Chapter **11**

The Middle Paleolithic of the Levant

Recursion and Convergence

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ABSTRACT

Improved geochronology for the Middle Paleolithic Levant reveals a "recursive" trajectory to several important dimensions of archaeological variability. This paper argues these recursions stem from repeated turnovers of Levantine hominin populations. Neandertals and early modern humans appear to have occupied the Levant at different times. Nevertheless, the similar lithic assemblages associated with these humans are seen by many researchers as evidence for cultural contacts and evolutionary continuity. Closer examination suggests they arise from convergence in hominin behavioral evolution, probably in the context of competition for the same ecological niche.

INTRODUCTION

Our ability to infer trajectories of culture change depends heavily on chronology. Improved chronology has dramatically altered our understanding of Middle Paleolithic (MP) biological and cultural evolution in the East Mediterranean Levant (the territory corresponding to the modern states of Lebanon, Syria, Israel, Jordan, and the Sinai Peninsula). From the 1950s to the mid-1980s, when chronological relationships among MP assemblages were inferred primarily from land-sea stratigraphic correlations, biostratigraphy, and the archaeological sequences at "type-sites" such as Tabun Cave, the Levant MP record was seen as furnishing strong fossil evidence for the gradual origin of modern humans out of "progressive" Neandertal ancestors (Howell 1958; Brace 1964; Wolpoff 1980:304–309; Trinkaus 1984). That both Neandertals and early modern humans were associated with very similar "Levalloiso-Mousterian", or alternatively "Levantine Mousterian", assemblages supported the hypothesis of evolutionary continuity between these hominins in this region. Archaeological studies of Levantine MP variability during this time identified changes in settlement patterns and lithic industries that were thought to reflect this evolutionary transition (Binford 1968; Brose and Wolpoff 1970; Jelinek 1982).

During the 1980s–1990s, new Thermoluminescence (TL), Electron Spin Resonance (ESR) and Uranium-series dates reversed the chronological relationship between Levantine Neandertals and early modern humans (Bar-Yosef 1989; for a complete listing of these dates, see Shea 2003a:337–343). The most recent Levantine MP humans are Neandertals dating to between 70,000 and 45,000 BP at Kebara and Amud. These Neandertals were preceded in the Levant between 80,000 and 130,000 years BP by early modern humans from Skhul and Qafzeh. Recent direct dating of the Tabun C1 Neandertal (112 or 143 thousand years BP, depending on the dating model used) points to a still earlier Neandertal presence (Grün and Stringer 2000). Rak *et al.* (2002) report that the Tabun C2 mandible, stratified below Tabun C1 and dating to more than 120,000 to 140,000 years (ESR) or 165,000 years BP (TL), lacks uniquely derived Neandertal morphologies, but other researchers consider its affinities ambiguous (Quam and Smith 1998). The new dates have effectively falsified the longstanding hypothesis of a simple Neandertal-modern human evolutionary transition in the Levant. Several researchers have accommodated these new dates to models of the Levant as a "Contact Zone" in which gene flow occurred between Eurasian Neandertals and African early modern humans (Simmons 1994; Hawks and Wolpoff 2001). Yet, there is thus far no stratigraphic evidence for the prolonged sympatry between Neandertals and modern humans that would be necessary for such gene flow to occur (Bar-Yosef 2000; Shea 2003a). The most parsimonious reading of the dating evidence (the one requiring the least number of assumptions about hypothetical cultural contacts and interbreeding), is that of ecological vicarism, alternating Neandertal and early modern human occupations correlated with patterns of regional climate change (Rak 1993). These developments reinforce the model of Neandertals and modern humans as separate species (Tattersall and Schwartz 1999; Klein 2003; Cooper *et al.* 2004), who, if they interacted at all, did so as competitors for the same ecological niche (Shea 2003b).

The implications of these new dates and reformed models of Neandertal-modern human evolutionary relationships have not yet been fully integrated into models of human cultural evolution during the MP of the Levant. This paper examines the trajectory of behavioral evolution in the Levant during MP times. I argue that the pattern of culture change in the Levant involves two phenomena, recursion and convergence. Recursion is when novel adaptive strategies do not persist in the archaeological record (and see Hovers and Belfer-Cohen this volume). Some of these recursive behaviors, such as blade production and exosomatic symbol use, foreshadow Upper Paleolithic adaptations. Others, such as the bulk production of stone spear points, do not. Convergence is when the adaptive strategies of different entities, in this case Neandertals and early modern humans, grow to resemble one another in response to similar evolutionary forces. Both of these phenomena, recursion and convergence, are distinctive features of the Levantine MP. I argue here that both arise from the same ultimate cause, repeated turnovers of human populations living in the Levant corridor in Late Pleistocene times.

(Author's Note: In the interest of bibliographic brevity, for primary documentation of chronology, paleontology, and lithic evidence, I refer the reader to recently published tabular summaries in Shea [2003a]).

THE LEVANTINE MIDDLE PALEOLITHIC SEQUENCE

The Middle Paleolithic period in the Levant lasted between approximately 250,000 and 45,000 BP, spanning marine Oxygen Isotope Stages (OIS) 7 through early OIS 3. The beginning of this period has been established by TL and ESR dates for Late Lower Paleolithic ("Acheulo-Yabrudian") and early Middle Paleolithic contexts at Tabun, Hayonim, Yabrud, and Qesem Caves, 'Ain Difla, and Rosh Ein Mor (for a recent review of the dating evidence, see Shea 2003a). The "Levantine Mousterian" is the principal MP industrial entity in the Levant. It contrasts with the preceding Acheulo-Yabrudian industry primarily in a broader geographic distribution in the southern Levant, increased use of recurrent Levallois core reduction techniques, and decreased frequencies (indeed absence) of handaxes and steeply retouched scrapers. Jelinek (1982) proposed that the Early MP developed out of the Acheulo-Yabrudian, but subsidence and sediment redeposition in the relevant sections of Tabun Cave call into question the geological underpinnings of this transition scenario (Bar-Yosef 1994:254; Tsatskin 2000).

