions. Such flexible

adaptations of game animals turned them into predictable, relatively *stable* resources, at least in terms of the season and location of their availability. The quality of game would have depended on local conditions on a year-to-year basis. In peripheral areas, more migratory species are found, e.g., *Gazella subgutturosa* and *Equus* sp. Birds are abundant and diverse, including both endemic species as well as numerous migratory species moving between Africa and Eurasia (Simmons 2004).

Notwithstanding the documented climatic changes, Pleistocene vegetal resources would have occurred for short durations at predictable times along the gradient of ecological niches formed by the region's topographic configuration. Phytogeographic zones may have alternately expanded and contracted, but the underlying parameters remained the same. Under these environmental conditions, it is suggested that the location and availability of *vegetal* rather than of animal resources were more significant in determining the timing and extent of group movements (Hovers 1997 and references therein). Subsistence behavior of hominin groups all over the Levant is expected to reflect organization according to regional plant seasonality notwithstanding social issues (and see Kelly 1995 and references therein). Thus, behavioral variability related to ecological conditions is likely to stem mainly from tactical decisions rather than from strategic differences among groups.

Raw Material Availability

The most commonly used raw material throughout the Levantine Paleolithic is flint. Since much of the local bedrock substrate is composed of limestone, primary (and secondary) sources of flint are widely available. There are but a few notable exceptions, where other sedimentary (sandstones, e.g., Edom), igneous (granites, e.g., southern Sinai), or volcanic (basalts, e.g., Golan, Black Desert) rocks are present. In some areas, raw material availability would have been constrained by the burial of source strata by later Pleistocene sediments, e.g., the southern Coastal Plain, the Rift Valley, and eastern Transjordan. Still, sources of raw material are rarely located more than a day's walk away from sites, although the visibility (i.e., the intensity of vegetation cover) of raw materials at any given point in time should also be acknowledged.

Additional raw materials for the production of chipped-stone tools are known mainly from Lower Paleolithic sites, where basalt and limestone were regularly used. Our current state of knowledge suggests that those, too, were obtained from nearby sources. Beginning with the Epipaleolithic, basalt, limestone, and sandstone, sometimes from distant sources, returned to the repertoire of raw materials (Weinstein-Evron et al. 1999); however, by then they were subjected to operational sequences distinctly different from those related to flint.

Lower Paleolithic

The Lower Paleolithic in the Levant lasted from about 1.4 Ma (e.g., at Ubeidiya and possibly Zihor) to 0.25 Ma (Bar-Yosef and Goren-Inbar 1993; Ginat et al. 2003) (Table 10.1). Scanty and contested lithic evidence from Erq el-Ahmar in the Jordan Rift may push the time of hominin presence in the Levant back to ca. 1.9 Ma (Ron and Levi 2001). This would accord well with the incontrovertible presence of hominins at ca. 1.75 Ma further north at Dmanisi, in the Republic of Georgia (Gabunia et al. 2000). Prior to the Late Acheulian, i.e., sometime post 0.5 Ma, hominin occupation tends to be sporadic (Figure 10.3). Chronological resolution is poor throughout

Table 10.1 The duration and dates for the various periods in the Levant

Period	Dates*	Duration (yrs)
Lower Paleolithic	~1.4Ma	~1.15Ma
Middle Paleolithic	~.25Ma	~200,000
Upper Paleolithic	50,000-22,000	28,000
Early Epipaleolithic	22,000-16,000	6000
Middle Epipaleolithic	16,000-13,100	2900
Late Epipaleolithic*	13,100-9600	3500
PPNA**	9600-8500	1100
Early PPNB	8500-8100	400
Middle PPNB	8100-7500	600
Late PPNB	7500-6750	750
Final PPNB	6750-6400	350
Late Neo 1	6400-5600	800
Late Neo 2	5600-4500	1100

* From the Upper Paleolithic onwards dates are calBC.
** The Round House Horizon in the upper Tigris region (in two phases) is estimated at ca. 10750- 9750-8750 calBC.

the period, being based in and around the Rift Valley on isolated paleomagnetic sequences as well as infrequent and indirect absolute age estimates of volcanic materials (Horowitz 2001 and references therein). In the coastal plain, there are but tenuous shoreline and terrestrial stratigraphic correlations (Gvirtzman et al. 1985). Ultimately, it is the biostratigraphic and lithic correlations that provide the principle means of agglomerating the records from isolated areas into a single regional chronological framework. This situation changes slightly towards the end of the Lower Paleolithic when site numbers increased markedly, with some absolute dates from both cave and open-air sites available throughout the region. However, a few of these age estimates are open to debate (see Marder et al. 1998; Porat and Ronen 2002; Porat et al. 2002; Ron et al. 2003).

A series of sweet-water paleolakes within the Rift Valley served as focal points for hominin settlement throughout the Early Pleistocene and Middle Pleistocene. It is from this region that the most prolific evidence is available, notably at Ubeidiya and Gesher Benot Ya'aqov (Bar-Yosef and Goren-Inbar 1993; Goren-Inbar et al. 2000; Mallol 2006; Tchernov 1986, to mention but a few). Both localities portray repeated occupations where, notwithstanding their respective long sequences of anthropogenic activities (about 40 and 100 ka, respectively; Feibel 2004), there is little obvious change in the broad affinities of the lithic assemblages.

Lithic studies demonstrate off-site raw-material procurement and probable transport of finished tools across the landscape. A wide range of faunal species including large and

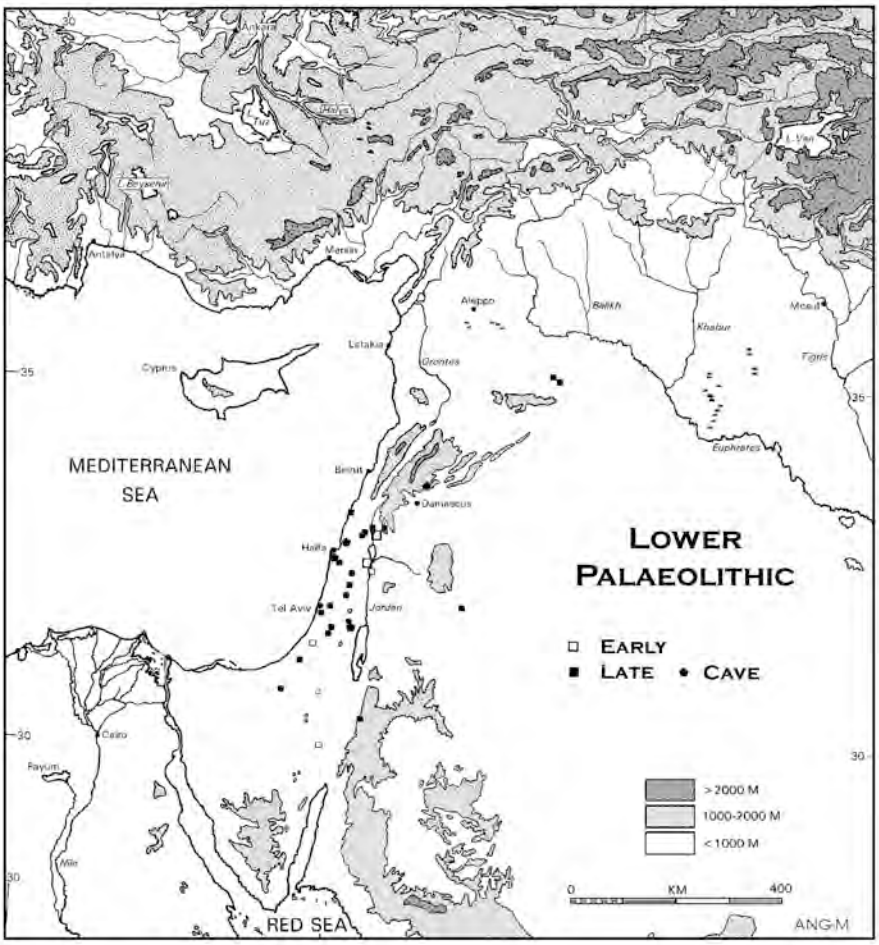

Figure 10.3. Distribution of Lower Paleolithic sites in the Levant.

medium-sized mammals was exploited, sometimes with evidence for intentional butchery. Several types of occupations can be recognized, some corresponding to Isaac's (Isaac and Crader 1981:43–44) site type B, where artifacts are closely associated with the carcass of a single large animal, and type C, in which concentrated patches of artifacts and of bones from several animal species coincide (Gaudzinski 2004a, 2004b, but see Mallol 2006; Goren-Inbar et al. 1994; Rabinovich et al. 2008). Obviously, sites of type G, where materials have been transported and redeposited are also known (Shea 1999). The preservation of botanical remains of edible species in the waterlogged occurrences of Gesher Benot Ya'aqov adds yet another dimension to the economic activities that may have taken place at such camps, with tangible evidence for the exploitation of nuts (Goren-Inbar et al. 2002). The use

of fire is documented in a number of separate stratigraphic horizons at Gesher Benot Ya'aqov (Goren-Inbar et al. 2004).

The distinct characteristics of the Ubeidiya and Gesher Benot Ya'aqov lithic assemblages imply considerable conservatism along each sequence, providing the archaeological evidence for at least two hominin dispersals out of Africa. At Latamne, in northern Syria, raw-material selection is similar to that seen in the Rift Valley sites in that flint was used for large cutting tools and small tools, whereas limestone and basalts were preferred for spheroids and choppers (Clark 1968:27). Nevertheless, the possibility of local developments should be taken into account, as attested by other, less extensively documented sites, e.g., Evron and Bizat Ruhama (Ronen 1991; Ronen et al. 1998). In these sites, which predate Gesher Benot Ya'aqov, raw-material exploitation and typo-technological characteristics differ from those of the Rift Valley localities. Specifically, a single raw material (flint) was used for the manufacture of all tool types.

These and later sites are found in a variety of habitats that differ from those in the lake environments of the Rift Valley. It is unclear, however, whether this represents an expansion of the ecological niches used by hominins or simply a bias of archaeological visibility. In addition to lakeside settings, e.g., al-Jafr (Rollefson et al. 2005), clearly favored sites for occupation are springs in oases in the east, e.g., Azraq and el-Kowm (Le Tensorer et al. 1993; Rollefson 1980) and, elsewhere, marsh habitats, e.g., Holon, Revadim, Bizat Ruhama, and Latamne (Chazan and Horwitz 2007; Clark 1967, 1968; Marder et al. 1998; Ronen et al. 1998; Yizraeli 1967). Still, immediate proximity to water sources seems to be less marked by the Late Acheulian, and site localities are found in both lowland and upland settings, including volcanic areas, e.g., Berekhet Ram (Goren-Inbar 1985). In addition, many Late Acheulian occurrences, often in the form of dispersed lithic surface scatters, are commonly sited in or adjacent to major topographic passes, e.g., Wadi Milik in the eastern Carmel, Yatir in the southern Hebron hills, Abu Agheila in Sinai, Baram/Yiron in the Galilee, Samaria (Gilead 1970; Hermon 1996; Ohel 1986; Olami 1984; Valla et al. 1979) and Fjaje in southern Jordan (Rollefson 1981; see also Rech et al. 2007). The above developments during the Late Acheulian likely relate to more systematic resource exploitation across the broader landscape, perhaps involving intercept hunting.

It is of interest to note that the Acheulo-Yabrudian is limited in distribution to the central part of the Levant. When compared to earlier periods, it is from this time onwards that cave occupations become a more normative feature of the regional record. These are found on the western flanks of the hills adjacent to the coastal plain, e.g., Bezez, Hayonim, Tabun, and Qesem (Garrod and Bate 1937; Gopher et al. 2005; Rink et al. 2004; Roe 1983); adjacent to the Rift, e.g., Zuttiyeh, Umm Qatafa (Gisis and Bar-Yosef 1974; Neuville 1951); or on the eastern flanks of the Anti-Lebanon range, e.g., Yabrud and Jerf Ajla further east (Rust 1950; Schroëder 1969).[1] The systematic use of cave sites may reflect abilities to use fire to confront predators (Karkanas et al. 2007).

Middle Paleolithic

Levallois materials, which characterize Middle Paleolithic assemblages, are ubiquitous throughout the landscape, culminating the process that began already during the Late Acheulian. The almost total absence of handaxes from Middle Paleolithic contexts in the Near East facilitates

differentiation between the Acheulian and the Mousterian. The quantities of Levallois material throughout both Mediterranean and more arid zones are, however, misleading (Figure 10.4). While much shorter than the preceding period, the Middle Paleolithic nevertheless lasts for some 200,000 years (ca. 250–45 ka). Similar to the Lower Paleolithic, there is a relative plethora of sites attributable to the later Mousterian, in contrast to the scantier evidence from the earlier part of the period.

Material expressions of cultural variability in the Levantine Mousterian can be observed mainly in the lithic assemblages, although other behaviors, e.g., burial customs, hearth construction, hunting strategies, and the organization of space, have recently been studied in some parts of the region (Alperson-Afil and Hovers 2005; Henry 2003; Meignen et al. 2001, 2006; Speth and Tchernov in press; Stiner 2005). The linear typo-technological developmental scheme, based on the Tabun sequence (Jelinek 1982), has been problematic at a regional scale. Where stratigraphic and chronometric controls are absent, the attribution of sites to specific time intervals within the period is open to debate (Goren-Inbar 1985, 1990). The tendency to uncritically attribute to the Tabun D-type Mousterian any assemblage with a laminar component has caused much confusion (Crew 1976; Clark et al. 1997; Henry 1995, 2003; Munday 1976). The retouched, elongated Abu Sif or Hummal points that are the hallmark of this industry, to the degree that the names "Abu-Sifian/Hummalian" have been suggested for it (Bar-Yosef 1998; Boëda and Muhesen 1993), are not cohesively distributed in time or space (see also Goren-Inbar and Belfer-Cohen 1998). In fact, they only occur in sites in the Mediterranean zone in or adjacent to the coastal plain, e.g., Bezez, Hayonim, Misliya, and Tabun; the Rift Valley, e.g., Zuttiyeh; and northern Syria, e.g., Hummal and Jerf Ajla (Copeland 1985; Garrod and Bate 1937; Meignen 1998; Weinstein-Evron et al. 2003). Similar chronological constraints impede the evaluation of "dendritic" models that assign lithic variants to specific geographic regions over long time periods (Crew 1975; Marks 1992). Still, we seem to be dealing with a single cultural taxon, notwithstanding differences in the biological affinities of the hominins involved, i.e., the anatomically modern humans and Neanderthals are both associated with Mousterian assemblages (Bar-Yosef 1989).

