Shifting understandings of the Acheulo-Yabrudian complex and the Lower to Middle Paleolithic transition at Tabun Cave.

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Abstract

More than 80 years after it was first excavated, Tabun Cave remains a key reference sequence for the Lower and Middle Paleolithic of the Levant. A large part of the sequence at Tabun consists of assemblages termed Yabrudian, Pre-Aurignacian/ Amudian and Acheulo-Yabrudian/Acheulian that comprise Jelinek's Mugharan Tradition. Investigators have assigned these assemblages to either the Lower or the Middle Paleolithic. Alternative classifications reflect changes in prevailing theoretical frameworks for explaining technological and typological variation as well as in the ways larger periods themselves are conceived. Choices to place them within either the Lower or Middle Paleolithic in turn have important consequences for how cultural and biological transitions in the Levant are understood.

Introduction

The transition from the Lower to Middle Paleolithic has been examined much less closely than the Middle-to-Upper Paleolithic transition. The lack of attention reflects the fact that it many parts of Eurasia and Africa it is seen as a gradual, in situ transformation (Monnier 2006; Villa 2009) accompanied by an equally gradual (or insignificant) biological transition. It sometimes seems that the only interesting cultural transformations in the Paleolithic are those which accompanied the appearance and dispersal of *Homo sapiens.* Earlier forms of behavior are perceived as being less evolved, and transitions between them are treated as unremarkable if not inevitable progress from primitive to less primitive forms (Kuhn and Hovers 2013), incremental steps on the slope culminating in behavioral modernity and *Homo sapiens.*

Despite these biases it is becoming clear that many important developments in hominin behavior pre-date the MP-UP transition. In Africa many aspects of "modern human behavior" (itself a problematic term) are now associated with the MSA, and their roots must be sought in earlier periods (e.g. McBrearty and Tryon 2006; Nowell 2010; Porat *et al.* 2010). Researchers also recognize that the Eurasian Middle Paleolithic encompasses a highly evolved set of behaviors, clearly different in some ways from both the MSA and the Upper Paleolithic, and therefore meriting explanation in its own right (Kuhn 2013).

In this paper we discuss changing interpretations of the Acheulo-Yabrudian complex at Tabun Cave, Israel. The assemblages making up the Acheulo-Yabrudian complex are situated stratigraphically and chronologically between the Acheulian Lower Paleolithic and the Levallois Mousterian Middle Paleolithic, and typically include markers of both Acheulian and Mousterian. Interpretations of the Acheulo-Yabrudian complex and of its place in the transition from Lower to Middle Paleolithic, are strongly influenced by archaeological methodologies as well as theoretical frameworks for understanding variation among Paleolithic assemblages. These interpretations are also closely linked to the ways different scholars view the Middle and Lower Paleolithic as entities. This very basic difference can lead to radically different understandings of trajectories of cultural evolution in the Levant.

As we use the term, Acheulo-Yabrudian is synonymous with Jelinek's (1981) Mugharan tradition. It is comprised of three main assemblage types: Yabrudian, Amudian, and Acheulean or Acheulo-Yabrudian. A remarkable number of names have been given to this entity as a whole or its component parts: Acheulio-Mousterian, final Acheulian, Yabrudian, Acheulian, Micoquian, Acheulo-Yabrudian, Prä-Antelien, Pre-Aurignacian, Amudian, Upper Paleolithic 0, and Acheulian of Yabrudian facies (Bar-Yosef 1995; Garrod 1934, 1935, 1936, 1937, 1938; Garrod and Bate 1937; Gilead 1970; Howell 1959; Ronen 1975; Rust 1933, 1950). This alone shows that various scholars understand their significance in quite different ways.

We know comparatively little of the hominins who produced the Acheulo-Yabrudian lithic assemblages. Human remains are scarce and as difficult to classify as the industries. The skull from Zuttiyeh, the most complete fossil associated with an Acheulo-Yabrudian assemblage, has been variously classified as Neanderthal, archaic *Homo sapiens*, or

Homo hieldelbergensis (Trinkaus 1982; Vandermeersch 1982; Zeitoun 2001). Isolated teeth from Qesem Cave show both archaic characteristics and features reminiscent of *Homo sapiens* (Hershkovitz *et al.* 2010).