Levantine MP faunal assemblages preserve evidence for effective hunting of many large woodland-dwelling species, most notably aurochs, red deer, fallow deer, and boar, as well as smaller species and taxa associated with steppe vegetation, including ibex, gazelle, and various equids (horse, onager). Remains of both territorial woodland species and migratory steppe species occur in MP faunal assemblages, suggesting a degree of tactical variability in MP food procurement strategies (see Shea 2003a:351–354). Limited faunal assemblages from Acheulo-Yabrudian contexts make it difficult to tell if this is a novel aspect of MP human adaptation. Comparison with Upper Paleolithic faunal assemblages suggests no major differences in large mammal exploitation (Kaufman 2002). Levantine MP humans did not exploit small game (birds, tortoises, small mammals) to nearly the same extent as Upper Paleolithic humans. This is thought to reflect relatively smaller MP group sizes (Stiner *et al.* 2000).

The principal MP lithic industry in the Levant is the Levantine Mousterian. Since the mid-1970s the internal cultural variability of the MP period in the Levant

Table 1. Archaeological Chronology for the Levant Late Lower Paleolithic, Middle Paleolithic, and Initial Upper Paleolithic

Period & Dates (Kyr)1	Marine OIS & Levantine Climate	Hominids & Lithic Industries	Representative archaeological contexts
Late Lower Paleolithic 250-350 Kyr	OIS 8-7 Cold, then warmer	*Homo* sp. indet. with Late Acheulean & Acheulo-Yabrudian	Hummal Well Ib Masloukh Bezez Level C Yabrud Shelter 1, Levels 11–25 Zuttiyeh Tabun Units X–XII
Early MP 250-128 Kyr	OIS 7-6 Warm, then colder	*Homo* sp. indet. with Tabun D-type/Phase 1 Levantine Mousterian	Douara Level IV Hummal Well Level 6b? Hayonim Level E Tabun Units II–IX (& lower Unit I?) 'Ain Difla (WHS 634) Rosh Ein Mor (D15)
Middle MP 128-71 Kyr	OIS 5. Initially warm and humid but growing colder, more arid	Neandertals and early modern humans with Tabun C-Type/Phase 2 Levantine Mousterian	Douara Level IIIB Naamé Nahr Ibrahim Tabun Unit I Skhul Level B Qafzeh Units XVII–XXIV
Late MP 71-< 47 Kyr	OIS 4-early 3. Cold and dry.	Neandertals with Tabun B-type/Phase 3 Levantine Mousterian	Umm el Tlel Unit III2a Jerf Ajla Level C Biqat Quneitra Amud Levels B1–B4 Kebara Units VI–XII Tor Faraj Level C Tor Sabiha Level C Far'ah II
Initial UP 47-32 Kyr	Mid-late OIS 3 Cold and dry	Unknown humans with IUP, modern humans with Ahmarian industry.	Üçagizli Locus II, Level H Umm el Tlel Unit III2a-b Ksar Akil Levels XXV–XVI Kebara Units III–VI Boker Tachtit Levels 1–4 Boker A Lagama Sites VII & VIII Abu Noshra Sites I & II

has usually been described in terms of Garrod's stratigraphy of Tabun Cave Levels B-D (Copeland 1975; Meignen 1988; Bar-Yosef 1995). Though it is highly improbable that such a coarse division of the Tabun sequence can serve as a model for the entire region, recent dates for MP contexts tend to support correlations between the major Tabun-based divisions of the Levantine Mousterian and a three-part division of the MP based on patterns of climate change (Shea 2003a:345–348) (See Table 1).

The Early Middle Paleolithic lasted from around 250,000 to 128,000 years BP (OIS 7-6). Marine sediments and pollen evidence from the East Mediterranean and Jordan Valley indicate a shift from warm humid conditions supporting extensive temperate *Quercus-Pistachia* woodlands in OIS 7 to cold dry conditions and increased *Artemisia* steppe-desert vegetation during OIS 6 (Horowitz 1987; Cheddadi and Rossignol-Strick 1995). The Early MP witnessed the extinction of several archaic Middle Pleistocene rodent species and an infusion of African fauna (Tchernov 1998). Early MP (Levantine Mousterian "Tabun D-Type" or "Phase 1") assemblages include Tabun Units II–IX (Garrod's layer D), Rosh Ein Mor, Hayonim Level E, and 'Ain Difla (WHS 634). These assemblages feature products of recurrent unidirectional-parallel and bidirectional-opposed Levallois core reduction. Many of these reduction by-products are elongated flakes and blades. "Upper Paleolithic" tool types such as endscrapers, burins, backed knives, and perforators are common. No human fossils of diagnosable morphology are associated with Early MP assemblages.