The Mousterian is characterized by more intensive usage of caves and rockshelters compared to the Lower Paleolithic. Long stratigraphic sequences are present in Mediterranean habitats in Syria, Lebanon, the Galilee, the Carmel, and the Judean desert. Notably, in these areas prior settlement choices of Acheulo-Yabrudian groups were often repeated by early Mousterian bands, e.g., Tabun, Hayonim, Zuttiyeh, Jerf el-Ajla, and Adlun caves. From the Mousterian onwards, there is a clearer adherence to specific cave and rockshelter locations as evidenced by stratigraphic sequences encompassing the early and late Mousterian, overlain by Upper and Epipaleolithic occupations, e.g., Hayonim, Jerf el-Ajla, Qafzeh, Kebara, Shukbah, Ksar 'Akil, Umm el-Tlel, site complexes at el-Kowm, the Carmel, and Wadi Amud caves (Boëda and Muhesen 1993; Garrod 1942; Turville-Petre 1932). In more desertic settings, some occupations are also found in rockshelters, especially in Transjordan and Syria. Irrespective of ecological setting, most sites throughout the Near East were almost certainly open-air sites. Still, visibility and preservation are problematic, especially in the Mediterranean area where geomorphic and

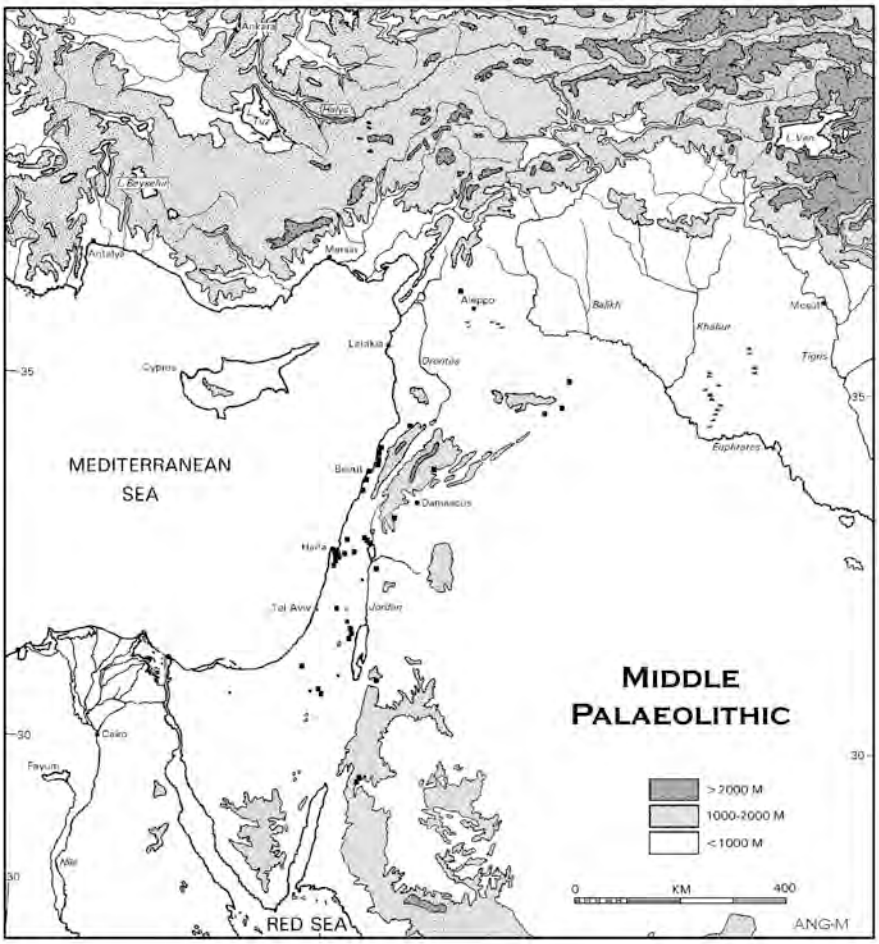

Figure 10.4. Distribution of Middle Paleolithic sites in the Levant.

anthropogenic processes mask prehistoric occupations, e.g., Qashish and Tirat Carmel (Hovers et al. in prep.; Olami 1984; Ronen 1974). Certainly the initial focus on investigating cave localities, and most especially those with hominin remains, has resulted in major biases in perceived patterns of the archaeological record. This has only recently begun to be rectified.

In the majority of Mousterian sites, individual occupations were of short duration, comprising multiple palimpsests. Differences in occupation intensity between caves (estimated on the basis of relative artifact/bone densities per TL years; see Bar-Yosef 1998) possibly reflect the extent of occupation redundancy rather than the duration or intensity of individual settlement episodes. Increasing occupation intensity was observed in caves within the Mediterranean zone from the early to the later Middle Paleolithic. This repetitious use of sites was not

necessarily related to the manner in which a particular locality was used within a settlement system. Thus the same location at Umm el-Tlel served alternately as a habitation site and as a kill/butchery site, whereas the caves of Kebara and Qafzeh were used differently through the Mousterian sequence. This distinction is significant in view of claims that increasing occupation density is related to an overall population growth. Alternately, this can be ascribed to a localized contraction of territorial systems, especially within the ecologically more attractive Mediterranean zone during glacial climate phases (Griggo 1998; Hovers 1997, 2001; Meignen et al. 2006; Speth 2004; Stiner et al. 2000).

In both caves and open-air sites, depending on preservation conditions, there is evidence of repeated spatial patterns of hearth locations and hearth-related activities, refuse dumps, and sometimes burial areas. For many sites, there are claims for differential use of space on the basis of the patterning of typo-technological characteristics across the site's area, e.g., Rosh Ein Mor, Tor Faraj, Quneitra, Amud, and Kebara (Alperson-Afil and Hovers 2005 and references therein). However, the high densities of material remains can provide only general information as regards spatial activities, e.g., Kebara and Amud caves. The best-documented sites for intrasite spatial patterning are short-lived, such as Tor Faraj and Farah II (Gilead 1988; Henry 2003).

Sites with consistent, repeated occupation levels exhibit the exploitation of both plants and animals, with an emphasis on small- and medium-sized artiodactyls, e.g., Douara and Kebara caves (Payne 1983; Speth and Tchernov 2007; Stiner 2005). Indeed, one can even use the term "broad spectrum" exploitation for such sites (Lev et al. 2005; Madella et al. 2002; Stiner 2001).

There is a slow but constant growth of nonlithic remains. These include sporadic occurrences of marine molluscs as ornaments, ochre, artistic manifestations, and burials (Belfer-Cohen and Hovers 1992; Hovers et al. 2003; Marshack 1996; Tillier 1990; Bouzouggar et al. 2007 and references therein). Some of these phenomena possibly functioned as "site appropriation" symbols, group cohesion markers, and the like.

Upper Paleolithic

Although the Upper Paleolithic is inevitably of much shorter duration (ca. 48,000–22,000 calBC[2]), the overall tempo of change gradually increases in a more visible manner compared to preceding periods.

The nature of the shift from the Middle to the Upper Paleolithic remains a contentious issue. While some view the shift as a "revolution," emphasizing the differences in behavioral strategies, others see it in terms of more incremental changes, at least insofar as they are reflected in the material record (Bar-Yosef 2002a and see references therein; Belfer-Cohen and Goring-Morris 2007). In the Near East, this transition is represented by at least two variants, one of which demonstrates connections beyond the Levant (Figure 10.5). The Emiran is characterized by the Emireh point and appears to represent a purely local developmental phenomenon as is best documented at Boker Tachtit and Tor Sadaf and by isolated instances elsewhere (Marks and Kaufman 1983; Fox 2003). The other variant, known as Ksar 'Akil phase A, is represented by the *chanfrein*. In the Levant, it is restricted to the Lebanese coast at Ksar 'Akil, Antelias, and Abu Halka, and a very ephemeral occurrence in the Negev (Azoury 1986; Copeland 1975; Goring-Morris and Rosen 1989). Of particular interest

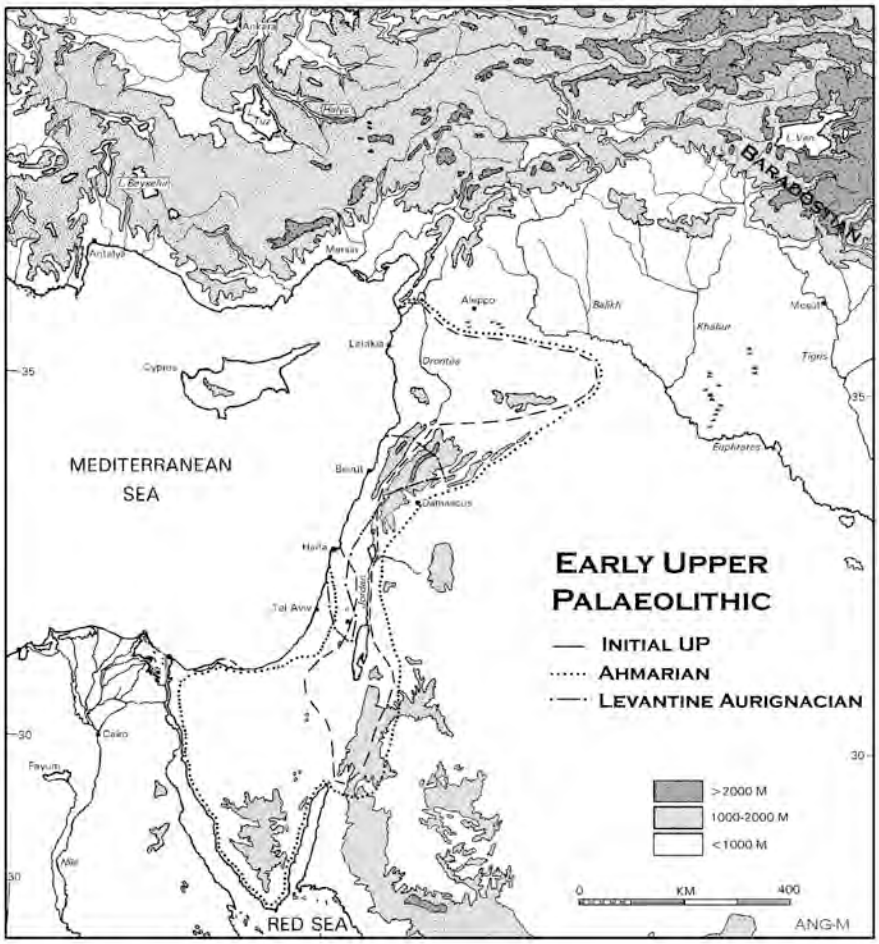

Figure 10.5. Distribution of Early Upper Paleolithic sites in the Levant.

are the similarities to the Dabban of Cyrenaica (McBurney 1967), which provide the only obvious connection with Africa during the Upper Paleolithic. Interestingly, recent genetic studies suggest that during the early Upper Paleolithic there were population movements from the Levant "back-to-Africa" (Olivieri et al. 2006). While one can speculate that such connections involved movements along the coast, as was often the case when human groups ventured into new territories (e.g., Dixon 2001; Mandryk et al. 2001; Bowdler 1990; Mellars 2006), Upper Paleolithic sites are conspicuously absent from the littoral of the southern Levant.[3]

The more obvious spatial clustering and greater chronological resolution of Upper Paleolithic phenomena legitimize the use of the term "culture" with respect to actual human groups. Regardless of specific cultural affinity, the Upper Paleolithic can be characterized as a

period of quite ephemeral settlements by mobile bands. This is similar to the situation we have reconstructed for the Middle Paleolithic. The overall impression of lesser occupation intensity in Upper Paleolithic sites is *partially* the outcome of the time spans involved and the resultant respective visibilities of their archaeological records. It seems that overall occupation intensity did not change; yet it is expressed differently than it was during the Middle Paleolithic, except in a few instances such as at Ksar 'Akil. This likely reflects relatively less systematic use of caves and rockshelters.

It is certainly true in the case of the (early) Ahmarian. This endemic long-lasting culture (ca. 40,000–28,000 calBC) appears to have developed and flourished in the south against the backdrop of greater precipitation and environmental instability. The latter is expressed, among other things, in large flood events due to the strengthening of both the Mediterranean and Red Sea climate systems (Gladfelter 1997; Greenbaum et al. 2006). Site clusters are found in more open, steppic settings at the fringes of the highlands, often near springs in the arid regions of the Negev, Sinai, and Transjordan. Most Ahmarian sites in the arid region are limited in size (25–75m^2) and often include large fire pits and smaller satellite hearths together with adjacent activity areas (see papers and references in Goring-Morris and Belfer-Cohen 2003). Although faunal preservation is poor, a wide range of locally available medium- and large-sized animals appear to have been hunted. Systematic refitting studies at several sites demonstrate the dynamic flow of artifacts into, within, and from sites (Goring-Morris and Davidzon 2006). We can thus reconstruct a pattern of dispersed, highly mobile groups practicing circular residential mobility over large tracts of the steppic landscape. The similarities in specific lithic features between some sites, such as Thalab al-Buhira in Wadi Hasa and Boker BE/II–VI in the central Negev (Coinman 2003; Jones et al. 1983), raise the possibility that group ranges extended over the Rift Valley, as posited many years ago by Larson (1979).