Tabun Cave and the Acheulo-Yabrudian Complex

For nearly 80 years the archaeological sequence of Tabun Cave has played a central role in understandings of the Levantine Paleolithic. Tabun contains > 25 m of archaeological deposits spanning a period of roughly 500,000 years (Mercier and Valladas 2003; Rink *et al.* 2004) and encompassing both Lower and Middle Paleolithic. Roughly one third (7.10 m) of the stratigraphic sequence of the cave yields Yabrudian, Amudian, and Acheulo-Yabrudian assemblages, providing one of the longest and most varied record of these phenomena in the region.

Tabun Cave has been excavated in different eras, using different methods and following different schools of thought. The site was first excavated in 1929-1934 by D.A.E. Garrod (Garrod and Bate 1937:1-2), later in 1967-1971 by A. Jelinek (Jelinek *et al.* 1973). A. Ronen continued working at the site until 2003 (Ronen and Tsatskin 1995). Garrod removed a huge volume of deposits from the cave. She recognized six thick cultural layers, starting with the so called "Tayacian" of Layer G and ending with the late Mousterian in Layer B (Garrod and Bate 1937). Jelinek's project concentrated on a face 10 m high and six m wide, dividing the exposed sequence into 14 major stratigraphic units (Jelinek 1982b, 1990). The Acheulo-Yabrudian assemblages come from Units XIII-X, which are roughly equivalent to Garrod's Layer E. Ronen's excavations concentrated on the parts of the sequence below the area excavated by Jelinek.

The three facies of the Acheulo-Yabrudian complex are defined according to their technological and typological features. The Acheulian facies is characterized by abundant bifacial tools and flake production, the Yabrudian by flake production and heavy scrapers, often with Quina retouch, and the Amudian by blade production and 'Upper Paleolithic' tools forms. However, elements such as handaxes, heavy scrapers and blades occur in most assemblages at varying frequencies (Copeland 2000; Jelinek 1990). Similar assemblages have been recovered from sites such as Hummal (Le Tensorer *et al.* 2007), Adlun (Copeland 1975, 1978; Garrod and Kirkbride 1961), Yabrud I (Rust 1950) and Qesem Cave (Barkai *et al.* 2009; Gopher *et al.* 2005) among others. Nowadays, the various assemblages making up the Acheulo-Yabrudian complex are most often described as constituting the latest part of the Lower Paleolithic in the Levant, preceding the Levantine Mousterian (Copeland 2000, Gopher *et al.* 2010) although some authors (e.g., le Tensorer *et al.* 2007) assign them to early Middle Paleolithic. They are dated from 400-220 kyr at a number of sites (Barkai *et al.* 2003; Gopher *et al.* 2010; Grün and Stringer 2000; Porat *et al.* 2002; Rink *et al.* 2004; Valladas *et al.* 2013), although the TL dates from Tabun suggested a somewhat earlier replacement by the Levallois Mousterian Middle Paleolithic at ca. 250 kyr (Mercier and Valladas 2003).

The perspectives from Garrod's excavations and era

Garrod's (1934, 1935) preliminary publications of her work in Tabun show that she saw intermediate or transitional characteristics in the assemblages from her layer E. She initially called the material *'Acheulio-Mousterian'*. Later, after being convinced of a Lower Paleolithic origin of the heavy side-scrapers, Garrod proposed the name 'Upper Acheulian/Micoquian' (Garrod 1936; Garrod and Bate 1937), even later adopting the term 'Final Acheulian' (Garrod 1938). Her understanding of variability within the Acheulo-Yabrudian complex was further influenced by emerging results from other sites. In her monograph on the site she treated these assemblages as a single cultural unit (with subunits Ea-Ed). Later, Rust (1950) ascribed assemblages from the 15 earliest layers at Yabrud I to four cultures: Acheulian, Yabrudian, Acheulo-Yabrudian and Pre-Aurignacian. He argued that Yabrud I and Tabun represent the same cultures (1950:141-154). He believed the difference between the two sites lay in the fact that the Yabrud I assemblages were reported as distinct entities, while in Tabun they blended into one another due to poor stratigraphic control (Rust 1950). After becoming familiar with the work of Rust at Yabrud I Garrod altered the description of Layer E at Tabun (Garrod 1938; 1956).

