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SHIFTING IDEAS ABOUT THE MIDDLE PALAEOLITHIC HISTORY OF THE LEVANT

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Abstract

In an era where archaeological research is increasingly dominated by the application of costly, high-tech analytical techniques, we run the risk of neglecting the detailed reconstruction of human behaviour that informs on ancient lived experience. This re-issue of a 2003 volume on the site of Tor Faraj is in 2023 a delightful anachronism as it focuses on the craft of archaeology, employing multi-stranded analytical strategies to arrive at a meticulous reconstruction of a few days in the life of a group of Middle Palaeolithic hunter-gatherers. The objective: to see if habitation at Tor Faraj was characterized by a differentiated use of space. This is proposed to be characteristic of the complex ways of life in which modern humans structure their settlements. Alternatively, the material remains of the stays at the rockshelter could be homogenously distributed throughout the excavated area. This spatially unstructured way of behaviour is generally taken to characterize "archaic" humans (Henry 2003, ch. 3, 10). As the inhabitants at the site are presumed to be Neanderthals (no bone is preserved so no fossils available), the latter would be the default expectation. In this review article, I introduce the volume on of Tor Faraj and summarise the archaeological results. I then contextualise these in view of changes in the field in the 20 years since the volume was originally published. In that time, the interpretative frame in which the excavation results have to be placed has become far more complex, but the review also shows that detailed data such as presented at Tor Faraj are of great value to start resolving some of the current open questions in the area.

The excavations at Tor Faraj

Three camping trips, with a site occupation lasting an estimated 36 days in total. This seems hardly sufficient to fill an entire edited volume.[1]) Yet, Henry and colleagues' report of the excavation of two ~44 and 69 thousand-year-old living floors at Tor Faraj rockshelter, Jordan, does exactly that. The significance of the site lies in the taphonomic serendipity a pristinely preserved site of this age that can be documented over a spatially extensive area.

Tor Faraj is strategically located in a wadi valley connecting the low-lying Jordan Rift Valley with the uplands of the Ma'an plateau (>1500 masl). It occupies a suitable location for a stop-over in the hypothesized annual nomadism taking nomadic hunter-gatherer groups from the valley (winter) to the plateau (summer). Although currently situated in a desert environment, during the Middle Palaeolithic increased availability of humidity means the site provided access to water, plant foods and allowed the effective monitoring of animal herds (ch. 3).

[1]) This article is a review of: HENRY, D.O. (ed.) — Neanderthals in the Levant. Behavioural Organization and the Beginnings of Human Modernity. (New Approaches to Anthropological Archaeology). Bloomsbury Publishing Co. Ltd., London, 2023. (25,5 cm, XII, 322). ISBN 978-1-3503-4399-3. $ 40.95.

The rockshelter's suitability for habitation is not unique, there are many similar rockshelters in the vicinity. Its archaeological value lies in its preservation potential: Taphonomically, Tor Faraj does present a special situation. Disintegration of the rock along the rockshelter's roof led to large rockfalls around the shelter edge. These formed a sediment trap, without which sediments would have eroded out long ago. The area between the shelter wall and the rockfall gradually filled in with wind-blown sand. In Palaeolithic times this afforded inhabitants of the site a near-horizontal living surface. Continuing aeolian deposition of sand also covered archaeological remains relatively quickly as most artefacts are not or hardly weathered (Hietala ch. 8).

The shelter opens to the South, while the rockshelter wall describes a right angle at the northern corner of the excavation trench. The alcove this forms is heated by the sun in winter and spring. This is all the more significant as nowadays winters in the area are cold (average January temperature 6-9 °C) and during the last Ice Age temperatures were probably around 3 °C lower (Henry ch. 3).

The excavation itself documents a rectangular area of 52 m^2 inside the shelter, flanked on two sides by the rockshelter wall. To study the spatial organization of the site's (presumed) Neanderthal inhabitants, all finds >3 cm were individually measured in 3D. All sediment was collected by 1/4 m^2 and sieved over a 2 mm sieve, giving insight in the distribution of even the smallest material remains. Vertically, the excavation proceeded in 5 cm levels. It revealed the presence of two "living floors" separated by a zone of more or less archaeologically sterile sediment. Hence two successive episodes of site use can be compared. A small test pit shows that underneath the lower living floor at least one other archaeological level is present, but this is not analysed in the volume.