Ahmarian-related occupations have also been reported from caves and rock shelters in the Mediterranean zone, e.g., Üçağ ızlı, Yabrud II and III, Ksar 'Akil, Qafzeh, el-Wad and Kebara (Bachdach 1982; Bar-Yosef and Belfer-Cohen 2005; Kuhn 2004; Ohnuma and Bergman 1990). Where Middle Paleolithic levels underlie Ahmarian ones, there is a stratigraphic hiatus between the two entities, suggesting that the Ahmarian in the Mediterranean zone did not evolve directly out of the local Middle Paleolithic. Moreover, Ahmarian lithic characteristics in some of these sites differ from those in the more arid regions. This difference may indicate sporadic connections between groups in the respective environmental zones, which in turn could reflect the scale of home ranges.

The alternating use of caves by humans and hyenas, most notably at Qafzeh but also at Kebara (see Rabinovich 2003; Speth in Bar-Yosef et al. 1992) is yet another indication of the ephemeral nature of these Ahmarian-related occurrences. There is virtually no information concerning intrasite spatial organization, with the exception of Üçağ ızlı, where a partition wall at the back of the cave is interpreted as delineating a bedding area filled with ashy deposits (Kuhn et al. 2003).

The Levantine Aurignacian *sensu stricto* (Goring-Morris and Belfer-Cohen 2006) seemingly represents a short-term (ca. 35,000–29,000 calBC)[4] population influx into the Mediterranean zone of the Levant (Figure 10.6).

With the exception of Yabrud II/1–4, all such occurrences are found west of the Rift Valley, from Ksar 'Akil VII south, by way of the Galilee at Hayonim D and the Carmel at Kebara D (II–I), Raqefet, and el-Wad D, to the Judean Desert at el-Quseir (Goring-Morris and Belfer-Cohen 2006; Lengyel et al. 2006 and references therein). Similarities in lithic technology and typology as well as the use of antler and bone tools (split-base and bi-points) together with considerable quantities of personal ornaments demonstrate ties to populations in southern and western Europe (see papers in Bar-Yosef and Zilhão 2006; Vanhaeren and d'Errico 2006). While concrete evidence is lacking, we propose a coastal migration in this case as well.

All the Aurignacian occurrences were found in restricted areas within caves and rock shelters and were clearly of short duration. Only Hayonim D provides evidence of spatial patterning with a "kitchen midden" and hearths in a swale against the cave wall (Belfer-Cohen and Bar-Yosef 1981).

While Ahmarian-related groups seem to have continued to exist in the more steppic areas, different, flake-based entities unrelated to the Levantine Aurignacian emerged some time after ca. 28,000 calBC (Goring-Morris and Belfer-Cohen 2003, 2006; Williams 2006 and references therein). In the Mediterranean zone (coastal plain and adjacent to the Rift Valley) of the southern Levant, these were represented by the Atlitian, occurring in cave as well as open-air sites. Its lithic assemblages are characterized by numerous truncation burins but are notably poor in projectile points (Belfer-Cohen et al. 2004). Further south (and east?), in the steppic zone, the assemblages of the open-air occupations of the Arqov/Divshon entity include numerous laterally carinated items but, again, lack obvious projectile points.

No Upper Paleolithic sites are currently known from the area between the Euphrates and the Tigris, and it remains unclear whether this situation reflects reality or rather the vagaries of research biases.[5]

The presence of occasional grinding stones in Upper Paleolithic contexts (e.g., Qafzeh, Boker), whether for ochre or plant processing, foreshadows their more systematic use later and represents an instance of preadaptation.

The presence of sporadic marine and freshater mollusk shells in Upper Paleolithic sites suggests some exploitation of the immediate Mediterranean marine habitat, as at Üçağızlı and Ksar 'Akil (Stiner 2003). At Lagama and Qadesh Barnea in northern Sinai, the dentalia shells indicate the movement of items into the hinterland (Bar-Yosef and Belfer 1977; Gilead and Bar-Yosef 1993). Together with the use of ochre and personal adornments, these indicate an increase in symbolic behaviors.

The Epipaleolithic

The recent analytical ability to calibrate radiocarbon dates from the beginning of the Epipaleolithic has had a major impact on our perceptions of the duration of the various cultural entities within this time period (ca. 22,000–9500 calBC). In turn, it also enables us to evaluate more realistically the tempo of cultural developments. Furthermore, the Epipaleolithic landscape closely approximates that of the present, with principal exceptions being the existence of Lake Lisan and a more extensive coastal plain (sea levels dropped to at least 120 m bsl and then rose to about 70 m bsl by the late Epipaleolithic). There is a quantum increase in the relative numbers of occupations (Figure 10.14) and in lithic variability. The latter is reflected by stylistic and typological differences in the microlithic components and is considered

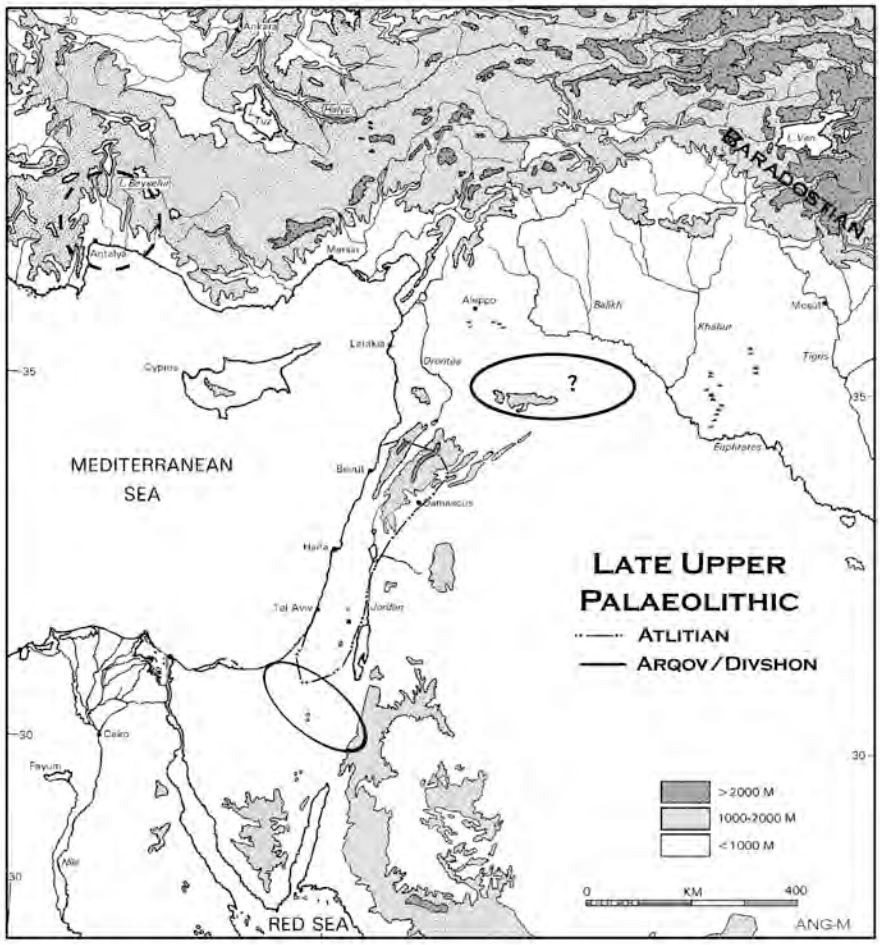

Figure 10.6. Distribution of Late Upper Paleolithic sites in the Levant.

to portray the increasing territoriality of specific groups. Broadly speaking, a clear articulation between fluctuating climatic conditions and settlement patterns exists.[6]

Early Epipaleolithic

The Early Epipaleolithic (ca. 22,000–16,000 calBC) roughly coincides with the Late Glacial Maximum. From this time onwards, we observe a clear pattern of markedly variable adaptations to the mosaic environments created by the particularity of climatic and topographic conditions. There was a concurrent contraction of resources, both vegetal and faunal, mostly into low-lying, protected settings. Thus, many early Epipaleolithic sites are located at low elevations within refugia in the Mediterranean zone, especially in the coastal plain and in the Jordan Valley adjacent to Lake Lisan (Figure 10.7). At the same time, the presence of massive sites (up to

20,000 m^2) on the Transjordanian plateau around the western margins of the Azraq basin, i.e., the Nebekian, Masraqan, Kebaran, and Nizzanan occupations at Kharaneh IV, Jilat 6, and Jilat 22, should be noted (Byrd 1988; Garrard and Byrd 1992). These sites, occupied during winter–spring (Martin 1994), most probably represent major aggregation localities dependant on seasonal migrations of large herds of *Gazella subgutturosa* (which is not found on the western side of the Rift Valley). For some entities, such as the Nizzanan and Kebaran, this seasonal aggregation may have involved some bands crossing the Rift Valley over large swathes of the landscape (Goring-Morris 1995; Goring-Morris and Belfer-Cohen 1997).

Conversely, there is also convincing evidence, based on the stylistic proclivities of microliths, for seasonal movements of some Kebaran groups between the central coastal plain and the Rift Valley, while others were centered only on the southern coastal plain.[7] We are thus able to reconstruct territorial ranges of some of these groups, which are likely to have extended over no more than 500–1500 km^2 (Bar-Yosef and Belfer-Cohen 1989a; Goring-Morris and Belfer-Cohen 1997; and see Figure 10.8).

The exceptional preservation conditions at Ohalo II (Masraqan), on the western shore of Lake Lisan, provide a glimpse into the spatial organization of the camp site and the broad spectrum of resources exploited. A series of spatially discrete brush huts (*fonds de cabane*) was constructed, and sometimes renewed later, in shallow depressions, where bedding was recovered around a central hearth (Nadel 2002; Nadel et al. 2004; and see Goring-Morris and Belfer-Cohen 2003, in press a for other examples). External features include roasting pits and hearths as well as a possible oven. Acquisition of food resources involved the systematic harvesting (and processing inside one hut) of quantities of small-grained grasses and other cereals such as barley, as well as the collection of numerous nuts and fruits – more than 140 separate species were identified (Kislev et al. 1992; Piperno et al. 2004; Weiss et al. 2004). In addition to the hunting of medium-sized mammals, a range of freshwater fish and birds was also regularly taken (Simmons and Nadel 1998; Van Neer et al. 2005). Together, these indicate year-round use of the site. We would argue that Ohalo II was a base camp visited regularly during the course of the year but that it should not be considered as indicating genuine incipient sedentism. Similar situations have been documented ethnographically (Yellen 1977; Lee 1979; Binford 1980).

In the northern Levant east of the Rift Valley and the Euphrates, there remains a lacuna in our knowledge concerning this period. Given the virtual absence of systematic *pedestrian* surveys in the area, this situation may reflect current research biases. Another possibility is that conditions were particularly unfavorable in the open areas of the northern Levant during the LGM.

Two technological changes seem to have occurred during the early Epipaleolithic. The occasional use of grinding slabs made way for more of an emphasis on pounding equipment in the form of mortars and pestles (Wright 1994 and references therein). Another technological shift is reflected in the approach to microlith fabrication, when backed microliths replaced finely retouched types, sometimes using the microburin technique. The introduction and systematic use of this technique in the Levant (i.e., Nebekian, Nizzanan, and later the Mushabian, Ramonian, and Natufian) are an endemic phenomenon, originating east of the Rift Valley. The phenomenon also contributes to the identification of connections across the Rift

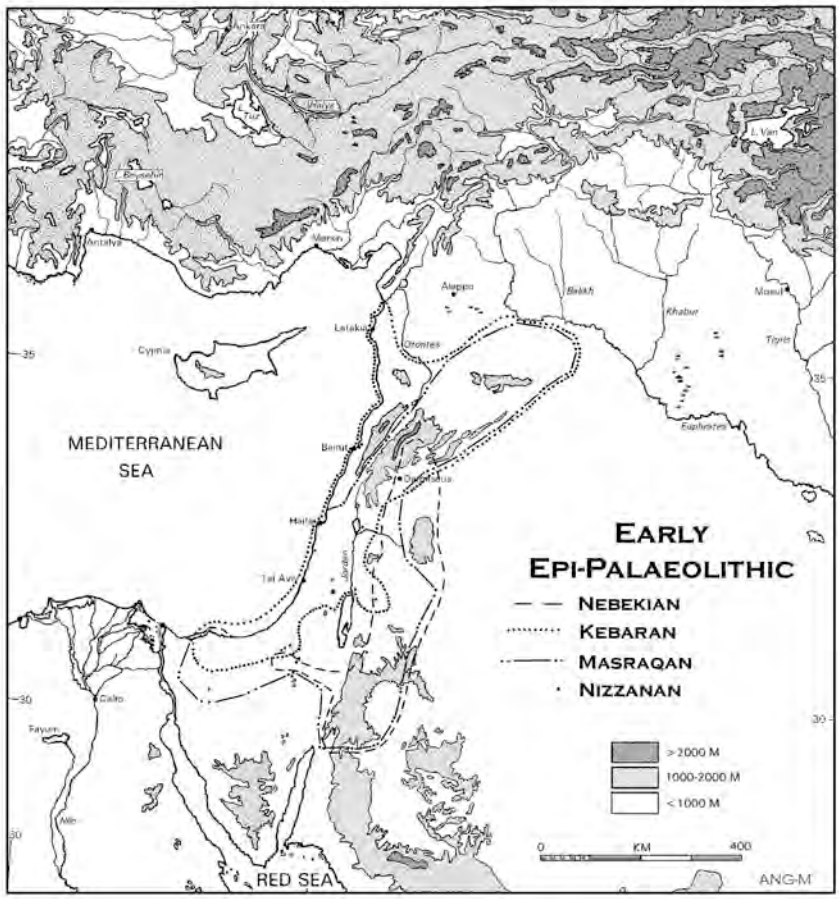

Figure 10.7 Distribution of Early Epipaleolithic sites in the Levant.