Much discussion was stimulated by the unexpected presence of blades deep in the stratigraphies at Tabun and Yabrud. At the time, systematic blade production was perceived as characterizing *Homo sapiens* exclusively (Bar-Yosef and Kuhn 1999). Rust (1958) and Howell (1959:37) indeed argued that the Pre-Aurignacian ought to be attributed to *Homo sapiens* while the other facies were made by Neanderthals. This perspective is clearly evident in

Garrod's assertion (1934:9) that the blades from Tabun Layer E reflected a "…contact with a very early Aurignacian…"As the name he gave it shows, Rust (1950:28) saw the 'pre-Aurignacian' assemblage from Yabrud I, Layer 15 as a blade culture ancestral to the later European and Levantine Upper Paleolithic. Rust believed that the appearance of the Pre-Aurignacian in the eastern Mediterranean was a response to climatic changes (1950:129-130). It is important to recall that at the time the temporal gap between the Upper Paleolithic and the Acheulo-Yabrudian complex was thought to be much shorter than we now know it to be. Garrod (1934) for example, argued that the entire sequence of Tabun (Layers A-G) represented only 100,000 years, whereas it is now known to represent a period roughly five times as long.

Bordes' (1955) study of Yabrud I reflects a similarly compressed chronology. Observing a resemblance between the Pre-Aurignacian of Yabrud I Layer 15 and the Aurignacian Upper Paleolithic from Yabrud II he concluded that the layer dated to the Würm II, close in time to the earliest Upper Paleolithic industries of Europe. Bordes' radical interpretation triggered a debate with Garrod (e.g., Bordes 1961, 1977; Garrod 1956, 1961, 1962). Garrod emphasized how Bordes' forcing his preconceptions onto the archaeological record resulted in a scenario that was stratigraphically and chronologically improbable : "Bordes…, unable to accept that a typical blade industry should appear earlier in the Middle East than in Europe, suggests that the Pre-Aurignacian is contemporary with the Chatelperronian and that the last stage of the Yabrudian and the whole of the Levalloiso-Mousterian corresponds in time with the French Aurignacian Perigordian complex." (Garrod 1962: 236).

In the first half of the 20th century archaeologists tended to equate archaeological cultures with human groups, and explained transformations in archaeological cultures in terms of migrations and population contacts (Trigger 1989). Despite their disagreements, Garrod, Bordes and Rust shared the view that the Pre-Aurignacian was produced by, or at least influenced by, new immigrants to the region. They also agreed the Yabrudian and Acheulo-Yabrudian had developed directly out of the local Acheulian culture (e.g. Garrod 1962:234).

Excavations at the Adlun sites (Garrod and Kirkbride 1961), which employed more accurate excavation methods, shed a clearer light on the variability among the assemblages. They showed that Yabrudian layers rich in heavy scrapers could also contain substantial numbers of blades and handaxes. Still, the explanation remained the same. The layers including both large scrapers and blades were suggested by Garrod (1961:72) to represent a "Jabrudian-Pre-Aurignacian symbiosis" and the possibility "that the two peoples continued to live side by side for some time…" (Garrod and Kirkbride 1961: 42). Still, one shift in perspective can be seen by the replacement of the term 'Pre-Aurignacian' with 'Amudian'- (Garrod and Kirkbride 1961), a designation not associated with the Upper Paleolithic nomenclature in distant Europe (Garrod 1970).

The Acheulo-Yabrudian complex from the perspective of Jelinek's excavations

Starting in 1967, A. Jelinek (*et al.* 1973) and colleagues applied state-of-the-art field methods at Tabun in an attempt to refine the understanding of the cultural and geological stratigraphy of the site. Jelinek's meticulous excavations provided vastly better stratigraphic resolution than had Garrod's. Within Garrod's layer E and the lower part of D (Garrod and Bate 1937:78-87), Jelinek recognized four major sedimentary units (XIII-X) containing roughly 140 distinct layers and sub-layers. This enabled much closer tracking of trends and variation.