The Middle MP lasted between about 128,000 to 71,000 thousand years BP, roughly conterminously with OIS 5 or the Last Interglacial *sensu lato*. This period witnessed an abrupt increase in temperatures and humidity during the Last Interglacial (OIS 5e, 128,000–115,000 years BP) followed by a general cooling trend punctuated by wide alternations between cold dry and warm humid conditions. The overall impact of these changes was a reduction in woodland vegetation cover in favor of steppe-desert. "Tabun C-Type" or "Phase 2" Levantine Mousterian assemblages dating to this period include Tabun Unit I (Garrod's layer C), Skhul Level B, the beach deposits at Naamé, Nahr Ibrahim, and Qafzeh Units XVII–XXIV. The MP levels of Ras el-Kelb, Lebanon, are also assigned to this period on stratigraphic grounds. Centripetal methods dominate Levallois core reduction in Middle MP assemblages. Flakes are typically more common than either points or blades. Retouched tools include numerous sidescrapers on large oval flakes. Both Neandertals and early modern humans appear to have been in the Levant during this period, though Neandertal fossils are restricted to the uppermost surfaces of Tabun layer C. Some researchers, including the original excavator (Garrod 1937: 64) consider these Neandertal remains intrusive from Tabun layer B (Bar-Yosef and Callendar 1999). The Middle MP ends around 71,000 years BP with the rapid transition between nearly full-interglacial conditions during OIS 5a and the onset of Main Würm Stadial (OIS 4).

The Later MP spans the period 71,000–47,000 years BP. Following the rapid establishment of cold dry conditions during OIS 4, the climate of the Levant varied widely between cooler and warmer conditions. Steppe-desert conditions predominated throughout the Levant, but decreased evaporation resulted in the formation of large lakes in the Jordan Valley, on the Golan Heights, in Syria and in Jordan. Archaeological contexts dating to this period include Kebara Units VII–XII, Amud Level B, Tor Faraj Level C, Biqat Quneitra, and Umm El Tlel Unit IIIA. Levantine Mousterian "Tabun B-Type" or "Phase 3" lithic assemblages from these contexts typically feature high percentages unidirectional-convergent core-reduction strategies. Many assemblages reflect bulk production of both large and small isosceles Levallois points. Only Neandertal fossils have been found in association with Late MP assemblages.

Initial Upper Paleolithic (IUP) assemblages appear in the Levant *ca.* 47,000–40,0000 years BP. This period witnessed a short, but profound increase in aridity, registered by a drop in level of Lake Lisan (the Pleistocene precursor to the Dead Sea) to –350 m below sea level (Bartov *et al.* 2002; Haase-Schramm *et al.* 2004). Examples of IUP assemblages include Üçagizli Cave Levels F-H, Umm el Tlel Units III2a-b, Ksar Akil Levels XXV–XVI, Kebara Units III–VI, Boker Tachtit Levels 1–4, and Tor Sadaf Levels A-B (Marks 1983; Azoury 1986; Bar-Yosef 2000; Fox and Coinman 2004; Kuhn *et al.* 2004). There are numerous typological continuities between IUP and Late MP assemblages, most notably in the production of Emireh points (Levallois points and blades with basal retouch) and *chanfrein* endscrapers (flakes and blades retouched distally by an oblique or "tranchet" flake removal). The main technological difference between IUP and Late MP assemblages is decreased use of Levallois techniques and increased use of prismatic blade core technology. No human fossils are associated with IUP assemblages, however, *Homo sapiens* fossils are associated with Early Upper Paleolithic "Ahmarian" assemblages at Qafzeh Cave and Ksar Akil Level XVII (Ronen and Vandermeersch 1972:201; Bergman and Stringer 1989:106; Gilead 1991:191).

RECURSIVE BEHAVIORAL CHANGE IN THE LEVANT MP

What is the trajectory of human behavioral evolution during the MP in the Levant? The answer to this question depends on the particular behaviors that comprise one's definition of behavioral modernity (Henshilwood and Marean 2003) and the degree to which one accepts rare instances of a particular behavior as indicating a general pattern of adaptation. One of the advantages of improved chronology for the MP Levant is that it allows us to examine change and variability in evidence for particular components of "behavioral modernity." This paper examines two of the most commonly cited attributes of "behavioral modernity", blade production and exosomatic symbol use. It also examines stone spear point production, a behavior that is thought to link Later MP assemblages to the IUP. In each of these behaviors, there is neither a steady increase in frequency nor is there a steady state without apparent change. Rather, each follows a recursive trajectory, an increase followed by a decrease, without clear evidence of continuity in subsequent periods.

Blade Technology

The value attached to blade technology in modern human origins research almost certainly reflects the historical priority of Paleolithic research in Europe, where consistent evidence for blade production and modern human fossils appeared together in the early Upper Paleolithic. We now know that blade production occurred episodically in Europe, Africa, and the Levant from mid-Middle Pleistocene times onward (Bar-Yosef and Kuhn 1999). Unlike such earlier blade technologies, blades from Levantine Mousterian contexts are typically large, generally cortex-free, and feature carefully prepared striking platforms (Wiseman 1993; Monigal 2001). Systematic blade production of the kind seen in the MP Levant also has a significant energetic payoff in terms of both increased morphological consistency among debitage products and, theoretically, increased cutting edge recovery (Leroi-Gourhan 1993:134–137; Whittaker 1994:119–231). This sort of blade production speaks to a greater degree of planning depth and technical skill than any of the other core reduction strategies in use among Late Middle Pleistocene hominins. If there was a trend towards more complex tool making strategies through the course of the MP in the Levant, it ought to be reflected in increased blade production.