Valley (Goring-Morris 1995). These changes were likely related to a shift in hafting mechanisms for composite tools. Interestingly, the earliest appearance of backed microliths is documented in the basal levels of the large aggregation sites in Transjordan. The postulated changes in hafting techniques, i.e., hunting patterns, may also be linked to different settlement patterns than those observed in earlier periods. They may reflect intensification of both plant exploitation and hunting, which continued thereafter.[8]

Together these varied early Epipaleolithic settlement and adaptation patterns would have had a major impact on the nature and intensity of mating and social networks; these are also likely reflected in increased use and exchange of decorative items (Bar-Yosef Mayer 2005; Goring-Morris 1989b; Hovers et al. 1988). The appearance of more, but still sporadic, items that have symbolic and notational implications, as at Urkan and Jiita, is notable (Hovers 1990; Copeland and Hours 1977).

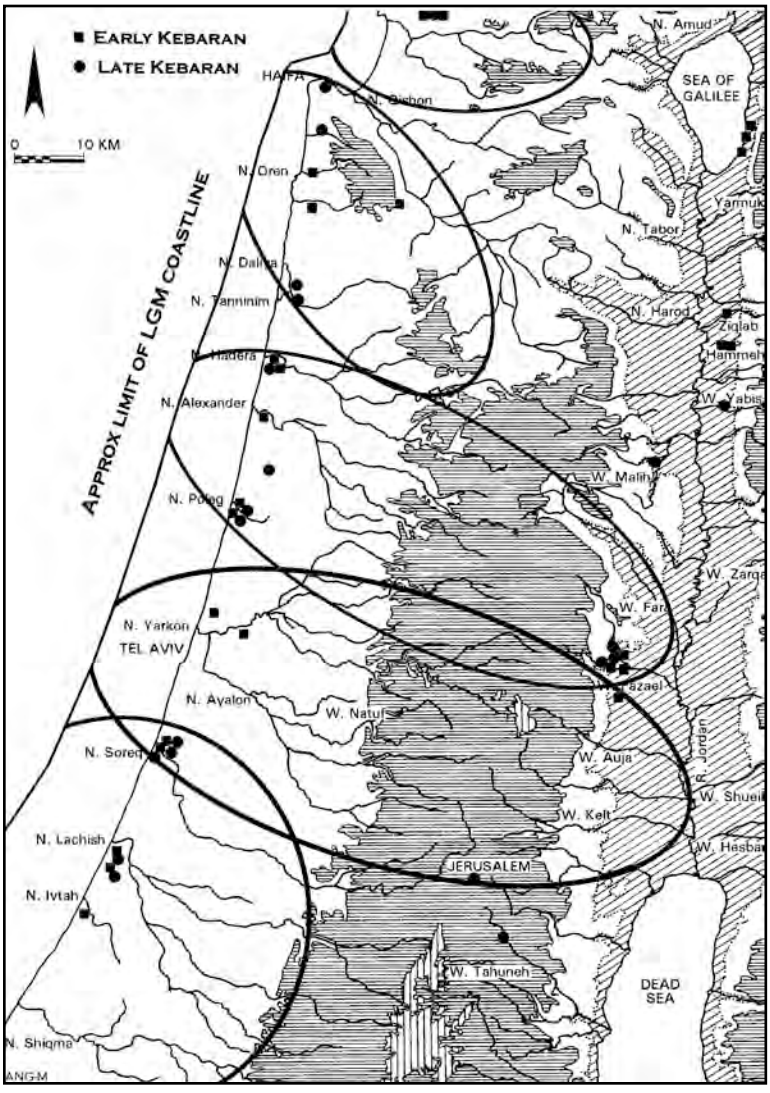

Figure 10.8. Reconstruction of some Early Epipaleolithic Kebaran site ranges in the southern Levant.

Middle Epipaleolithic

The beginning of the Middle Epipaleolithic (ca. 16,000–13,100 calBC) coincides with the rapid onset of the warmer, more humid conditions corresponding to the Bölling/Alleröd (Figure 10.9). Occupation expanded significantly into the semi-arid steppic areas of the Negev and Sinai and to similar regions east of the Rift Valley, whereas in the Lebanon, higher elevations also began to be occupied. Within the Mediterranean region, settlement distribution largely mirrors that of the early Epipaleolithic, with (mostly

small) sites located in lowland settings in the coastal plain and the Rift Valley. There are some suggestions for larger occupations, reflecting a gradual transition from small encampments of mobile foragers to more settled groups occupying larger sites (culminating in the Natufian settlement pattern; see Kaufman 1992). The lack of large-scale excavations in the Mediterranean zone makes the evaluation of these propositions difficult.[9] Sites such as Ha'on II, Neve-David, and 'Uyyun al-Hammam (WZ148) with architectural vestiges of huts, installations, and some burials actually continue trends observed previously in the early Epipaleolithic (Bar-Yosef 1975; Kaufman and Ronen 1987; Maher 2005).

East of the Rift Valley, Geometric Kebaran–related entities appear to have also generally continued earlier patterns of fusion and fission, with major aggregation sites at Kharaneh IV and Jilat 22 in the Azraq basin, as well as Nadaouiyeh 2 further north, in the el-Kowm basin (Cauvin et al. 1997; Garrard and Byrd 1992; Henry 1995; Muheisen 1988 and references therein).

Of some interest is the interaction between the Geometric Kebaran and the Mushabian in the Negev and Sinai, where, following a possible brief period of local coexistence, the Mushabian (and the subsequent Ramonian) appears to have flourished in these areas, seasonally(?) exploiting both the local highlands and the lowlands. Meanwhile, the local Geometric Kebaran groups seem to have either been absorbed by the Mushabians and/or retreated into the Mediterranean zone in areas north of the Hebron hills (Goring-Morris 1987, 1989a).

Late Epipaleolithic

The Late Epipaleolithic (ca. 13,100–9600 calBC) is broadly synonymous with the Natufian complex. Yet, it is crucial to differentiate between the various phases and facies of the Natufian (Figures 10.10–11). Indeed, the Early Natufian core area (Bar-Yosef 2002b and references therein) represents the culmination of subsistence and social processes of the adaptive radiation initiated by the beginning of the Middle Epipaleolithic, if not earlier. The Early Natufian (ca. 13,100–11,000 calBC) is a complex hunter-gatherer society, in which a hierarchy of large, sedentary[10] communities through to more mobile communities subsisted on broad-spectrum foraging, i.e., intensive plant exploitation with attendant processing as indicated by quantities of glossed blades and pounding equipment (Bar-Yosef 2002b; Bar-Yosef and Belfer-Cohen 1989a; Henry 1989; Valla 2000). The degree to which intensified plant collection involved manipulation of the natural stands of cereals remains unresolved because of the poor preservation of botanical remains in the terra rosa soils in which most Natufian core area sites are located. Specialized hunting of medium-sized mammals, especially gazelle, and a gradual expansion of prey choice to avifauna, is indicated, and hunting was supplemented by fishing where available, e.g., Eynan, el Wad, and Hatoula (Davis et al. 1994; Desse 1987; Munro 2003; Simmons 2004; Tchernov 1993; Valla 1998; Valla et al. 1986). The dog was domesticated and could have aided in communal hunting (Davis and Valla 1978; Tchernov and Valla 1997).

These changes in subsistence practices co-occur with much more complex social interactions compared to earlier periods at the interpersonal and intra- and intergroup levels. Some bands in the more favorable "core area" of the Carmel, Galilee, and the Jordan Valley coalesced into larger groups (perhaps up to 100 individuals) to build hamlets in ecotonal localities (Henry

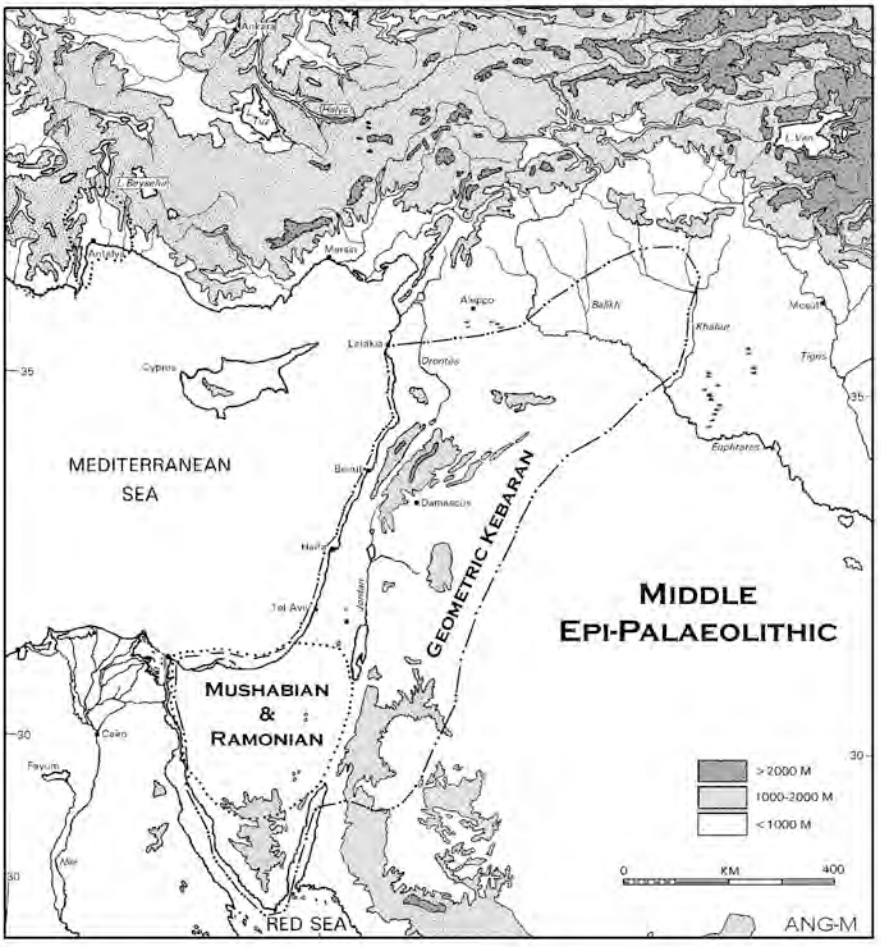

Figure 10.9. Distribution of Middle Epipaleolithic sites in the Levant.

1989).[11] Nevertheless we still have little idea as to the degree of packing of Natufian sites within the "core area," although it seems likely that home ranges decreased significantly in size. Furthermore, the large sizes of many early Natufian structures as well as the presence of massive mortars indicate that, contrary to earlier periods, residence patterns were based on units larger than nuclear families (Goring-Morris and Belfer-Cohen 2003; Belfer-Cohen and Hovers 2005). A reversion to the use of smaller houses is noted during the late Natufian (ca. 11,000–9600 calBC), which may indicate further changes in social structure, function, and the interplay of different environmental settings and sites (Bar-Yosef 1983; Valla 1981). This may reflect the inherently unstable nature of attempts at incipient sedentism; while competition favored larger groups, cost considerations selected for smaller aggregations, and a return to familiar earlier adaptations

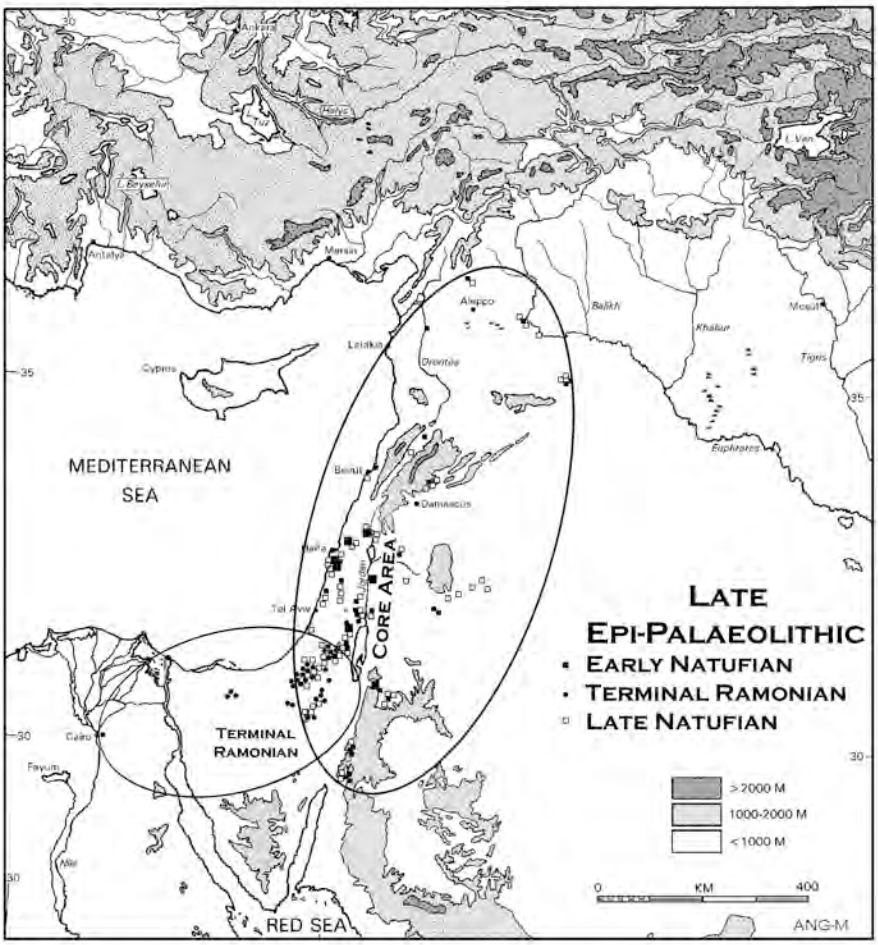

Figure 10.10. Distribution of Early and Late Natufian sites in the Levant.

(Belfer-Cohen and Bar-Yosef 2000; Kosse 1990). A shift to even greater mobility accompanies the final Natufian, which coincides temporally with the Younger Dryas (ca. 11,000–9600 calBC).

Numerous burials are found within sites, whether below houses, in abandoned houses, in special "houses of the dead," or in separate areas of the sites, sometimes including grave goods or decorative items. Indeed, in the Late Natufian, separate cemetery and ceremonial sites may emerge, as at Nahal Oren and Hilazon Tachtit Cave (Goring-Morris and Belfer-Cohen 2003; Grosman 2003; Noy 1989). Such sites were perhaps located at the boundaries between various regional groups.