Jelinek's (1982b: 65) excavations confirmed that within the sequence of Units X-XIII there are two main facies - one poor in handaxes and rich in side-scrapers which he called Yabrudian, and one poor in side-scrapers and rich in handaxes which he ascribed to an Acheulian facies. He further observes that the two facies grade into one another, and that the ratio of bifaces to scrapers fluctuates cyclically (Jelinek 1981: 270, Fig. 2, 1982a: 1373). Jelinek (1981: 374, Fig. 3) ascribed Unit XIII to the Yabrudian facies, Unit XII to the Acheulian facies, but identified Unit XI as containing Amudian, Yabrudian and Acheulian facies. Jelinek (1981: 273; 1982b: 72) also argued for a basic continuity between Acheulian, Yabrudian and Amudian, proposing that: "…we are dealing with a single, but highly variable industry, within which two extreme facies can be distinguished…" He proposed that the three assemblage types be combined as facies of a single "Mugharan Tradition" (Jelinek 1981: 271).

Jelinek viewed the transition from Lower to Middle Paleolithic at Tabun as gradual processes. This is most clearly shown in his (1977) study of the width/thickness ratio of flakes, which demonstrated a gradual increase in refinement (thinness) of blanks throughout the layers of Tabun. Jelinek also had a different perspective on the place of the Mugharan

Tradition with respect to the Lower and Middle Paleolithic. Based on its obvious resemblance to the Quina Mousterian, Jelinek (1982b:68) argued that the Yabrudian should "…be considered as the earliest known manifestation of the Middle Paleolithic in the southern Levant. " At this time most scholars also assigned this complex to the Middle Paleolithic period (e.g. Bordes 1977; Copeland 1975, 1978; Farrand 1965, 1979) although some, still ascribed it to the Lower Paleolithic (e.g., Ronen 1979: 301). Jelinek identified Unit X as an interval of transition between the assemblages of the Mugharan Tradition and the Levallois Mousterian (Jelinek 1981). Bar-Yosef (1995) later argued that the presence of Levallois elements was a result of mixture and not evidence for a gradual transition. Our recent examination of this material reveals that Levallois elements are abundant only in the upper part of this unit, while the lower part can be ascribed to the Acheulian facies with rare Levallois flakes.

The New Archaeology's rejection of the equation of assemblages with ethnic groups is also reflected in Jelinek's view of the variation among the Acheulo-Yabrudian assemblages. Based on his study of the material from Tabun Layer E and Yabrud I-15 a few years earlier, Skinner (1965: 175-176) had suggested that the Pre-Aurignacian/Amudian was the manifestation of specialized activity rather than an independent culture (see also Hours *et al.* [1973], Parush *et al.* 2016). Jelinek promoted a similar view, stating that the Amudian is "simply a specialized aspect of the Yabrudian" (Jelinek *et al.* 1973: 174). He suggested that the observed variability reflects an adaptive response to a changing environment, and that the appearance of the facies in Tabun is correlated with climatic changes and varying sea levels (Jelinek 1981). The correlation of industries with climate phases was eventually shown to be incorrect, first by the new absolute ages (Mercier and Valladas 2003) and later by the case of Qesem Cave (Gopher *et al.* 2005) where assemblages rich in blades were made over a period of nearly 200,000 years. Nonetheless, it represents a fundamental reorientation of thinking about the meaning of assemblage variability in the Levantine Paleolithic.

Other researchers proposed related explanations for the variability within the Acheulo-Yabrudian complex. Following her study of the material from Adlun, Copeland argued that in Bezez Cave (1975:321-322) the facies of the Acheulo-Yabrudian complex did not vary between levels but did vary laterally, indicating that the cause for differentiation is more a matter of activity zones. Solecki and Solecki (1986) bolstered Copeland's argument by demonstrating that Layers 12-18 in Rust's (1950) Yabrud I sequence are partly overlapping and differ in horizontal location.

New directions in research on the Acheulo-Yabrudian complex

Information about the Yabrudian, Amudian and allied assemblages has greatly increased in the last three decades following the investigation of sites such as El Kowm (Copeland and Hours 1983; Le Tensorer *et al.* 2007), Jamal Cave (Weinstein-Evron *et al.* 1999), Misliya Cave (Weinstein-Evron *et al.* 2003) and Qesem Cave (Gopher *et al.* 2005).