Both living floors reveal the presence of hearths (6 in the upper floor, 13 in the lower floor) structuring the available space in the shelter. Across both living floors the hearths were constructed in similar locations: a line of hearths relatively close to the back wall and a line of hearths more centrally in the rockshelter. Their placement already suggests that the use of the site is structured. The site is divided into four quadrants, where one (B) has most hearths across both floors and one (D) has none.

The analysis focuses largely on the recovered stone artefacts as organic preservation is poor and hardly any bones were recovered. These are highly technical but rewarding chapters which show how much information can be gleaned from the combination of different techniques applied to this material.

Most of the lithics are made from flint from the Ma'an plateau transported over 20 km to the site, suggesting a high degree of logistical planning (Henry ch. 4). The spatial distribution not just of the retouched tools, large pieces and cores (Hietala ch. 8 & 9), but also of the sieved small fraction is mapped and analysed (Armagan ch. 5). In many excavations, even nowadays, the small fraction does not get enough attention and this was certainly uncommon two decades ago. The analysis reveals that a number of distinct concentrations is present, most are related to hearth locations. Different concentrations reveal different characteristics: One cluster (A) is identified as the location where most initial flint-working was performed because of a higher proportion of chips with cortex (the outer "crust" of flint) and another (D) is identified as a dump of material. The chips here are relatively frequently weathered and show more signs of burning than in other concentrations. Technological information such as the type of percussion (mostly hard hammer, but some soft hammer), is also derived from this category.

Much attention goes to the larger pieces and formal tools, as these represent the goals of lithic production. The most spectacular analysis performed is a refitting study (Demidenko & Usik ch. 6). This analytical technique reconstructs the organization of knapping strategies literally by piecing the fragments of a core back together in the order in which they were removed from a flint core. This affords "real-time" insight in knapping decisions. The analysis is rarely employed in rockshelter sites as excavation areas are generally too small and sediments too disturbed to recover sufficient pieces of a single reduction sequence. The successful application at Tor Faraj is testament to the pristine preservation of the site. The analysis reveals a highly efficient application of the "prepared core technique". This is a technique to produce stone tools of predetermined shape, at Tor Faraj so-called Levallois points. In this case, the technique was adapted to make use of the oval shape of the imported flint nodules. This allowed the production of Levallois points with only minimal core preparation and resulted in the production of sometimes up to 6 points from a single core. It is worth noting that at the raw material source, not only oval nodules occur but also tabular flint. The latter was not selected for transport to the site, showing the clear relation between knapping technique and raw material preference (Demidenko & Usik 2003, p. 150). As can be expected with materials imported from a considerable distance, it was used economically: When cores were exhausted, large thick flakes were repurposed as cores ("cores on flakes" or "truncated facetted pieces") to produce one or two more Levallois points. A disappointing omission is the specification of spatial patterning across refits. Especially in a research project focused on spatial analysis, the importance of the distribution of refitted pieces can furnish crucial information on spatial structure (see for an example Roebroeks 1988).

The spatial distribution of retouched tools is clearly patterned, reinforcing the idea that the use of space at the site was structured. Levallois points are in different spatial zones than the cores and flakes from the point production sequence. Other tool-types show different distributions from the Levallois points again. One of the most intriguing patterns is the distribution of cores on flakes. Flakes themselves are distributed widely across the shelter, but "cores on flakes" are distributed in the same concentrations as "normal" cores. This suggests that flakes, when used as a core were "re-conceptualised" and knapping was done in a "designated zone". The site's occupants took care to do everything in its right place (sensu Fontijn 2008).

Not only the production of stone tools is analysed, their function is as well. By studying microscopic polish on the edges of flint tools that results from use the activities that were performed can be reconstructed. The results show that both plant and animal tissues were worked at the site and also that the ubiquitous points were not just used on animal matter, but show evidence of plant working too. The spatial distribution suggests changes in emphasis (more plant working near the central hearth, more animal working on the periphery of the living area), yet the results are not completely clear-cut. Similarly, in depth, statistics-heavy analysis of how the different tool-types are distributed across the different sectors from the site does not always yield clear-cut results (Hietala ch. 8 & 9).

The study of phytoliths, the siliceous "skeletons" of plant cells yields interesting results not only from a spatial, but also from an ecological perspective (Rosen ch. 7). The analysis shows that glacial climates resulted in a significantly less arid environment than now. Further, the analysis gives insight into the plant component of the diet, for example through starch grains and date-palm phytoliths. Spatially, the distribution of grass phytoliths in two distinct zone near the back wall is interpreted to show areas of bedding. These have clear ethnographic parallels.