As monitored by laminar indices (Ilam, see Table 2) blade production peaks among Early MP assemblages, declines in the Middle MP, then rebounds among some Late MP assemblages (see also Hovers 1998:155; Monigal 2001:15). This pattern can be seen through the Tabun sequence, the one site with assemblages representing Early, Middle and Late MP. However, it should be noted, that Ilam values for Tabun are consistently higher (by two or more standard deviations) than the mean for assemblages of the same MP period. Furthermore, some Later MP assemblages, such as Kebara and Amud, exhibit essentially opposite trends in blade production. Blades increase through time at Amud and decrease through time at Kebara (Hovers 1998:155). Blade production increases across the Middle-to-Upper Paleolithic transition in the Levant, but the particular methods of blade production seen in IUP and early Upper Paleolithic "Ahmarian" assemblages differ from those predominating in Late MP contexts (Monigal 2001). Instead, they have their strongest affinities with blade production techniques seen in Early MP (*e.g.*, Rosh Ein Mor), more than 100,000 years earlier (Marks and Monigal 1995).

Exosomatic Symbols

The use of exosomatic symbols, colorants, personal adornment, mortuary structures, and the like are behavioral universals among recent humans. While there are some sporadic hints of a symbolic capacity among Neandertals (d'Errico 2003), the earliest clear and convincing evidence for exosomatic symbolic behavior appears in contexts associated with African early modern humans (McBrearty and Brooks 2000; Henshilwood *et al.* 2004;). After 40,000 to 50,000 years BP, evidence for such symbolic behavior tracks the global dispersal of *Homo sapiens* (Klein and Edgar 2002). If there was either a steady increase or a sudden revolution in modern humans' symbolic capacity, it should be reflected in the chronological distribution of exosomatic symbols through the MP Levant (Table 3).

The Early MP has, thus far, no claimed evidence for exosomatic symbolic behavior. In contrast, Middle MP contexts feature several different indications of exosomatic symbol use, including incised patterns on stone tools, transport

Table 2. Laminar Indices and Percentages of Points among Levallois products for Middle Paleolithic assemblages by period

Assemblage (Site & Level)	I Lam	%LP	Source
Early MP			
Tabun Unit IX	76	34	Jelinek (1982)
Rosh Ein Mor	20	33	Crew (1976)
Ksar Akil XXVIIIA	24	44	Marks and Volkman (1986)
Ksar Akil XXVIIIB	28	41	Marks and Volkman (1986)
WHS 634/'Ain Difla	42	17	Lindly and Clark (1987)
Bezez B Unit M150	20	17	Copeland (1983)
Bezez B Unit M151	30	28	Copeland (1983)
Bezez B Unit V200	33	24	Copeland (1983)
Bezez B Unit D44/G44	31	26	Copeland (1983)
Nahal Aqev/D35 Level 3	25	41	Munday (1976)
Middle MP			
Tabun Unit I, Beds 18–26	36	8	Jelinek (1982)
Ksar Akil Level XXVIA	24	0	Marks and Volkman (1986)
Ksar Akil Level XXVIB	20	7	Marks and Volkman (1986)
Ksar Akil Level XXVIIA	25	0	Marks and Volkman (1986)
Ksar Akil Level XXVIIB	26	19	Marks and Volkman (1986)
Qafzeh Unit XIX	8	1	Hovers (1997)
Qafzeh Unit XVII	11	2	Hovers (1997)
Qafzeh Unit XV	17	15	Hovers (1997)
Ras el-Kelb Rail Level D	21	3	Copeland (1998)
Ras el-Kelb Rail Level C	10	3	Copeland (1998)
Ras el-Kelb Rail Level B	18	2	Copeland (1998)
Ras el-Kelb Tunnel Level O)	9	5	Copeland (1998)
Ras el-Kelb Tunnel Level N	13	0	Copeland (1998)
Ras el-Kelb Tunnel Level M	7	3	Copeland (1998)
Ras el-Kelb Tunnel Level L	11	1	Copeland (1998)
Ras el-Kelb Tunnel Level K	5	1	Copeland (1998)
Ras el-Kelb Tunnel Level J	6	0	Copeland (1998)
Naamé Upper Level	3	4	Fleisch (1970) and Copeland (1998)
Naamé Lower Level	4	6	Fleisch (1970) and Copeland (1998)
Late MP			
Tabun Unit I, Beds 1–17	64	28	Jelinek (1982)
Kebara Unit VII	12	7	Meignen and Bar-Yosef (1989)
Kebara Unit VIII	11	5	Meignen and Bar-Yosef (1989)
Kebara Unit IX	10	14	Meignen and Bar-Yosef (1989)
Kebara Unit X	13	18	Meignen and Bar-Yosef (1989)
Kebara Unit XI	20	8	Meignen and Bar-Yosef (1989)
Kebara Unit XII	23	11	Meignen and Bar-Yosef (1989)
Keoue Unit I	26	26	Nishiaki and Copeland (1992)
Keoue Unit II	21	31	Nishiaki and Copeland (1992)
Keoue Unit III	27	32	Nishiaki and Copeland (1992)
Tor Sabiha Level C	37	37	Henry (1995)
Tor Faraj Level C	17	62	Henry (1995)
Amud Level B1	32*	8	Hovers (1998)
Amud Level B2	22	34	Hovers (1998)
Amud Level B4	10	38	Hovers (1998)

*I Lam values for Amud B1 estimated from Hovers 1998, Figure 7.