One finding relevant to the transition between the Lower and Middle Paleolithic concerns the antiquity of Acheulo-Yabrudian technology. It is commonly assumed that there was a major technological shift in the Tabun sequence between Layer F ('Acheulian Lower Paleolithic') and the first assemblages described as Yabrudian (Tabun Layer Ed). However the technological transition may begin much earlier. Based on the abundance of elements typical of Acheulo-Yabrudian technology, Ronen ascribed assemblages that are stratigraphically below Jelinek's Unit XIII to the Yabrudian (Gisis and Ronen 2006). In fact, dejete and transversal scrapers with Quina retouch are well represented in Layer F (Wright 1966), something already noted by Garrod (Garrod and Bate 1937:87-89).

A technological analysis of blade manufacture Qesem Cave, Tabun and Yabrud I showed that blade production is represented to some extent in all facies, and blade are even present in small numbers in levels equivalent to Garrod's Layers F and G (Acheulean and Tayacian) in Ronen's excavations (Gisis and Ronen 2006). Although the frequency of blades varies considerably, the technology of making them was rather similar across the facies, suggesting that they were the products of a single learning tradition or population (Shimelmitz 2009). The succeeding early Levantine Mousterian of Tabun Layer D at sites such as Hayonim (Meignen 2007), Hummal (Wojtczak *et al.* 2014) and Misliya (Weinstein *et al.* 2003) is also dominated by blades. However, the issue of continuity in the knapping traditions is still in question. Some argue for a connection (Jelinek *et al.* 1973; Nishiaki 1989) while other argues that the technologies are completely different in character (Monigal 2002; Vishnyatsky 2000). Our recent study (Shimelmitz *et al.* 2014a) shows that the industries share some traits.

Another topic of relevance is the presence of Levallois. The Acheulo-Yabrudian complex is gene-

rally regarded as 'non-Levallois' or lacking Levallois completely (e.g. Bar-Yosef 1987:33; Gisis and Ronen 2006; Nishiaky 1998; Solecki and Solecki 1966; Vishnyatsky 2000:148; see Goren-Inbar 1995 for a dissenting view). Part of the discrepancy between descriptions may stem from the fact that some studies were based exclusively on typological observations while others used technological criteria suggested by Boëda (1995) to identify Levallois. However, there also seems to be an asymmetry in discussion of Late Acheulian and and Acheulo-Yabriudian complex. The presence of Levallois in Acheulean collections is often emphasized (e.g. Bar-Yosef 1995), but it is always presented as being marginal or intrusive for the Acheulo-Yabrudian (e.g. Rolland and Dibble 1990; Shea 2001; Tuffreau 2003). Yet Levallois elements are reported from most of the larger Acheulo-Yabrudian assemblages, including Tabun (Garrod and Bate 1937:79-89; Jelinek *et al.* 1973:177; Rollefson *et al.* 2006:68), Adlun (Copeland 1983), Yabrud I (Bordes 1984:16-40) and Masloukh (Skinner 1970). The one exception is Qesem Cave which has so far yielded no evidence of Levallois method (Gopher *et al.* 2005:73). It will be important to rectify this asymmetry in the detection and description of the Levallois technology in the context of exploring links between assemblages and processes of transition.

Discussion and Conclusion

Nearly 80 years of research have resulted in a broad picture of the variability within the Acheulo-Yabrudian complex and an evolving set of explanations for that variability. Researchers are still divided as to whether it should be assigned to Lower or Middle Paleolithic. Much of this ambiguity stems from the ways the larger units, Middle and Lower Paleolithic, are conceived and from the criteria used. The presence of handaxes and the absence (or scarcity) of Levallois would argue for assigning these component assemblages to the Lower Paleolithic. However, others find justification in defining these same assemblages as (early) Middle Paleolithic based on the presence of Quina retouched scrapers (Garrod 1934, 1935; Jelinek 1982b:68), or due to the importance of flake production as opposed to bifacial faconnage (le Tensorer *et al.* 2007). Emphasizing other technological indicators, such as a dominance of predetermined blank production - blades in the case of the Amudian (Shimelmitz 2009), and large flakes in the case of the Yabrudian—(Shimelmitz *et al* 2014a) would tilt the classification of the assemblages toward the Middle Paleolithic.