In the final chapter, all the information is synthesized and gives a clear image of spatially structured use of the site similar to examples known from ethnographic sites. Through assumptions on the surface area in use and the numbers of hearths constructed, an estimation of the number of people (12-15) and the number and duration of stays is given (1 stay for the upper floor of 8-14 days; two stays for the lower floor of 6-11 days each). These interpretations are indicative at best, the assumption that a single forager would consume around 10 points/day does not have any clear ethnographic support, however plausible it may sound.

The site of Tor Faraj represents an important data-point in this period, both for the excellent research reported here, but also because of its location East of the Jordan Rift Valley. This provides an important counterpoint in a discourse dominated by work on sites located in the Mediterranean ecological zone along the coast to the northeast. The reported data have certainly not lost in value in the past 20 years and some analytical techniques, but perhaps more interesting is how the synthesis and wider interpretations have held up.

The Levantine fossil record

Tor Faraj's occupants are assumed to be Neanderthals, even though no human fossils were recovered from the site. Since the Tor Faraj report was written, some new fossil discoveries, as well as changing taxonomic interpretations change the consensus-view of Levantine population history.

The southern Levant has a rich human fossil record. The first significant human fossils were discovered in the 1920s and 1930s. This means that some taxonomically informative fossils are difficult to assign a stratigraphic context as best practices on the precision of documentation have developed significantly in the intervening decades, but new discoveries in controlled excavations continue to be made.

The distribution of human fossils is skewed towards the Mediterranean coast: Especially the Mount Carmel area has yielded an important suite of fossils that figure largely in the discourse on the relationship between Neanderthals and modern humans. So far, no human fossils have been reported from the Levant East of the Jordan River. While some other areas, due to political circumstances remain underexplored. This is highlighted by the recent analysis of a fossil tooth excavated on the Palestinian West Bank in 1928 by Dorothy Garrod. Re-study determined it to be a Neanderthal fossil and is currently the southernmost known Neanderthal fossil (Blinkhorn et al. 2021).

Based on the known fossils, the (near-)consensus model 20 years ago was an alternation Modern Humans (125-80 ka), Neanderthals (80-50 ka), and modern humans again (50 – present). The new status quo suggests a more complex population history of the region.

For the period between ~80 and 50 ka, characterised by cold global climates, a relatively large number of Neanderthal fossils are known from the region. Supporting evidence is available from a Neanderthal occurrence in the northern Levant, at Dederiyeh and the well-known Neanderthal fossils from Shanidar in northern Iraq. After 50 ka, *Homo sapiens*, were thought to inhabit the region. Modern human fossils in the Levant just post-50 ka are rare (Shea 2008), but the discovery of a partial modern human skull at Manot Cave dated to ~55 ka provides support for their presence in this time range (Hershkovitz et al. 2015).

The occupants of the region during the preceding interglacial (warm period in between Ice Ages) between 125 and 80 ka were thought to be modern humans. *Homo sapiens* fossils are known from the famous sites Skuhl and Qafzeh in the Mt Carmel area. A long-held idea is that modern humans expanded their distribution from the African continent during the warm interglacial, but were displaced when global climates cooled down around 80 ka (Shea 2008).

This consensus of modern humans occupying the Levant in warm periods followed by Neanderthals in colder periods was always complicated by the Tabun C1 fossil, a Neanderthal fossil with a provenance potentially putting it in the interglacial warm period. However, the fossils were excavated in the 1930s and their exact stratigraphic context remains unclear (e.g. Shea 2008; Harvati & Nicholson Lopez 2017). The Tabun Neanderthal may date from the preceding cold period (Shea 2008). If that is the case, this would suggest that Neanderthals and *Homo sapiens* alternated in the Levant multiple times.

Recent discoveries complicate the situation. A hominin maxilla from Mislya Cave dated to ~185 ka years ago now provides evidence for a much earlier presence of *Homo sapiens* in the Levant than previously documented (Hershkovitz et al. 2018) and shows modern human presence in the Levant during an Ice Age instead of an interglacial. Another fossil from Apidima in Greece at 210 ka provides confirmation of early expansions by *Homo sapiens* outside of Africa (Harvati et al. 2019).