Symbolic items increase dramatically in quantity, probably as a means of alleviating scalar stress, whether as mobile pieces or stabile items of house furniture, such as the monoliths at Wadi Hammeh 27 and Rosh Zin (Bar-Yosef

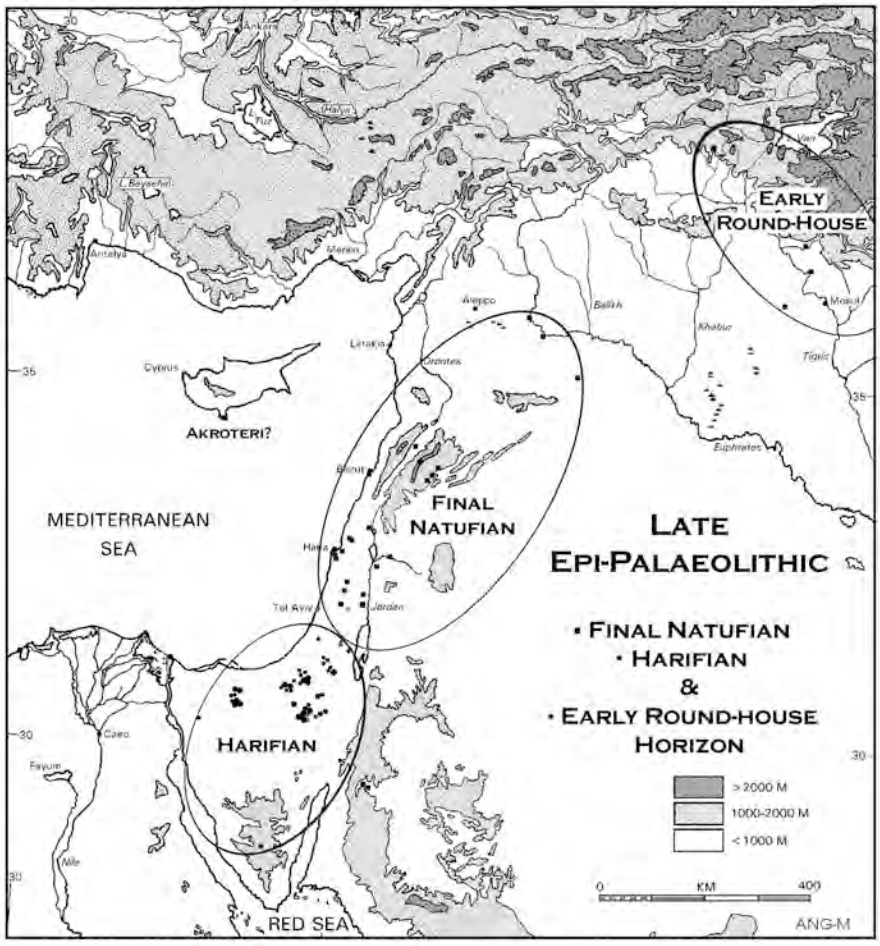

Figure 10.11. Distribution of Final Natufian, Harifian, and Early Round House Horizon sites in the Levant.

1997; Goring-Morris and Belfer-Cohen 2003). Distinct stylistic provinces can be recognized, such as the Carmel, western Galilee, and upper and middle Jordan Valley facies. Notwithstanding the decreased size of individual territories, exchange networks intensified and expanded, as evidenced through distribution patterns of flint, basalt, exotic minerals, and marine molluscs (Bar-Yosef Mayer 2005; Delage 2001; Weinstein-Evron et al. 1999).

In more peripheral regions of the southern Levant, such as the Jebel Druze/Black Desert and the Negev/Sinai, settlement dynamics tracked a different trajectory. The Terminal Ramonian, e.g., Upper Besor 6, Shunera VII, and Nahal Sekher 23, was locally based in the Negev and Sinai, developing directly out of the Ramonian (Table 10.2). Links with the Mediterranean zone to the north and east were renewed at this time. However, stylistic considerations indicate that

coeval ephemeral Early Natufian sites, such as Azariq XV, likely represent westward forays across the Rift Valley by Early Natufian groups residentially based in Edom in Transjordan (Byrd 1991; Janetski and Chazan in press), perhaps to procure marine molluscs from the Mediterranean coast. Territories in the arid zones were more extensive, reflecting lower carrying capacities (Betts 1998; Goring-Morris 1987). This, in turn, necessitated continued seasonal mobility, albeit logistically organized. The Terminal Ramonian range reached as far west as the right bank of the Nile Valley at Helwan (Schmidt 1996).

By the Late Natufian, there is evidence for local contraction in the geographical extent of human settlement, with no sites documented in Sinai. Within the Negev, a hierarchy of occupations can be observed. Thus, a major spring/autumn (?) aggregation locality is documented in the Negev highlands at Rosh Horesha-Saflulim, which likely served the entire Negev population (Goring-Morris et al. 1999). In addition, there are smaller (summer?) residential sites with architectural remains at the highland fringes, e.g., Rosh Zin and Upper Besor 6, and smaller, more ephemeral hunting camps, e.g., Nahal Sekher VI and Givat Hayil I, in the lowland dunes (Goring-Morris 1997, 1998; Horwitz and Goring-Morris 2001).

Towards the end of the late Epipaleolithic, the Harifian (ca. 10,800-9600 calBC), a local Final Natufian-related entity, emerges, coinciding with the onset of the Younger Dryas (Goring-Morris 1991 and references therein). This is also a logistically organized entity, seasonally (spring-autumn?) exploiting the highest reaches of the highlands from major residential camps, including Abu Salem, Ramat Harif, Shluhat Harif, and similar sites in the southern Hebron hills. Smaller (winter?) base camps are located at the highland fringes (Ma'aleh Ramon East and West, Shunera VI and IX), while still smaller hunting encampments are found in the lowlands of the Negev and northern Sinai, (Mushabi III, XX, Nahal Lavan 110, and Shunera XXIV). Seasonal patterns thus change in comparison to the Late Natufian, perhaps reflected by the increased reliance on grinding as opposed to pounding technology (cereals vs. nuts?). Procurement networks for exotics also changed, focusing primarily on southern Sinai and the Red Sea.

There seems to be an expansion of Natufian-related groups also to the north, through the Beqaa, e.g., Saiide II, and along the eastern margins of the Anti-Lebanon, e.g., Jayroud; by the Late Natufian, it extended up to, but not beyond, the Middle Euphrates at Abu Hureyra and Mureybet (Cauvin 1991; Conard 2006; Moore et al. 2000; Schroeder 1991). Still, the available data in the north are spotty at best, so reconstruction of local settlement adaptations remains problematic. Nevertheless, the appearance of these sites represents the initial stages of subsequent developments along the Middle Euphrates. Indeed, such riverine settings, then and subsequently, may have neutralized and cushioned the impact of environmental deterioration on local adaptations. Architecture was semisubterranean, using puddled mud and wattle and daub. Mortars are absent, and instead large querns are found (Moore et al. 2000).

In the far northeast, adjacent to rugged settings within the intermontane valleys and at the western fringes of the Zagros, the poorly defined Zarzian entity broadly corresponds temporally and, seemingly, culturally to the Natufian. But again, the available data are few, being based on investigations conducted more than 50 years ago (see Olszewski 1993).

Table 10.2 Time-stratigraphic units and cultural entities from the Mediterranean and steppic/desert provinces of the southern Levant

	Sociocultural entities	
Time-stratigraphic units	Mediterranean zone	Steppe and desert zone
Epipaleolithic		
Early		Nebekian
	Masraqan/Late Ahmarian	Masraqan/Late Ahmarian
	Early Kebaran (many variants)	Early Kebaran
	Late Kebaran (many variants)	Late Kebaran
	Nizzanan	Nizzanan
Middle	Geometric Kebaran	Geometric Kebaran and Proto-Mushabian
	Geometric Kebaran	Classic Mushabian
	Geometric Kebaran	Early Ramonian
Late	Early Natufian	Terminal Ramonian
	Late Natufian	Late Natufian
	Final Natufian	Harifian
Early Neolithic		
PPNA	Khiamian	Final Harifian
	Sultanian	Abu Madi I
PPNB	Early PPNB	Early PPNB
	Middle/Late PPNB	Middle/Late PPNB
	Final PPNB (PPNC)	Final PPNB (PPNC)

The Aceramic Neolithic

The early Neolithic is characterized by the rapid emergence of genuine village societies, at least within more favorable areas of the Levant. Starting with local transformations into productive modes of subsistence, the period ends with communities that were economically based on the farming and herding of a basic suite of domesticates that later became the staples of the region (Aurenche and Kozłowski 1999; Bar-Yosef and Meadow 1995; Cauvin 2000; Cauvin et al. 1997; Goring-Morris and Belfer-Cohen 1997; Kuijt and Goring-Morris 2002). Nevertheless, the nature and tempo of developments were uneven throughout the area, resulting in a mosaic of specific adaptations. For the first time, we can observe three distinct geographic foci of cultural developments, namely the Levantine corridor, the Middle Euphrates, and the upper Tigris basin (corresponding to the "Western" and "Eastern" Wings of the Fertile Crescent in the parlance of Kozłowski and Aurenche 2005; Ozdögan and Basgelen 1999).

Nevertheless, the major increases in global and community population sizes, coupled with the effects deriving from changes in subsistence modes, led to unforeseeable consequences on numerous levels. These necessitated realignments and intensification in local and regional social organization as well as ideological adjustments, all reflected in the abundant evidence for intensified ritual practices (Cauvin 2000; Goring-Morris and Belfer-Cohen 2002; Kuijt 2002; Verhoeven 2004). This period also witnessed the beginnings

of the dispersion of the early Neolithic "package" to the west, sometimes by systematic colonization, i.e., Cyprus and perhaps also across the Taurus into the central Anatolian plateau (Ozdögan 1998; Esin and Harmankaya 1999; Guilaine and Le Brun 2003; Peltenburg and Wasse 2004; Ronen 1995 and references therein).

Pre-Pottery Neolithic A

The Pre-Pottery Neolithic A (PPNA) can be seen as an "archaic" village society, locally emerging out of the preceding Late Epipaleolithic milieu. While each region presents its own unique trajectory, all three display broad parallels to one another (Figure 10.12). Whether one area served as the primary centre of innovation or whether more polycentric dynamics took place remains an issue of some debate (see below). Certainly, in all three regions, systematic cultivation, if not always actual domestication, emerges as a major innovation supplemented by continued foraging and hunting. The substantial increase in community sizes necessitated more intensive, extensive, and formal social intercourse. But, again, where data are available, this often seems an elaboration of previous Epipaleolithic traditions.

In the southern Levant, the PPNA (ca. 9600–8500 calBC) appears to have developed directly out of the Natufian, displaying numerous elements of continuity. This transformation occurred by way of the brief interlude of the Khiamian (Belfer-Cohen and Goring-Morris 1996; Enoch-Shiloh and Bar-Yosef 1997; Ronen and Lechevallier 1999) as the Younger Dryas climaxed, resulting in a critical threshold in terms of the viability of local adaptations. At this time, the arid margins to the east and south of the Mediterranean core area were generally abandoned.[12] Segments of such declining populations likely retreated northwards and/or eastwards, acting as a catalyst in coalescing with their vestigial Natufian/Khiamian "cousins" to form the larger Sultanian communities (Goring-Morris and Belfer-Cohen 1997). This later stage corresponded with the onset of the Preboreal, when warmer and more humid conditions prevailed.

Most PPNA settlements were founded in low-lying regions within the Mediterranean zone (including the present Sudanian phytogeographic zone), especially at the margins of both sides of the Rift Valley, and on the western flanks of the central hill range. A distinct hierarchy of site sizes developed, with the largest villages reaching up to 2.0–2.5 hectares in size at Jericho and Netiv Hagdud (Bar-Yosef and Gopher 1997; Kuijt 1994). Smaller hamlets of less than 0.5 hectares are documented at Wadi Faynan 16, Dhra, Zahrat edh-Dhra 2, Ain Darat, el-Khiam, Gilgal I, and Gesher (Bar-Yosef et al. in press; Echegaray 1966; Edwards et al. 2002; Finlayson and Mithen 2007; Garfinkel and Nadel 1989; Gopher 1996; Kuijt and Goodale 2006). Settlements seem to be spaced at intervals of ca. 10–15 km along the western (and eastern?) side of the Rift Valley north of the Dead Sea, close to perennial springs or the outlets of major wadis. Hamlets are also found at the eastern edge of the coastal plain, such as Hatoula, Nahal Oren, and Quleh (Lechevallier and Ronen 1994; Stekelis and Yisraely 1963; Zbenovich in press). Thus, while community sizes in the smaller settlements hardly exceeded those of Natufian hamlets, the few real villages may have comprised up to a couple of hundred inhabitants, which would have had major social implications.