Table 3. Levantine Middle Paleolithic Symbolic behavior by periods

Context	Description	Interpretation	Source
Middle MP			
Qafzeh XVII	Core fragment with repetitive linear markings.	Unknown	Hovers (1997)
Ras el-Kelb Tunnel Trench Level F	Flint flake with linear incisions on the dorsal surface.	Unknown	Moloney (1998)
Qafzeh XVII	Incised blocky fragment of red ochre, numerous ochre pellets, ochre-stained stone tools.	Color symbolism	Vandermeersch (1966), Hovers *et al.* (2003)
Qafzeh XXI–XXIV	Shells of the marine mollusc, *Glycymeris*.	Personal adornment? Pigment use, long-distance (>30) transport of non-utilitarian objects.	(Taborin 2003)
Qafzeh XVII	Antlers and frontal bone of a fallow deer clasped to the upper chest of Qafzeh 11.	Mortuary ritual	Vandermeersch (1970)
Qafzeh IX	Double burial of a child (Qafzeh 10) and a young adult female (Qafzeh 9).	Mortuary ritual	Vandermeersch (1981)
Skhul B	Boar mandible under left forearm of Skhul 5.	Mortuary ritual	McCown (1937:100)
Skhul B	Mollusc shells	Transport of non-utilitarian objects?	(Bate 1937: 224–225)
Nahr Ibrahim	Fallow deer skeleton with red ochre	Unknown/Mortuary ritual?	(Solecki 1975: 290)
Tabun B/C	Adult female Neandertal (C1) accompanied by an unrecovered neonate.	Mortuary ritual	Garrod (1937)
Late MP			
Biqat Quneitra	Tabular flint block with concentric elliptical incised marks.	Unknown	Marshack (1996)
Amud B	Red deer maxilla on the pelvis of Amud 7.	Mortuary ritual	Hovers *et al.* (1995)
Dederiyeh 11	Infant skeleton accompanied by limestone slab, flint flake.	Mortuary ritual?	Akazawa, *et al.* (1995)
Kebara XII	Cranium of Kebara 2 removed after burial.	Mortuary ritual?	Bar-Yosef and Vandermeersch (1991)

of nonutilitarian objects (possibly for personal adornment), collection and use of mineral pigments, and mortuary ritual (Shea 2003a:359). Artifacts with repetitive linear markings have been reported from Qafzeh Unit XVII and Ras el-Kelb Tunnel Trench Level F (Hovers *et al.* 1997; Moloney 1998). Shells of the marine molluscs found more than 30 km inland at Qafzeh is evidence for the long-distance transport of nonutilitarian objects (Taborin 2003). Numerous fragments of red ochre from Qafzeh gathered from diverse geological sources also point to color symbolism (Hovers *et al.* 2003). This conclusion is reinforced by identifications of ochre and manganese oxide traces on two of the Qafzeh shells (Walter 2003). Skhul Level B also preserves shells of several mollusc species (Bate 1937:224–225) that are considered unlikely to have been transported for food (Daniella Bar-Yosef Meyer, personal communication 7/12/04).

Perhaps the clearest evidence for Middle MP symbolic behavior, however, are human burials, largely complete skeletons preserved in anatomical articulation (Skhul 1, 4, 5, and 9, Qafzeh 8–11, 13, and 15 and Tabun C1)(Garrod 1937; McCown 1937; Vandermeersch 1981). Two of these (Qafzeh 9 & 10) appear to have been a double burial. Two others were buried with foreign objects clasped to their chests, a red deer antler with Qafzeh 11 and a boar mandible with Skhul 5. There is even a report of a fallow deer skeleton accompanied by red ochre from Nahr Ibrahim Cave (Solecki 1970).

Evidence for symbolic behavior decreases in the Late MP, even though the number of recently excavated Late MP contexts vastly outnumbers those of Middle MP ones. A single flint fragment with concentric markings is reported from the Biqat Quneitra open-air site (Goren-Inbar 1990:238; Marshack 1996). Three Late MP burials, in themselves indications for symbolic behavior, possibly show evidence of mortuary ritual, but each is problematical. The cranium of Kebara 2 was removed several months after its death, but it is unclear if this activity was symbolic, as what was done with it next remains unknown. A complete red deer maxilla on the pelvis of Amud 7 is the only claimed instance of Late MP mortuary furniture (Rak *et al.* 1994). Though red deer complete anatomical elements are not common, fragmentary red deer remains do occur in the same level as Amud 7 (Rabinovich and Hovers 2004:292), and thus the possibility of a fortuitous non-symbolic juxtapositioning cannot be ruled out (see detailed discussion in Gargett 1999, 2000; Hovers *et al.* 2000). Similarly, the Dederiyeh 1 child's skeleton is associated with a limestone slab (near its head) and a triangular flake (on its abdomen), but both limestone slabs and triangular flakes are common components of the archaeological "background" at this site (Akazawa *et al.* 1995). In this respect, the burials of the Later MP have rather more in common with the ambiguous mortuary structures seen with European Neandertals (Gargett 1989) than they do with their immediate precursors in the Levant. Burials with grave goods, perforated shells, and red ochre do not again become common components of the Levantine archaeological record until Upper Paleolithic and Epipaleolithic times (D. Bar-Yosef 1989; Belfer-Cohen and Hovers 1992; Bar-Yosef 1997; Kuhn *et al.* 2001), long after the extinction of Levantine Neandertal populations (Hovers *et al.* 2003).

Spear Point Production

Systematic use of hafted weapon armatures is among the emergent features of modern behavior seen in the African Middle Stone Age (McBrearty and Brooks 2000:496–497; Brooks *et al.* this volume). Hafting in general, and hafted points in particular, are rare in European MP contexts (Mellars 1996:116–117). A link between Levallois point/triangular flake production and the use of hafted stone spear points in the MP Levant is supported by microwear analysis, an ecogeographically-patterned distribution, and morphometric comparisons with experimental tools, and a point fragment embedded in an equid vertebra all point to (Shea 1988, 1998; Boëda *et al.* 1999; Shea *et al.* 2001). Although Meignen (1995) cites the systematic production of subtriangular flakes by unidirectional convergent methods as a main characteristic of the Levantine Mousterian, this method of point production is not distributed evenly through time. Bulk production of triangular flakes is vastly more common among Early and Late MP assemblages than in Middle MP assemblages (see Table 2).

