



# An analysis of the compositional integrity of the Levantine Mousterian facies



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## ABSTRACT

For almost a century, the Levantine Mousterian facies B, C and D first defined by Dorothy Garrod at Mugharet et-Tabūn have figured prominently in discussions of spatial and temporal variability in the Middle Paleolithic of the Levant. Although much modified by subsequent workers, and frequently described qualitatively, the compositional integrity of these basic analytical units has never been assessed quantitatively. Here we describe the statistical parameters of the facies using a large data set comprising 54 collections from 20 sites assigned by the excavators to one or another of the facies. A statistical summary revealed many cross-cutting patterns that departed from qualitative descriptions of the facies, calling their compositional integrity into question. A multivariate discriminant analysis helped resolve some of these problems. It confirmed a strong statistical affinity between the B and C facies, which were in turn sharply differentiated from D. Our results are then compared with the stratified Mousterian sequence at Hummal, a site in the Syrian Desert. Relatively good correspondence was attained. Implications of the analysis are discussed in terms of the adequacy of the systematics used to identify facies differences and what they might mean behaviorally.

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## 1. Human origins in the Levant

The significance of the Levant in human origins research cannot be overstated. Situated at a biogeographical crossroads, the region has been a nexus for migrations into and out of Africa, Europe, and Asia since the early Miocene (c. 20 Ma). The area is relatively rich in Upper Pleistocene human remains, and the recovery of Neanderthal fossils at Tabūn, Kebara and Amud that post-date anatomically modern fossils from Qafzeh and Skhūl has fueled debates over these hominins' evolutionary relationship for more than 75 years (Bar-Yosef, 1994, 1996). There is now consensus that anatomically modern humans (AMH) evolved in Africa approximately 150,000–200,000 years ago and dispersed throughout the middle latitudes of Eurasia by 35 ka. These humans outcompeted, displaced, exterminated and/or genetically 'swamped' extant populations, likely through minor reproductive advantages and limited hybridization (see Barton et al. (2011) for a plausible scenario). Whether the advent of modern human anatomy constitutes a speciation event (Mellars, 1989, 2004, 2005, 2006a–c; Stringer, 1998, 2007; Davies, 2001; Cann, 2001) or the emergence of a new 'geographical race' or subspecies (Wolpoff et al., 2000, 2001, 2004; Relethford, 2001,

2008; Templeton, 2002, 2005; Eswaran et al., 2005; Hawks and Cochran, 2006; Hawks et al., 2008; Trinkaus, 2011) is still unresolved. The molecular evidence, however, indicates that some interbreeding did occur between AMH and Neandertals (Green et al., 2010; Abi-Rached et al., 2011) and also between AMH, 'Denisovans', and possibly other groups (Reich et al., 2010; Bower, 2011; Gibbons, 2011; Marshall, 2011). Genetic admixture suggests that "archaic" and modern humans are members of a single but highly variable species, and the archaeological record suggests similar if more controversial interpretations (e.g., Clark, 2002; Straus, 2003; Zilhão, 2006, 2011). Researchers across disciplines, then, continue to debate how morphological, molecular, and behavioral variability should be parsed and what patterning might mean in the broader context of human evolution. We focus discussion here on the Levantine archaeological record. More specifically, we direct attention to the systematics that are used to describe how variation in Mousterian stone tools is spatially and temporally distributed (Fig. 1) and on the potential role these systematics have in our understanding of human behavior and evolution.

## 2. The Levantine Mousterian

The evolution of and relationships between different tool production methods, technological skills, implement styles, and tool kits are potentially discernible in the archaeological record and