Sediments in these villages are primarily anthropogenic, with accumulations reaching several meters in depth, notwithstanding the relatively short duration of the period. Indeed, they

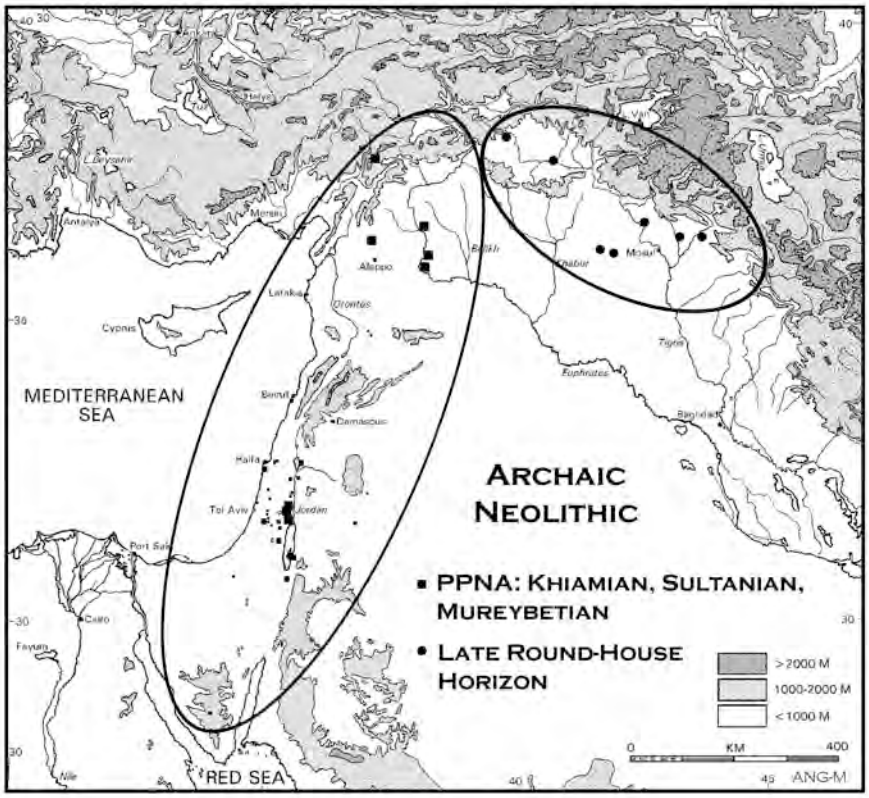

Figure 10.12. Distribution of PPNA and Late Round House Horizon sites in the Levant.

represent the earliest genuine *tel* sites in the region, both in terms of scale and in the composition of the ashy sediments; the life cycles of individual houses must have been brief. The domestic architecture of nuclear families was based on dispersed and increasingly more standardized sunken oval structures, much in the Natufian mode; they were constructed on stone foundations, with superstructures initially of wattle and daub and, later, of mudbrick and *terre pisée* floors on a cobbled base. The presence of silos is a notable feature. A number of the structures were destroyed in local conflagrations. Construction activities representing communal endeavors are notable at Jericho, with its renowned wall and tower, which likely fulfilled a cultic role (Bar-Yosef 1986; Kenyon 1981; Naveh 2003; Ronen and Adler 2001).

In light of the investigations at Netiv Hagdud and Gilgal I, subsistence appears to have been based on intensive and repeated cultivation of wild barley and oats and smaller quantities of wheat, together with intensive collection of pulses as well as wild pistachio nutlets, acorns of wild oak, and fig (Kislev 1997; Kislev et al. in press; Weiss et al. 2006). The quantity of avifauna (including both aquatic and other species) is notable, while medium- and large-sized mammals

(gazelle, ibex, fallow deer, aurochs, and wild boar) remained the same as before (Horwitz et al. in press; Tchernov 1994). They occur, however, in relatively smaller quantities.

While there is every reason to interpret these settlements as permanent villages, evidence exists to indicate the presence of much smaller ephemeral sites. Those were located in, and at the edge of, the highlands flanking the Rift Valley, with (e.g., Iraq ed-Dubb) or without (e.g., Reches Shalmon, Yad Shmoneh, and Tzur Natan; Marder et al. in press) obvious architectural remains. Some feature numerous cupmortars, and the composition of the lithic assemblages differs from that in the permanent settlements. The numerous bifacial tools may indicate the onset of systematic forest clearance by felling (although burning is also possible), indicating, together with systematic agricultural beginnings, anthropogenic shaping of the landscape (Barkai 2005; Naveh 1990). These sites likely reflect elements of a (seasonally based?) radial logistical system. Interestingly, almost no sites are documented from the coastal plain (but see Gopher et al. 1999).

Large sites and smaller, task-specific occurrences are found further north, in the Beqaa and Orontes portions of the Rift Valley, up to the Aleppo region at Tel Qaramel (Mazurowski 2001). The small cave of Nacharini, high in the Anti-Lebanon Mountains (Garrard et al. 2003 and references therein), apparently represents an ephemeral summer hunting station, whereas small cave sites along the eastern flanks of the Anti-Lebanon may have been occupied in winter (Conard 2006).

In the northern Levant, contemporaneous Mureybetian (ca. 9700–8750 calBC) village settlements at Mureybet, Sheikh Hassan, Jerf el-Ahmar, and Tel Abr' 3 were founded along the east bank of the Middle Euphrates above the flood plain; these were also spaced at regular intervals of ca. 15–20 km (Cauvin 1977; Stordeur and Abbès 2002; Yartah 2004); a similar situation may also have pertained along the Balikh.

Subsistence in the region was based on the cultivation of locally available cereals (Nesbitt 2002; Willcox 2005), together with the continued collection of wild nuts and fruits. Hunting focused on equids, together with gazelle, aurochs, and wild boar (Peters et al. 1999). Domestic architecture was initially circular, through time becoming more rectangular. Nuclear family houses were built to a standard plan, with communal activity installations and areas in the open spaces between clusters of houses, perhaps for use by extended families. House clusters are accompanied by largely subterranean, circular, roofed communal structures. Internally, they sometimes feature a circumferential bench or are divided into smaller cells and platforms. These seem to have been used for a combination of storage and social-cum-ritual activities; upon abandonment, they were often intentionally burnt, buried, or destroyed, a practice that continued locally into the later Neolithic (Belfer-Cohen and Goring-Morris 2005; Ozdögan 2006; Stordeur 2004; Stordeur et al. 2001; Verhoeven 2000).

Late in the period, the isolated hilltop site of Göbekli Tepe was founded at the watershed between the Balikh and other northward-flowing tributaries of the Middle Euphrates (Schmidt 2005 and references therein). This impressive site displays little evidence for regular domestic occupation but rather comprises a series of massive, sunken, circular enclosures (15–20 m diameter) with large, *bas relief*–sculpted, T-shaped pillars up to 8 m in height, which were quarried from nearby hillsides. It remains unclear whether these structures were roofed. Perhaps even more astonishing is the fact that, while

Göbekli Tepe is the only such cult site currently definitely attributable to the PPNA–early PPNB, similar PPNB sites are known in the region, as at Karahan, 70 km away, on the watershed between the Balikh and the Khabur (Çelik 2000, 2004). These sites are best understood in the framework of "amphictyonies," i.e., leagues of neighboring communities associated with sacred locales (Belfer-Cohen and Goring-Morris 2002b, 2005).

In the area further to the northeast, especially on floodplains in the upper reaches of the Tigris and its tributaries, in and close to the Taurus/Zagros foothills a series of small "Round House Horizon" villages were founded, as represented by Hallan Çemi, Demirkoy, Qermez Dere, Nemrik, Çayönü, and M'lefaat (Peasnall 2000 and references therein). These seemingly derive from sparse Zarzian populations in the neighboring mountain valleys. Two "Round House" phases can be identified (ca. 10,750–9750–8750 calBC), with more steppic settings favored for settlement in the later phase. Subsistence was based on foraging for nuts and pulses, while hunting focused on ovi-caprines, red deer, and wild boar. In the later phase, dietary breadth expanded to include cereal grasses and gazelle, although nuts and pulses remained the significant dietary sources (Nesbitt 2002; Peasnall 2000).

The settlements of the "Round House Horizon" were much more substantial in scope than previous settlements, with spaced, solidly constructed, sunken circular domestic architecture and extensive midden deposits. Residential units were spaced at some distance from one another, often around an expansive cobbled open area or plaza. In some sites, larger communal structures are also present (Hallan Çemi, Qermez Dere), often incorporating massive central pillars.

These settlements initially displayed distinct local cultural characteristics, including an emphasis on triangular microliths and maceheads,[13] as well as the production of thin-walled stone bowls, arrowheads being a later addition. They also share certain similarities with the Natufian/PPNA sphere in the south and west.

A common characteristic of all three geographical foci of settlement during the PPNA is that they are located in ecotonal regions (see Figures 10.2, 10.11), facilitating the systematic exploitation of a broad range of animal and especially plant resources. The increase in global population, as well as in specific community sizes, would have had a major impact upon mating networks and social relations, as is indeed reflected in the increased evidence for more elaborate and intensive ritual and mortuary practices, and the expansion of diverse exchange networks corresponding to discrete interaction spheres. Thus Cappadocian obsidian reached south Levantine sites, while "Round House Horizon" sites relied on sources from Bingöl (upper Euphrates); Middle Euphrates sites were supplied from both sources (Cauvin 1996; Cauvin and Chataigner 1996).

Pre-Pottery Neolithic B

The Pre-Pottery Neolithic B (PPNB; ca. 8500–6400 calBC) represents the emergence of genuine village societies, coinciding with the early Holocene optimum.[14] Whether this represents diffusion from a single hearth of cultural innovation (the Middle Euphrates?), or a more complex array of polycentric innovations and interactions remains open to debate (Gebel 2004; Horwitz et al. 2000; Lev-Yadun et al. 2000; Willcox 2005). At this time, there was a quantum leap in population size at both the local and global scales, leading to greater social complexity (Banning 1998; Kuijt 2000; and see

Figure 10.13). A broad cultural interaction zone or *koine* emerged, extending over the entire Levant and beyond (Bar-Yosef and Belfer-Cohen 1989b). Still, the shift to the PPNB and subsequent developments are uneven throughout the Levant. Whereas considerable continuity from PPNA to PPNB is manifest in the north, this is not apparent further south. There is a mosaic of specific adaptations to local conditions: settled village life in more favorable areas was based on agriculture and, in some areas, domesticated animals, while mobile foragers recolonized more peripheral regions. This is also the time at which Cyprus was systematically colonized (see papers in Swiny 2001; Guilaine and Le Brun 2003; Peltenberg and Wasse 2004).

In the north, in the Eastern Wing, the end of the Round House horizon (ca. 8750 calBC) is marked by divergence into two separate and distinct trajectories. Downstream on the Tigris, in the steppes east of the Khabur and at the margins of the Zagros, the Proto-Hassuna cultural sphere developed (Huot 1994; Kozłowski and Aurenche 2005; Peasnall 2000). By way of contrast, the more northerly area, in the upper reaches of the Tigris, became aligned with sites on the Upper and Middle Euphrates – the "Golden Triangle" – to form the "Taurus PPNB" (Cauvin 1989, 2000; Kozłowski and Aurenche 2005).

Along the Middle Euphrates and the Balikh valley, the transition to the PPNB (ca. 8750 calBC) is relatively seamless, forming part of the "Taurus PPNB" facies (Abbès 1998; Akkermans 2004; Cauvin and Stordeur 1978; Stordeur and Abbès 2002). Linear settlement patterns along the main drainages continue at intervals of 15–25 km, with some sites enduring (Mureybet, Cheikh Hassan, Göbekli Tepe and Çayönü), and others being abandoned, as exemplified by Jerf el-Ahmar and Tell Abr' 3. Still other sites were newly founded, either immediately, or during later PPNB phases, e.g., Gritille, Nevali Çori, Akarçay Tepe, Dja'dé, Tel Halula, and Bouqras along the middle Euphrates; and Gurcutepe, Tell Assouad, and Tell Sabi Abyad along the Balikh. This cultural facies also expanded northwards and eastwards, as new sites were founded further upstream in the Upper Euphrates, amongst the Taurus Mountains, e.g., Çafer Höyük, Boytepe, Cinaz.

The earliest evidence for large-scale settlement on the other side of the Taurus mountains on the central Anatolian plateau, Asikli Hüyük, was founded by at least the MPPNB (Esin and Harmankaya 1999). The site is located close to the Çiftlik obsidian sources, on which the workshop site of Kaletepe is found (Binder and Balkan-Atli 2001). Sites on the Cilician coast are only documented from the FPPNB, but this may be misleading, masking presently submerged sites on the shallow coastal shelf (Caneva 1999).

The rectangular "Grill Plan" house was widely adopted, to be replaced by the "Cell Plan" (ca. 7750 calBC), and later still, the "Large Room Plan."[15] Ritual precincts can be recognized as plazas, communal structures and sanctuaries, which are sometimes associated with funerary rites, in addition to sacred sites, e.g., Dja'dé, Çayönü, Nevali Çori, and Göbekli Tepe (Ozbek 1992; Hauptmann 1993; Ozdögan and Ozdögan 1995; Esin and Harmankaya 1999; Coqueugniot 2006). Subsistence was based on farming, with domesticated cereals including einkorn wheat and rye, and lentils, as well as continued collection of wild nuts and fruits (Zohary and Hopf 2000; Nesbitt 2002; Willcox 2005). Domestication of sheep, goat, cattle, and pig is documented by the LPPNB, although it seems likely that some degree of cultural control was exerted earlier.[16]

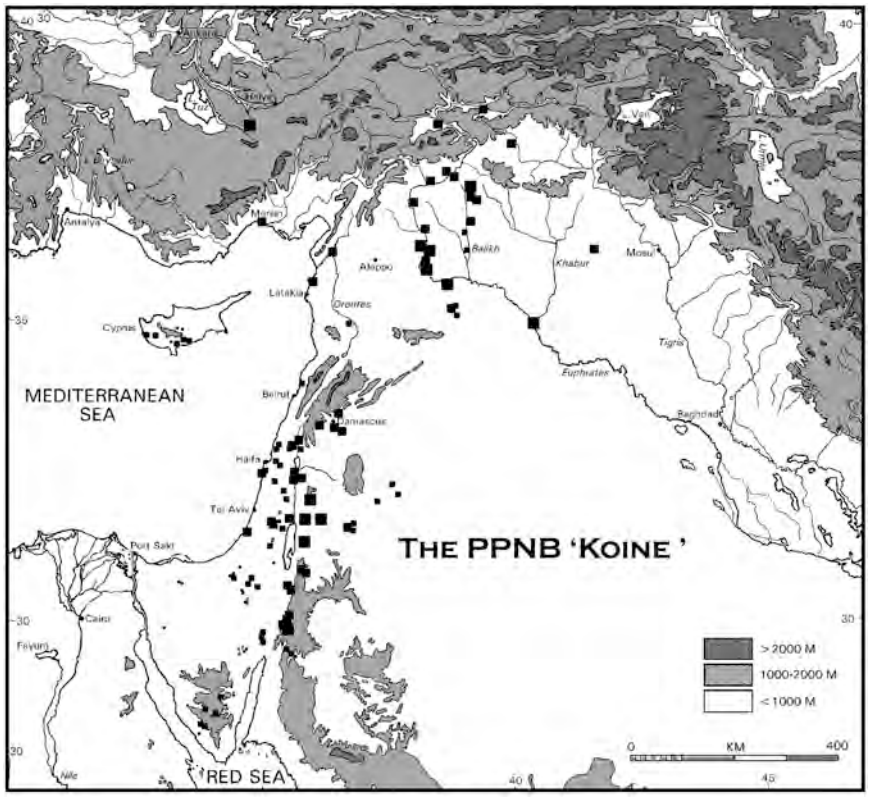

Figure 10.13. Distribution of PPNB Paleolithic sites in the Levant.