Levantine Initial and Early Upper Paleolithic contexts feature many pointed stone artifacts that are thought to have been hafted weapon armatures (Bergman 1981; Bergman and Newcomer 1983), and it could be argued that these represent a development out of Late MP technological strategies. Emireh points, for example, are made on Levallois points in Later MP contexts and on blades in Initial Upper Paleolithic contexts. However, even a cursory examination of such Initial and Early Upper Paleolithic points reveals telling morphometric and functional differences. Upper Paleolithic stone points are significantly narrower and thinner in cross-sectional area than their MP precursors (Shea 2003a:370). They are also more extensively retouched and retouched in different ways (*i.e.*, backed) than MP points. These differences suggest that Upper Paleolithic stone points were true projectile points while most MP points were designed for use with close-quarters weapons (*i.e.*, thrusting spears or hand-cast spears). There is no necessary reason to see this projectile technology as an indigenous development out of the Late MP. It may just as well reflect the immigration of human populations from a region in which projectile technology has a much greater antiquity, such as Africa.

In terms of each of the behaviors examined, the pattern of cultural change in the Levantine MP is “recursive.” Blade production, exosomatic symbol use, and spear point production appear, flourish, then either disappear or decline markedly in frequency during subsequent periods. These and other elements of behavioral modernity really only begin to appear consistently in the Levant only after the onset of the Initial Upper Paleolithic, *ca.* 40,000–47,000 years BP.

These “recursions” might reflect changes in the costs and benefits attending particular behavioral strategies of a stable Levantine human population. However, the new chronology for human fossils in the Levant suggests an alternative explanation–changes in the hominin populations occupying the region. Neandertals and early modern humans originated on different continents, in different habitats. It seems reasonable to expect that there would have been differences in the ways that each of them adapted to the Levant.

"EVERYBODY LOSES": A DISCONTINUITY HYPOTHESIS

In order to understand the course of MP culture change in this region, we need to understand the ecogeographic forces shaping its biological community. Throughout the Pleistocene, the Levant was a biogeographic corridor linking Eurasia and Africa. The North-South alignment of the Levant's principal topographic features, the Jordan Rift Valley and the Anti-Lebanon Mountains, facilitated dispersals of mammal species from Western Asia and North Africa into the Levant (Tchernov 1992). Neandertals and early *Homo sapiens* appear in the fossil records of western Eurasia and northeastern Africa, respectively, in late Middle Pleistocene times, *ca.* 250,000–130,000 years BP (Klein 1999). As global climate changes periodically expanded fertile oak-terebinth woodlands out of their refugia along the East Mediterranean coast and upslope into the formerly steppe-desert interior (Cheddadi and Rossignol-Strick 1995), Eurasian Neandertal and African human populations would have been drawn into the Levant.

Although the Levant's corridor-like structure encouraged dispersal, it may also have been a particularly inimical place for long-term stability in human populations. The Levant is a small region circumscribed to the north by mountains, to the west by the Mediterranean Sea, and to the south and east by the Arabian Desert. Geographic circumscription increases the risks of extinction to small populations of large mammals with slow reproductive rates (Gilpin and Soulé 1986), characteristics that almost certainly describe all hominin populations. These risks would have increased during periods of rapid climate change, increasing aridity, and declining temperatures during Marine OIS 5-3 (Lister 1997; Finlayson 2004). There were many rapid climate shifts in the Levant during Late Pleistocene times. It is interesting, perhaps telling, that several of these, the OIS 6-5e deglaciation (*ca.* 128,000 years BP), the rapid onset of glacial conditions in OIS 5a-4 (*ca.* 71,000 years BP) and an episode of hyper-aridity at *ca.* 40,000–47,000 years BP, all mark major changes in the character of MP archaeological assemblages.

The stability of a large mammal population in a particular region is in large part a function of population size. A rough estimate of Levantine MP population size can be constructed using data on recent human hunter-gatherer population densities (Kelly 1995:224–225) and the known distribution of MP sites. Hunter-gatherers living in temperate woodland habitats comparable to those associated with most Levantine MP sites do so at population densities ranging between 1–38 people per 100 km^2, with a median value of 7. Projecting this median population density value onto a 120,000 km^2 polygon enclosing all known MP sites in Lebanon, Syria, Jordan and Israel yields a population estimate of 8400 people. This number almost certainly over estimates actual MP population. Only the Early MP appears to have coincided with widespread temperate woodland. For much of the Middle and Late MP (from OIS 5d-3, 115,000–45,000 years BP) the region was dominated by steppe and desert vegetation (Cheddadi and Rossignol-Strick 1995). The range of population densities for hunter-gatherers living in temperate deserts ranges less widely, 1–19 people per 100 km^2, with a median value of 4.75. Projecting this figure onto the MP Levant polygon yields a population of only 5700 people; yet, even this may be an overestimate.

Faunal assemblages from contexts associated with Neandertals and early modern humans consistently point to these populations as having been less effective at collecting smaller game than recent human hunter-gatherers (Stiner *et al.* 1999; Klein *et al.* 2004). Such limited foraging efficiency would have further reduced population densities. If we use the lowest population density figures for recent human hunter-gatherers living in temperate woodlands and temperate deserts (1.0 in both cases), the projected Levantine MP human population at any one point in time would be only 1200 people. By any standard, these figures suggest that Levantine MP humans' risks of encountering minimum viable population thresholds were much greater than those of MP humans living in less-circumscribed regions to the north and south of the Levant.