Moving beyond the stone tools, recent results suggest that this interval did see important changes in hominin social behavior and foraging. Geological and zooarchaeological studies of Qesem Cave reveal features such as hearth-centric activities and transport of meat to shelters for sharing which seem to anticipate later Mousterian and even Upper Paleolithic patterns (Karakanas *et al.* 2007; Stiner *et al.* 2009, 2011). Traces of fire have been found in most of the sites of the Acheulo-Yabrudian complex (Copleand 1975:322, 1983:158; Farrand 1965; de Heinzelin 1966; Ronen and Tsatskin 1995; Tsatskin 2000:135). At Tabun and Qesem intensity of burning increases in the middle of the Acheulo-Yabrudian sequence (Shimelmitz *et al.* 2014b; Stiner *et al.* 2011), suggesting a widespread shift in how hominins used fire. Another important development is intensive use of caves and rockshelters. All sites with Acheulo-Yabrudian materials are caves or large, permanent springs; this is in contrast to the Acheulian, which occurs mainly in the openair. The central place of caves in the life-cycle of the hominins who produced the Acheulo-Yabrudian assemblages continued into the succeeding Mousterian. Hunting strategies focused on prime-aged animals, which also characterizes both Neanderthals and *Homo sapiens*, are also manifest in layers yielding Yabrudian and Amudian assemblages (Stiner *et al.* 2011). At the same time, evidence from cutmarks suggests that butchering and food sharing may have been organized differently than in later periods (Stiner et al 2009).

Whether one assigns the Acheulo-Yabrudian assemblages to Middle or Lower Paleolithic is more than just a matter of terminology. It affects how one understands the transition between the two periods. If the Acheulo-Yabrudian complex is assigned to the Middle Paleolithic then the transition occurred around 400kya: if it is assigned to the Lower Paleolithic the transition happened 250-200kya, several climate cycles later. The placement of these industries also influences the apparent nature of the transition. If the Acheulo-Yabrudian complex is seen as belonging to the Lower Paleolithic, then within the Levant at least the transition is quite abrupt and is defined primarily by the (relatively) sudden appearance and spread of laminar Levallois production, and perhaps by population discontinuity as well. If however, these groups of assemblages are assigned to the Middle Paleolithic, we have to define the transition in terms of several episodic shifts in emphasis on different technological options as well as changing levels of technological variation. In this case the transition is more likely explicable as the outcome of gradual evolutionary or adaptive processes.

In fact, the Acheulo-Yabrudian assemblages are not a unique exception to a "natural" classification of Paleolithic industries: rather, their seemingly anomalous features are a natural outcome of the development in the field. The "big units" used to group Paleolithic material culture—Acheulean, Mousterian, Aurignacian, and so forth—are legacies from the early 20th century. They were originally conceived as chronostratigraphic horizons, and were defined in terms of a limited array of index fossils (handaxes, Levallois, etc.) using results from a small number of sites. Scholars of the period treated the archaeological record as a sequence of archaeological phases or cultures stacked one on top of one another, with change occurring only at the boundaries between them (Holdaway and Wandsnider 2006).

Over the past century the amount of information available about Paleolithic technology and behavior has expanded by orders of magnitude, resulting in a more finely-resolved picture of variation and a greater number of apparently 'intermediate' entities. During this same interval the dominant frameworks for interpreting synchronic variability and the evolution of cultural behavior have transformed repeatedly. It should come as no surprise that the century-old terms no longer capture what we understand of variability, and the transitions between them do not constitute the only, or indeed the most important, evolutionary dynamics taking place over the time intervals in question. Forcing the Acheulo-Yabrudian complex into categories such as Lower and Middle Paleolithic focuses attention on a few, arbitrarily-defined periods of transition, and may blind us to the diverse range of evolutionary dynamics that unfolded at the time hominins in the Levant produced these assemblages. What we do know is that interval between 400 kya and 220 kya witnessed a range of significant evolutionary developments in hominin culture and behavior. The timing and synchronicity of these developments, and their relationship to hominin forms, are important questions to be resolved, and are quite independent of whether we call them Middle or Lower Paleolithic.

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