The transition to the PPNB in the southern Levant (ca. 8500–6400 calBC) is marked by little continuity in terms of site locations, with almost all PPNA settlements being permanently abandoned.[17] The causes of this demise are uncertain, It could involve combinations of a brief climatic deterioration, declining yields, or social factors. For example, in the case of Netiv Hagdud, the ongoing lowering of Dead Sea levels seems to have caused a drop in the water table and the drying up of the Salibiya basin marsh, at which time the locality was permanently abandoned (Schuldenrein and Goldberg 1981).

The Early PPNB (ca. 8500–8100 calBC) represents a brief interlude and is still poorly documented, although recent advances have been made, especially with the excavations at Motza in the Judean hills (Khalaily et al. in press; Yizhaq et al. 2005), as well as at Aswad in the Damascus basin (Stordeur 2003; Stordeur and Khawam 2007).

Subsequent MPPNB village sites were founded in a new array of locations, a pattern that continues through the Late PPNB. An eastward shift in settlement is notable in a linear pattern. Foremost in terms of favored settings were major wadis intersecting the "Kings Highway" along the

ridge east of the Rift Valley, from the Damascus basin in the north to Ras en-Naqb at the southernmost extremity of the Mediterranean zone in Edom. Initially, many settlements were modest in scope but populations increased exponentially. These "megasite" villages sometimes supposedly reached up to 12 hectares by the LPPNB and FPPNB.[18] Large villages were also founded north of the Dead Sea within the Rift Valley, e.g., Jericho, Munhata, Beisamoun, and in the Lebanese Beqaa up to the Amouq. Further west, in the hills and valleys of Galilee, Carmel, Samaria, and Judea, PPNB settlement density was quite high, although occupations were small, rarely exceeding 2.5 hectares, e.g., Nahal Bezet, Horvat Galil, Yiftahel, Nahal Oren, Abu Gosh, and Motza (Echegaray 1964, 1966; Noy et al. 1973; Garfinkel 1987; Gopher 1989; Khalaily et al. 2000; Khalaily and Marder 2003; Khalaily et al. in press). A few sites are also located on the northern Lebanese coast adjacent to major drainages and promontories, as at Byblos and Ras Shamra (Dunand 1973; de Contenson 1992). However, the littoral south of the Carmel appears to have been unoccupied prior to the FPPNB, as represented by Atlit Yam and Ashkelon (Galili et al. 1994; Garfinkel et al. 2006).[19]

Architectural traditions were variable, but often independent of obvious chronological or regional patterning. In some cases, there is a continuation of circular mudbrick (Aswad) or stone structures (Shaqarat M'siad, Beidha), but single (Ain Ghazal, Yiftahel, Beisamoun) and two-story rectangular corridor (Ain Ghazal, Beidha, Yiftahel) and megaron (Jericho) houses are also found, as well as more cellular patterns (Basta, Wadi Ghwair) (Byrd 2000 and references therein). This architectural variability reflects local availability of construction materials but also specific group traditions, perhaps much in the manner demonstrated for the American Southwest (Wilshusen and Potter in press). The intensive use of lime plaster is one hallmark of the PPNB. The presence of sophisticated deep wells in Cyprus during the EPPNB renders it likely that such technology was also available in the Levant prior to this time, although it is only from Final PPNB Atlit Yam that evidence is available on the mainland (Galili and Nir 1993; Guilaine and Briois 2001; Peltenberg et al. 2001; Garfinkel, Vered, et al. 2006). These would have been important in terms of hygiene and the accessibility of water.

Communal structures, ritual areas, and cult structures and installations are present in some sites, e.g., Beidha, Aswad, Atlit Yam, Ain Ghazal, Jericho, and Shaqarat M'siad (Kirkbride 1968; Goring-Morris 2000; Rollefson 2000; Galili 2004; Hermansen and Jensen 2004). Burials in domestic contexts occur in many sites, but the numbers rarely accord with population estimations based on the scope of architectural remains.[20] This begs the question of the existence of designated burial areas (on- or off-site). In some instances, concentrations of burials are found associated with defined precincts, e.g., Jericho, Aswad, and Atlit Yam (Kenyon 1981; Kuijt 1995; Galili et al. 2005; Stordeur and Khawam 2007). The secluded site of Kfar HaHoresh may represent an example of a distinct funerary and cult site serving nearby lowland settlements (Goring-Morris 2000). This may serve as a model for other areas, and could represent the presence of local amphictyonies (Belfer-Cohen and Goring-Morris 2002b, 2005). The small, isolated cave of Nahal Hemar in the Judean desert seems to have served as a repository for ritual paraphernalia of a nearby Mediterranean community (Bar-Yosef and Alon 1988).

Although systematic agriculture was widely practiced, distinct regional patterns have been

noted, with an emphasis on cereals (emmer and barley) in and east of the Rift Valley, and a focus on lentils in the west (Garrard 1999; Colledge et al. 2004). While herded goat and sheep appear by the MPPNB in northern Transjordan (an introduction from the north?), west of the Rift Valley, hunting seems to have continued to be the main source of meat, with a slower, more gradual transition to the adoption of herded flocks (Horwitz et al. 2000).

Populations in the arid zones (Transjordan, the Negev, and Sinai) also increased gradually from the EPPNB onwards in tandem with environmental amelioration (Bar-Yosef 1984; Baird et al. 1992; Goring-Morris 1993; Betts 1998; Garrard 1998; Henry et al. 2003; Fujii 2006). This could have occurred in the form of local increases emanating from vestigial populations or by actual colonization, though the former seems more plausible. Given the constraints of local carrying capacities, adaptations were based on small mobile foraging bands in each region, probably moving seasonally (sometimes as bands and sometimes dispersing in smaller groups), usually between the highlands and lower elevations. In eastern Jordan, occupations are rather more substantial and a tendency towards quadrilateral architecture is apparent (Garrard 1998; Fujii 2006). Further south and west, in the Hisme, the Negev, and Sinai, occupations range from 25 to 250 m^2 and usually comprise beehive-type clusters of stone structures. A pattern of seasonal mobility between higher and lower elevations is indicated (Noy 1976; Simmons 1981; Bar-Yosef 1984; Henry 2005). Small hunting encampments for retooling are also known (Barzilai and Goring-Morris in prep.). Towards the end of the period, knapping stations and special-activity sites, e.g., for polished stone bangles and bead production, are also documented (Rollefson 1988; Starck 1988; Rollefson et al. 1999; Wright and Garrard 2003; Fabiano et al. 2004; Sharon and Goring-Morris 2004; Schyle 2007).

Indeed, at least four regional arid-zone variants can be discerned, primarily on the basis of techno-typological stylistic considerations of the lithic assemblages – the Palmyra region; the Azraq basin-Black desert; the Hisme-southern Negev- south Sinai province; and the northern Sinai-central and western Negev region (Baird 1994; Gopher 1994; Nishiaki 2000). Systematic connections between the "desert" and the "sown" are reflected by the supply of Red Sea marine molluscs northwards (Reese 1991; Bar-Yosef Mayer 2005).[21] It is only from the LPPNB and FPPNB onwards that arid-zone pastoral economies began to emerge, first in the north (el-Kowm and Qdeir), spreading southwards (Black desert, Azraq, Jilat, el-Jafr and the Hisme), before crossing into Sinai and the Negev (Akkermans and Schwartz 2003; Bar-Yosef 1986–1987; Betts 1998; Byrd 1988, 1992; Fujii 2006; Goring-Morris 1993; Henry 2005; Rollefson et al. 1999; Stordeur 2000).

Systematic exchange now encompassed surplus products and prestige items, e.g., exotics such as obsidian, beads, wood, and other valued items (Frachtenberg and Yellin 1992; Cauvin 1994, 1996; Wright and Garrard 2003; Pessin 2004). The geographical ties and locations of sites serving as nodes on the exchange network are linked to the emergence of a market economy.

The scale of PPNB "megasite" villages in both the north and south reached the level of social organization displayed by the early urban centers of the fourth millennium calBC (Hole 2000; Gebel 2002; Kuijt and Goring-Morris 2002; Simmons 2001, 2007). Their ultimate collapse may be due to the combined effects of the inability of PPNB communities to develop appropriate

sociopolitical frameworks; the unforeseen effects of overcultivation leading to declining yields; the emergence of contagious diseases, including zoonoses with the advent of animal domestication; and climatic deterioration (Alley et al. 1997; Baruch and Bottema 1999; Goring-Morris and Belfer-Cohen 1997, in press b; Rollefson and Köhler-Rollefson 1989; Smith and Horwitz 1998). Another possible factor could be growing interpersonal and even intercommunity violence – multiple burials do seem to be more prevalent in LPPNB contexts (see Akkermans and Schwartz 2003; Rollefson 2000). The decline of the PPNB *koine* throughout the Levant is a gradual process, portrayed by increasing fragmentation into more localized regional adaptations on a much more modest and dispersed scale than previously. This is reflected by the proliferation of local cultural entities during the later (Pottery) Neolithic, including the Hassunan, pre-Halafian, Amouq, Khirokitian, Yarmukian, Jericho IX, central Anatolian, and other unnamed pastoral societies of the desert margins (see references in Akkermans and Schwartz 2003; Banning et al. 1994; Betts 1993; Garfinkel 1993; Garrard et al. 1996; Gopher and Gophna 1993; Guilaine and Le Brun 2003; Hodder 2006; Huot 1994; Kozłowski and Aurenche 2005; Ozdögan and Basgelen 1999).

Discussion

We have chosen to focus in this review on the Levantine *local* record with an emphasis on changing settlement patterns. The picture that emerges may in fact hint at more complex and dynamic patterns of the relationship between dispersing, migrant, and local endemic groups than is commonly understood. We would like to mention but a few themes that derive from the above synthesis.

The archaeological record rarely portrays frozen *instances*, i.e., the "Pompeii premise." More commonly, sites and localities contain material remains averaging the temporal dimension of complex processes of human adaptations. The latter may be motivated by intertwined local subsistence potentials, levels of technological know-how, inter- and intragroup relationships, and cultural impositions or preferences. The very nature of this evolutionary record requires that it be approached probabilistically. By default, we must consider each archaeological manifestation as a reflection of success (at least over a certain temporal range), since it is unlikely that short-lived, failed instances of occupation and subsistence are visible archaeologically. Failures to adapt culturally and behaviorally to changing ecology, i.e., environmental, demographic, and social conditions, must be read between the lines of the existing record. This reading should be sensitive to the strengths and weaknesses of the said record. If the current paper appears at times to represent unbalanced sketches of different periods, it ultimately reflects the state of research. Indeed, the frequently limited exposures at sites throughout the sequence all too often hamper the understanding of intrasite patterning.

Levantine prehistory is often – perhaps too often – viewed in terms of the region's intermediate geographical position between Africa and Europe, mainly due to the scientific paradigms of the twentieth century. However, in the course of the Pleistocene, the Levant alternately had obvious links with other regions, whereas during different periods it was an autonomous, self-contained area. In emphasizing the "in-between" characteristics of the Levant, it has been easy to downplay the development of local traits and tendencies that remained stable throughout various events of population influxes

and, no doubt, extinctions, demographic bottlenecks and imported cultural innovations. Indeed, recent research suggests that the "Levantine Corridor" (via Sinai) may have been but one out of several routes taken by populations on their way out of Africa (e.g., Derricourt 2005 and references therein). Similarly, genetic studies and archaeological work hint that the sortie(s) out of Africa of modern humans around 50 ka could have taken an eastern route, only later reaching the Levant (Beyin 2006; Forster and Matsumura 2005; Mellars 2006; Petraglia and Alsharhk 2003). Indeed, it is interesting to note that the Sinai Peninsula appears to represent a very real border between the Levant and North Africa through most of the periods discussed herein, even when environmental factors may have enabled the passage of humans. Documented exceptions are the initial Upper Paleolithic, a very minor incursion at the beginning of the Late Epipaleolithic (into the Nile Delta), and after the PPNB.

The early hominin occupations of the region were indeed related to dispersals out of Africa. These occurrences, documented mainly in the Rift Valley, represent a series of diffusion waves of groups with cultural affinities that had evolved in Africa during the Early and Middle Pleistocene. Other, concurrent occupations, although sporadic, depict the existence of groups whose ties with the African record are less pronounced. These could reflect the persistence in the Levant of some of the incoming groups and their success at adapting to local conditions and embarking on a local cultural trajectory.

Population densities were low during much of the Lower Paleolithic (we can even envision periods when the area was virtually unoccupied). Still, a slight demographic increase can be noted with the beginning of the Late Acheulian that sets a trend that continues through the Middle Paleolithic and Upper Paleolithic. While this partially reflects increased archaeological visibility due to geomorphic changes in the landscape, it likely depicts to some degree also a real demographic increase. However, it is only with the onset of the Epipaleolithic that major population increases occur at both global and regional levels, seemingly first in the southern and later in the northern Levant. This trajectory intensifies markedly with the beginnings of sedentism and the shift to productive economies (Figure 10.14). Such a rise in relative and absolute population densities indicates increasingly successful exploitation of local subsistence resources, either through improved techno-cultural means and/or through environmental amelioration.