Although we archaeologists often infer continuity between MP contexts widely separated in time and space, we must also be aware that there are circumstances that make discontinuity more likely than continuity. In such a small region as the Levant, geographic circumscription combined with rapid climate change and increased aridity through much of the early Upper Pleistocene, probably kept MP humans close to the verge of extinction. When these populations became extinct, the success of subsequent attempts to recolonize the Levant would have depended in large part on the nature of the environment at the time. Colder conditions would have favored cold-tolerant Neandertals; warmer conditions would have favored Africans (Figure 1). There undoubtedly were times when both Neandertals and modern humans were both present in the Levant, but these periods were probably brief and marked by intense competition for the same ecological niche (Shea 2003b). This is an admittedly grim scenario, a "nobody wins" model

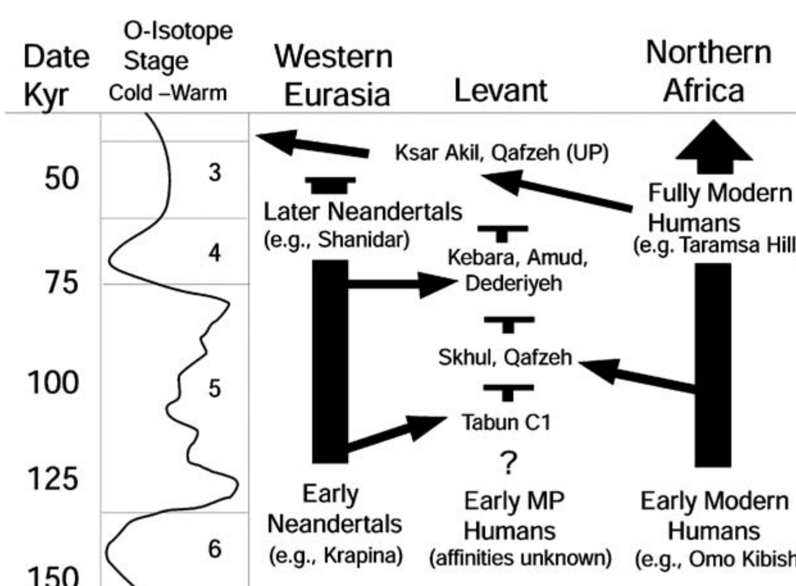

Figure 1. Middle Paleolithic population movement and relationships in the Levant and adjacent regions.

for the Levantine MP cultural sequence, but it is more realistic, better-grounded in general ecological principles, and more consistent with the facts than alternative models of Levantine MP cultural evolution.

ARCHAEOLOGICAL EVIDENCE FOR CONVERGENT BEHAVIORAL EVOLUTION

The hypothesis of discontinuity between Neandertals and early modern humans in the Levant is also consistent with ever-growing body of evidence indicating they were separate species (Tattersall and Schwartz 1999; Klein 2003; Cooper *et al.* 2004). Comparisons between Neandertal DNA and DNA of both European Upper Paleolithic and recent humans show no evidence of interbreeding or any particularly close relationship between Neandertals and living western Eurasian human populations (Caramelli *et al.* 2003). These same DNA comparisons suggest that Neandertals' and early modern humans' last common ancestor lived 300,000–500,000 years ago, long before either of its descendants appeared in the Levant. The body shapes of Levantine Neandertals and the Skhul/Qafzeh humans suggest origins in differing temperature regimes (Holliday 2000). Craniofacial differences between Neandertals and modern humans are comparable in scale to those between different living primate species (Harvati *et al.* 2004). It is not as easy to distinguish Southwest Asian Neandertals and the Skhul/Qafzeh humans from each other as it is to distinguish between European Neandertals and Upper Paleolithic humans (Hawks and Wolpoff 2001), but this may reflect the greater closeness of the Skhul/Qafzeh humans to their and the Neandertals' last common ancestor (Pearson 2000), as well as the relatively small number of well-preserved Levantine human fossils.

The principal argument against seeing extinction and turnover in hominin populations as the principal mechanism underlying Levantine MP cultural evolution is that similarities in the lithic assemblages associated with Neandertals and early modern humans suggest cultural continuity, and by implication evolutionary continuity, among the Neandertals and early modern humans associated with them (Jelinek 1982:99; Wolpoff 1989:136; Clark 1992:194; Hawks and Wolpoff 2001:42; Kaufman 2001).

Middle MP assemblages associated with the Skhul/Qafzeh humans and the Late MP assemblages associated with Levantine Neandertals are similar to one another, both technologically and typologically. They have a similar range of core reduction techniques, similar inventories of artifact types, and overlapping values for major technological and typological indices (Shea 2003a:333–335). These similarities have led some researchers to combine them into a single highly variable "Later Levantine Mousterian" industry (Ronen 1979:303; Jelinek 1982; Clark and Lindly 1989:973; Marks 1992:133; Hovers 1998:156). Other researchers point to differences in relative frequencies of tools and core reduction techniques (*chaînes opératoires*) to support making a distinction between them (Meignen 1998:686; Kaufman 1999:32–33; Bar-Yosef 2000:116). Regardless of what position one takes on this taxonomic issue, the central question is whether similarities among these assemblages are sufficient to infer cultural continuity among the hominins stratigraphically associated with them. I argue that this is not the case, and that an alternative mechanism, behavioral convergence, is a better explanation for these similarities.