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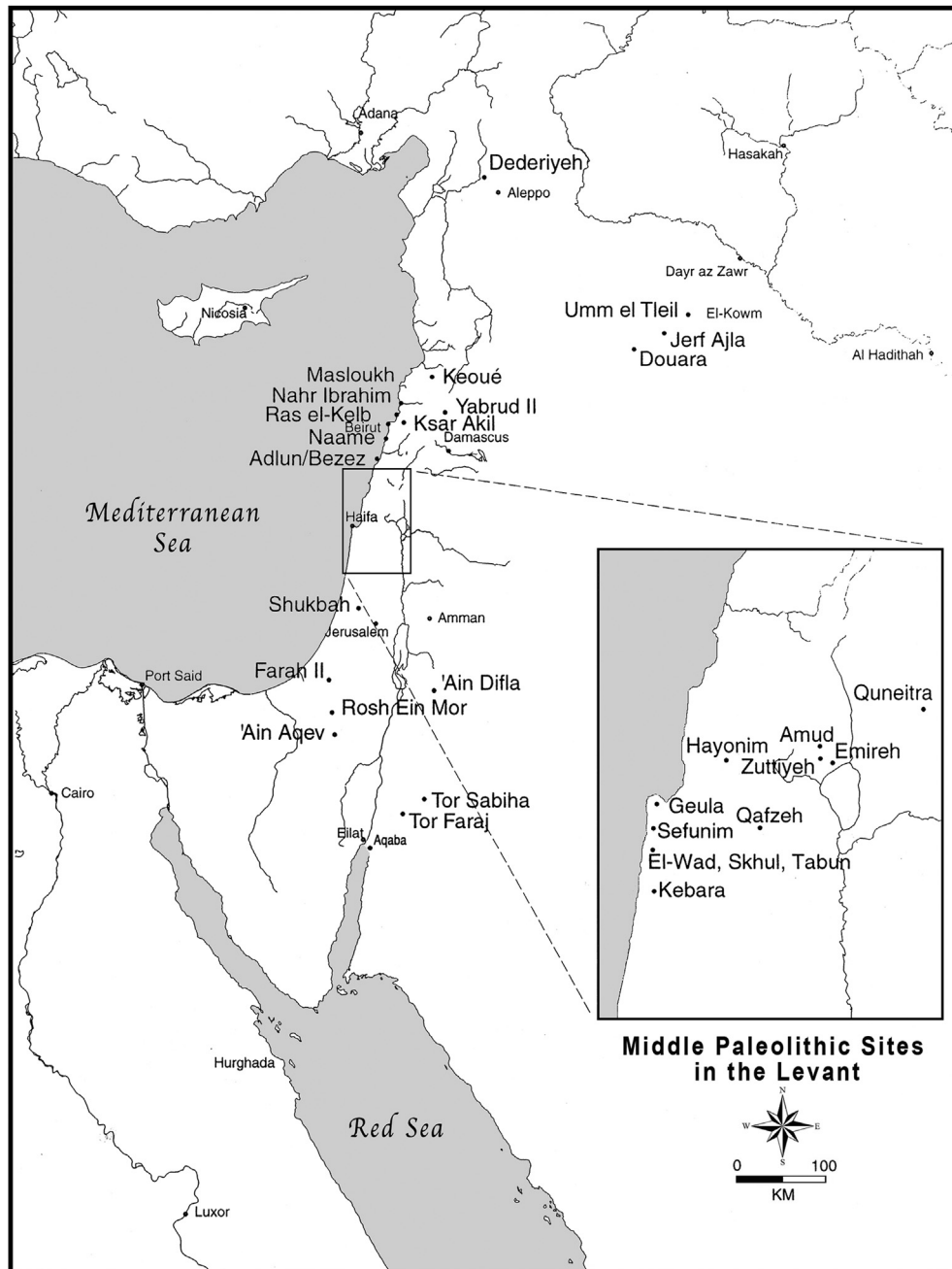


Fig. 1. Middle Paleolithic sites in the Levant. (From Belfer-Cohen and Goring-Morris, 2003: 3).

may, in turn, clarify the evolutionary relationships among the hominins who used them. Although change may be irregular, recursive, and ephemeral, with little or no region-wide currency, it could also exhibit the temporal and spatial continuity indicative of related groups, or the discontinuity expected among distinct species with differing technology. Yet, the range and distribution of technological and typological variation in the Levantine Mousterian are not well enough defined to track the evolutionary trajectory of tool kits, and any relationships between specific tool industries and hominid morphotypes during the Middle Paleolithic are uncertain.

Comparisons between Mousterian and later technology that should elucidate evolutionary relationships and population dynamics during the Middle to Upper Paleolithic Transition ultimately draw on the same systematics. In this context, many researchers (e.g., Mellars, 1989, 2003, 2004, 2006a; Bar-Yosef, 2002;

Tostevin, 2003) argue changes in advanced production methods, tool standardization, formal tool types, weapon types, 'non-utilitarian' artifacts (e.g., beads, portable art), and other phenomena beginning approximately 40 ka, constitute a dramatic shift in pattern due to AMH range expansion. Other researchers see a mosaic and more gradual – although not necessarily regular – change in the archaeological record consistent with a mainly autochthonous development of Middle Paleolithic technology (e.g., Kramer et al., 2001; Clark, 2002, 2009; Marks, 2003; Clark and Riel-Salvatore, 2006). As with evolutionary analyses of the Mousterian itself, comparisons with Upper Paleolithic technology are inconclusive, and a fundamental problem with both approaches lies in a 'disconnect' between the attributes used to describe the archaeological record and the human behaviors that produced it (Kuhn, 1995; Hiscock, 2004, 2007; Holdaway and Douglass, 2011; Shea,

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