There is little obvious continuity in the specific site locations from the Levantine Early and Middle Pleistocene into the later Pleistocene, notwithstanding a preference for certain physiographic features, e.g., the Rift Valley. The seeming absence of continuity in site locations is partly due to geomorphic processes, especially in the lowlands, where sediments accumulated and covered the early sites. For example, the conspicuous occupational gap between the Lower and the Late Upper Paleolithic in the Rift Valley may be more apparent than real, as this region has undergone repeated processes of lake expansion and contraction. These may have prohibited settlement, and/or may have obscured by sediment accumulation, or destroyed by erosion, the existence of earlier sites.[22] Sea level changes would have had similar effects along the littoral. Analogous processes of terrace formation and down-cutting also operated along the banks of the Euphrates and Tigris in the northern Levant. On the other hand, the paucity of sites of all periods

along the higher mountainous backbone of the Levant probably reflects continuous erosion and intensive human activity during the later Holocene. The role of the series of shallow lakes in eastern Transjordan and Syria with regard to broader settlement patterns throughout the course of Levantine prehistory remains poorly documented with only a few exceptions, i.e., the el-Kowm and Azraq basins. Changes in the landscape induced by human activities began to appear only with the intensification of systematic agricultural practices and long-lasting village communities from the Neolithic onwards, i.e., deforestation and ecological degradation (Rollefson and Köhler-Rollefson 1989).

This stated, cave and open-air sites alike are frequently located on the north banks of drainage systems, in both cases facing more or less southwards to provide maximal exposure to sunlight and warmth. Another shared characteristic of these sites is their location at ecotones near water sources, often in the proximity of topographic corridors and passages.

The view that open-air sites represent but a single occupation phase, in contrast to caves and rockshelters that attracted humans for repeated settlement, is biased by our tendency to consider vertical evidence within confined spaces. Such views are misrepresentations of the archaeological record. Often, open-air sites are composed of discrete site clusters or palimpsests at favored localities in the landscape, from the Lower Paleolithic, e.g., Ubeidiya and Gesher Benot Ya'aqov, right through the end of the Epipaleolithic. These palimpsests actually represent extensive lateral continuity in restricted localities, which are, of course, much larger than a single cave or rockshelter; Natufian and Neolithic sites differ once genuine sedentism becomes a factor.

It is important to note that there is much continuity through time in the *nature* of sites. Well into the Terminal Pleistocene (i.e., the Epipaleolithic), the vast majority of prehistoric sites seem to have been quite ephemeral, being occupied by highly mobile bands. As discussed above, the Levant offers ecological diversity – veritable ecotonal conditions – over its relatively small area, where the availability of vegetal resources was seasonally diverse and of short duration. The most efficient way to exploit such relatively short-lived resources would be for consumers to map onto resource patches when and where they became available. Since this resource structure prevailed in the Levant in all periods before plant cultivation, it is not surprising that mobility strategies ultimately varied little throughout the Pleistocene. The contrast between circular foraging, as opposed to radiating logistical settlement patterns, is often more a matter of degree than of type (Binford 1980). Certainly, from the Middle Paleolithic onwards, elements of both strategies often appear to have been employed in tandem by the same groups, even though these patterns are not necessarily clear-cut or associated with any particular hominin taxon, as argued by some (Lieberman and Shea 1994; Shea 1998). Later, mostly from the Neolithic onwards, linear settlement patterns are apparent in various settings, i.e., along perennial rivers, the Rift Valley, the "Kings Highway," etc.

The lack of systematic artistic manifestations in the Levant contrasts with phenomena observed elsewhere, induced by demographic stress (Jochim 1987; Johnson 1982). The situation in the Levant is attributable to the fact that large-scale aggregations were not part of the Levantine way of life throughout the majority of the Paleolithic. This, in turn, has been attributed to the mobility and subsistence strategies of

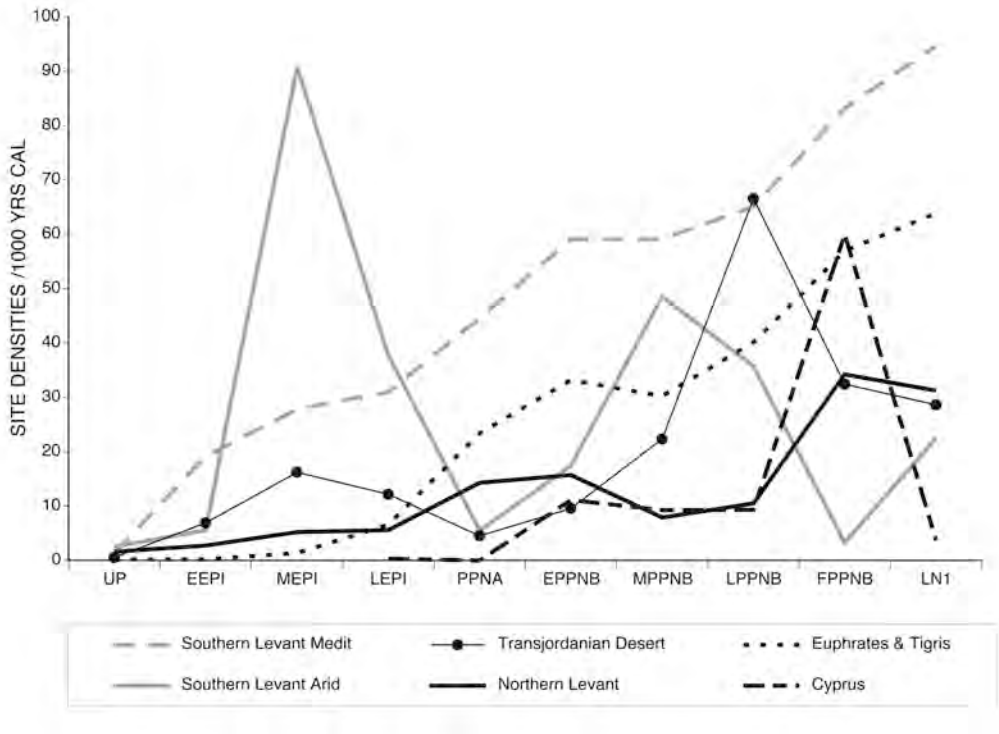

Figure 10.14. Estimates of site densities/1000 yrs cal for the various geographical regions in the Levant and Cyprus from the Upper Paleolithic through the Late Neolithic (n = 2,176). Actual population increases would obviously have been much more marked, since these data do not take into account the sizes or time depths of sites. Late Neolithic data for Cyprus are probably underestimated.

Levantine prehistoric groups, which reflect the particular ecological characteristics of the region (Bar-Yosef 1997; Hovers 1990). The manifestations of artistic expressions occur in the Levant intensively from the Natufian onwards, when populations grew and sedentism required mechanisms to relieve the scalar stresses of life in large communities (Bar-Yosef and Belfer-Cohen 1989a), and decline when community sizes break down.

The question of the contemporaneity of different cultural entities and their behavioral correlates is a constantly occurring one in prehistoric research in any geographic area. This has been an issue of considerable contention in the Levantine prehistoric research.[23] The small size of the region under discussion makes it difficult to model situations where populations of different cultures lived coevally and sympatrically for long time periods. Until such time as advances in chronometric techniques, combined with a much denser archaeological data base, offer sufficient chronological control to tackle such debates, stratigraphic sequences should be relied upon for elucidating

contemporaneity of cultural phyla.[24] Matters are, perhaps, simpler to evaluate when such issues involve different lithic entities in different geographical zones. Given the time depths concerned, it is really only from the Upper Paleolithic (and especially the Epipaleolithic) onwards that lithic styles can be interpreted as group denominators at more particularistic, higher-resolution scales (Figure 10.8).

The issue of settlement patterns in the landscape is clearly vital for comprehending the territorial ranges of groups. While it is obvious that settlement ranges in peripheral areas were generally larger than were those in the Mediterranean zone, considerable variability can be identified at different points in time.[25] This variability responds partially to environmental constraints, yet it is clear that cultural factors were also crucial. A case in point concerns the Mousterian manifestations in the Negev, the elongated aspect of which has often been ascribed to their cultural affiliation with the "Tabun D-type" Mousterian (Marks 1981) or to a specific hominin taxon (Shea 1998). But, in fact, this aspect of lithic technology may be related to steppic and desertic adaptations (a greater emphasis on hunting?). The trend for elongation indeed marks many of the lithic assemblages in the desert during later prehistoric periods, without necessarily denoting cultural affinities with their northern counterparts. The shifting border between the "sown" and the "desert" dictated markedly different subsistence modes and, hence, the different settlement patterns of groups sharing broader cultural markers. First recognized in the late Lower Paleolithic, i.e., the absence of Acheulo-Yabrudian sites in the south and east, these differences between the Mediterranean "core area" and the steppic/desertic parts of the Levant become especially marked with the onset of sedentism during the Natufian, leading eventually to the emergence of pastoral societies in the semi-arid zones.

The Near East, and the Levant in particular, represents a unique and rich mosaic of different specific environments in close proximity to one another. Geographically bridging Africa and Eurasia, the region witnessed dynamic demographic shifts, cultural influences, and endemic adaptations to its particularities. Given the inevitable complexity of human survival and adaptations throughout the Pleistocene in the Levant, it is perhaps not surprising that agriculture, the innovation that eventually replaced the prehistoric lifeways of mobile gatherers-hunters, setting the foundations for a different trajectory of human existence, first emerged in this region.

Notes

1. The caves of Tabun, in the Carmel, and Oum Qatafa, in the Judean Desert, had been occupied since the Late Acheulian.
2. Precise calibration during the Upper Paleolithic remains somewhat speculative but still provides some indication as to its actual duration.
3. Notwithstanding lower sea levels during the Upper Paleolithic, one would still have expected to find at least some isolated indicative Upper Paleolithic artifacts along the coastal plain. The only southern coastal Upper Paleolithic (Ahmarian) site known to date is Haruvit (A306) in northern Sinai (Gilead 1984).
4. While radiocarbon dates suggest a time interval of ca. 6,000 calibrated years, we speculate that the actual duration of this entity was, in fact, much shorter.
5. Indeed, it seems that the shift to the Upper Paleolithic in caves in the intermontane valleys to the north (Caucasus and Zagros) occurs later than in the Levant, as represented in the Zagros by the Baradostian (= the so-called "Zagros Aurignacian" – see Olszewski and Dibble 2006; Bar-Yosef et al. 2006).
6. Recent overviews of environmental changes in the region between 23,000–3000 calBC include

Robinson et al. 2006; Enzel et al. 2008; for the transition to the Holocene, see Byrd 2005.

7. Notwithstanding problems (Stutz 2002) with the use of cementum studies for reconstructing seasonality (Lieberman 1993), it seems that the patterns indicated are also plausible on other grounds.
8. The Levantine example may thus differ from that described in Europe during the Mesolithic, where changes reflect intercept vs. encounter-based strategies (Eerkens 1997; and see Belfer-Cohen and Goring-Morris 2002a).
9. See Bar-Oz (2005) for a local investigation of prey exploitation in the Carmel area.
10. Sedentism is indicated by the intensity of occupations (Bar-Yosef 1983; Hardy-Smith and Edwards 2004), durability of architectural remains, and presence of commensals (Tchernov 1991).
11. The level of Lake Lisan had begun to drop during the Early Epipaleolithic to form the Dead Sea, but it is only from the Early Natufian that sites are found within the Rift Valley proper (e.g., Salibiya XII), thus facilitating cross-valley connections (Hovers 1989 and references therein).
12. Some Harifian communities may have retreated into the south Sinai High Mountains as represented by Abu Madi I.
13. Indeed, at the cemetery in Shanidar cave, numerous individuals display head injuries likely corresponding to the use of maceheads as weapons for warfare (Solecki et al. 2004).
14. Nevertheless, we feel there has been a recent regrettable tendency to automatically equate such early "villages" with the recent Near Eastern peasant village.
15. With a few exceptions, the density of "packing" of domestic architecture and its spatial patterning within villages remains unknown (Akkermans et al. 1981; Ozdögan and Ozdögan 1990; Schirmer 1990; Esin and Harmankaya 1999).
16. E.g., the introduction to Cyprus in the ninth millenium calBC (=EPPNB) of sheep, goat, cattle, and fallow deer (the latter was never domesticated) in viable numbers to sustain herds (Vigne 2001).
17. Even in sites with PPNA and PPNB occupations, as at Jericho and Nahal Oren, a hiatus separates the two, or sites were relocated, as at PPNA Gesher and MPPNB Munhata, both on the alluvial fan of Nahal Tavor (Perrot 1966; Noy et al. 1973; Kenyon 1981; Garfinkel and Dag 2007). Mujahia, on the eastern flanks of the Kinneret, with a probable sequence of PPNA and PPNB may be an exception (Gopher 1990).
18. We feel there appears to have been a tendency to exaggerate the areal extents of many PPNB mega-sites, and we have little information concerning the "packing" within sites.
19. The likelihood of MPPNB and LPPNB sites being deeply buried under either alluvium or later large *tel* sites, or submerged off the Mediterranean shore, should be taken into account.
20. LPPNB Halula on the middle Euphrates is a notable exception with systematic burial in domestic contexts (Guerrero et al. 2006).
21. It has been suggested that meat may also have been exchanged for plant foods between the two zones (Bar-Yosef and Belfer-Cohen 1989b). The construction of desert kites in the Black Desert for large-scale hunting (gazelle?) may also begin during the latest stages of the PPNB (Betts 1998).
22. During the Upper and earlier Epipaleolithic, high stands of Lake Lisan would also have hindered east–west movements at various times.
23. Examples include the Acheulo-Yabrudian vs. Early Mousterian, the nature and timing of the Middle–Upper Paleolithic transition, the Upper Paleolithic entities of the Ahmarian vs. the Aurignacian, the Epipaleolithic Geometric Kebaran vs. the Mushabian, Terminal Ramonian vs. Early Natufian, and the Yarmukian vs. Jericho IX/Lodian.
24. However, relative dating based on stratigraphy, like radiometric dates, should always be considered as a working hypothesis rather than an axiom (Hovers and Marder 1991).
25. Of course, within the Mediterranean zone, areas of dense vegetation would often also be an impediment to settlement, prior to acquiring effective means for deforestation (Barkai 2005).

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