Most retouched tools from Middle and Late MP assemblages are simple flakes or blades with minimal modification. In the author's experience, a competent modern human flintknapper equipped with the proper raw materials can replicate any of these artifacts in a minute or less. Such simplicity carries with it a high likelihood of convergence, of different hominin populations producing similar tools in response to similar technological challenges. Not surprisingly, artifacts morphologically identical to those found in the Middle and Late MP of the Levant can be found in countless Eurasian MP and African Middle Stone Age (MSA) assemblages. This broad distribution suggests that these tools were products of cognitive and manual skills that were evolutionarily primitive among Middle Pleistocene *Homo* (Wynn 1989). Neandertals and early modern humans had similar metabolic needs (Sorenson and Leonard 2001) and they seem to have met them with similar energetic costs, at least as registered by skeletal indices (Lieberman 1998). It is not surprising that they responded with similar technological strategies when faced with similar terrain, raw material availability, and prey species. Thus viewed, Neandertals' and early modern humans' similar lithic archaeological associations in the Levant can be recognized as by-products of convergent behavioral evolution. To see them as evidence for contact and cultural exchange requires one to assume contemporaneity between these hominins that is not supported by the chronological and stratigraphic evidence.

Further evidence against accepting similarities among Middle and Late MP assemblages as evidence for Neandertal-modern human cultural continuity can be found in detailed studies of variability in core reduction techniques. There are many equally-effective ways to produce the various flakes, blades, and points that served as blanks for Levantine MP tools (Shea 2001:44). It would be a strong argument against the "discontinuity" model proposed here if separate Neandertal and early modern human populations chose precisely the same sets of core reduction techniques. Given the limited number of ways that there are to align flake scars across the surface of a Levallois core, there are, predictably, overlaps in the ranges of core preparation techniques seen in all Middle and Late MP assemblages. However, there are important differences in modalities between Middle and Late MP assemblages (Meignen 1998). By-products of radial/centripetal Levallois core reduction dominate Middle MP assemblages associated with early modern humans in Qafzeh Units XVII–XXIV (Boutié 1989:219). Late MP assemblages associated with Neandertals at Kebara and Amud are dominated by convergent and bipolar Levallois techniques (Meignen and Bar-Yosef 1992; Hovers 1998:148). (Comparisons involving the Skhul Level B and Tabun Level C assemblages are complicated by much of these assemblages having been discarded in the field, by the remainder having been dispersed to over a dozen different institutions, and by the possibly intrusive status of the Tabun C1 burial.) If the choice among functionally equivalent core-reduction techniques arises from patterns of learned, socially transmitted "traditions" (Meignen and Bar-Yosef 1988:88; Hovers 1997), then these technological differences suggest Levantine Neandertals and early modern humans maintained different lithic technological traditions. Such differences support the discontinuity hypothesis.

Many of the same criticisms leveled here against the assumption of continuity in the MP can also be applied to the Middle-to-Upper Paleolithic transition. It is frequently assumed that IUP populations were modern humans, but no hominin fossils are thus far associated with IUP assemblages. Indeed, the immediate precursors of the IUP in much of the region appear to have been Neandertals. The situation as it stands raises several interesting questions. If the ancestors of the Levant's Upper Paleolithic modern human populations were present in the Levant during Late MP times, why are they archaeologically invisible? Could it be that Late MP Neandertal populations experienced their own Middle-to-Upper Paleolithic transition in the Levant in much the same way as their European counterparts appear to have done in Europe (d'Errico 2003)? Might there be more than one hominin species undergoing such a transition to Upper Paleolithic adaptations in the Levant at the same time? Do the Levant's Upper Paleolithic human populations reflect a later dispersal following an extinction of Late MP Neandertals, in a manner similar to that proposed for Iberia (Finlayson 2004)? Alternatively, does the IUP represent modern humans having finally developed effective strategies for outcompeting Neandertals for the "human niche" in the Levant (Shea 2003b)? These questions can only be answered by further archaeological fieldwork and improvements in geochronology.

CONCLUSION

Most of our explanations for the long sweep of Paleolithic prehistory are optimistic ones. We interpret incremental changes in successive industries as evidence for cultural and biological continuity. Most, if not all, trajectories of culture change lead to modern humans and our global ecological dominion. Non-ancestral hominins are portrayed as static "bench-warmers" in the grand narrative of human evolution (Landau 1991). The contrast with models of biological evolution could hardly be starker. There, continuity is the exception, not the rule. Most species we know from the fossil record are extinct. Only a fraction of species extant today will likely have descendants 100,000 years from now. There is no question that we have ancestors who lived in Middle Paleolithic times, but estimating whether these ancestors were among those humans who lived in a particular part of the world requires us to make a clear-eyed assessment of the likelihood of their long-term success. Humans have no exemption from extinction, and some parts of the Pleistocene world were more likely than others to create evolutionary "dead ends." The Levant is one such region.

The East Mediterranean Levant is a tough neighborhood. It must have been tougher still during the MP, when rival human species competed there for the same human niche. During humid periods like the Early MP, the Levant was a corridor linking Africa and Eurasia. During periods of aridity and desert growth, such as the Middle and Late MP, it was a barrier. African populations who dispersed into the Levant during humid periods probably became trapped there during arid periods, and dwindled to extinction. Neandertals who moved into the region during cooler periods, probably met a similar fate, isolation followed by extinction. The human fossil and archaeological record of the Levant provides no support for a gradual indigenous transition to modern human adaptations. Rather, what we see is a recursive pattern, one that reflects cyclical human dispersals into the Levant driven by the wide swings of the Pleistocene climatic pendulum. Neandertals appear to have displaced early modern humans at least once in the Levant, after 71,000 years ago. It was not until after 40,000 years ago, more than 200,000 years after the beginning of the MP, that *Homo sapiens* populations broke this evolutionary stalemate, dispersing north into western Eurasia. Their success in this dispersal may owe much to the rigors they faced in successfully transiting the Levant biogeographic corridor.

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