Also, indications for the presence of a third population inhabiting the Levant next to Neanderthals and modern humans came to light. A human skull found at Nesher Ramla dated to 140-120 ka, has anatomical characteristics diagnostic of earlier, Middle Pleistocene populations (Hershkovitz et al. 2021). The fossil is argued to represent a late-surviving group of Middle Pleistocene descent in the area. Interestingly, a similar possibility was in the past brought up for a second fossil from Tabun Cave, the Tabun C2 fossil (Harvati & Nicholson Lopez 2017). The interpretation of the Nesher Ramla skull is contested by others, who argue it represents a Neanderthal individual (Marom & Rak 2021). Nesher Ramla is contemporaneous with Skhul and Qafzeh or slightly predates these *H. sapiens* fossils.

The current situation no longer supports a relatively neat succession of Neanderthals (Tabun C1 if original context is reliable) – *Homo sapiens* (Skhul & Qafzeh) – Neanderthals (Kebara, Amud) – *Homo sapiens* (Qafzeh upper layers, Ksar Akil). Instead the penultimate glacial may see the co-existence of *Homo sapiens* (Mislya), Neanderthals (Tabun C1) and a third population (Tabun C2, Nesher Ramla), while the interglacial may see *H. sapiens* (Skhul & Qafzeh) co-exist with the third lineage (the most recent part of the age range for Nesher Ramla seems best supported), to be succeeded by a period of Neanderthal populations in the region (see table 1 for my attempt at a summary). Complicating the taxonomic classification, the populations may have interbred, leading to combinations of anatomical characteristics not seen in other regions.

Table 1: Summary of changing status quo.

	Status quo 2003	Status quo 2023
> 200 ka	Difficult to classify "ancestral?" populations (Zuttiyeh)	Difficult to classify "ancestral?" populations (Zuttiyeh; Qesem)
200-125 ka	Neanderthals? (Tabun C1, C2)	***Homo sapiens*** (Mislya); Neanderthals? (Tabun C1); **Third lineage** (Nesher Ramla, Tabun C2?)
125-80 ka	***Homo sapiens*** (Skhul Qafzeh); Neanderthals? (Tabun C1)	***Homo sapiens*** (Skhul; Qafzeh); Third lineage? (Nesher Ramla); Neanderthals? (Tabun C1)
80 ka	**Neanderthals** (Kebara, Amud)	**Neanderthals** (Kebara, Amud, etc.); *Homo sapiens?* (Manot Cave)
< 50 ka	***Homo sapiens*** (only quite late fossils known)	***Homo sapiens*** (Ksar Akil)

The complex situation may in part be due to the sometimes unclear provenance of fossils (e.g. Tabun C1) and the large chronometric age range (e.g. Nesher Ramla), yet this only explains part of the picture. The region's rich fossil record and the fact that new discoveries, especially in the earlier period periodically yield surprising findings increase confidence in the fact that co-existence of anatomically very different populations represents a real feature of the region's past. As no fossils have been reported from the southern Levant East of the Jordan river, and this region is ecologically different from the near-coastal zone yielding most fossil discoveries, we cannot *a priori* assume the representativity of the available fossil record for the entire Levantine region and further discoveries can be expected to complicate the picture. In view of the fossil record, especially for the lower living floor at Tor Faraj estimated to be around 70.000 years old, Neanderthal authorship still appears to be the most parsimonious interpretation. Yet with the reported ages for the modern human from Manot Cave, this may not be the case for the upper living floor, closer in age to 50.000 years ago or even a bit younger. Nevertheless, the character of the lithic assemblages of the floors is very similar, which may strengthen the attribution of the site to Neanderthal populations.

Stone tool classification and human populations

Given the cultural and cognitive differences often assumed to exist between different hominin populations, the attribution of specific types of assemblages to specific populations has been an important emphasis of archaeological analysis. As human fossils are rare attributions of sites to specific populations often relies on such attributions. Nevertheless, the cultural interpretation of Middle Palaeolithic lithics has seen severe conceptual challenges over the past two decades and this generalization is no longer secure.

Stone tool production is generally divided into three main developmental categories, the Lower Palaeolithic (>300.000 years old), characterised by the use of core-and-flake techniques and bifaces, the Middle Palaeolithic (300.000-50.000 years old), characterised by prepared core technology. (In Africa, the Middle Stone Age occupies a similar period and is also characterised by prepared core technology.) And the Upper Palaeolithic (<50.000) years old, characterised by the structural production of blades, as well as microliths, very small tools. Both *Homo sapiens* and Neanderthals are associated with prepared core technology for much of their existence (Adler et al. 2014). The subsequent Upper Palaeolithic period in Europe and the Levant (from ~50.000 onwards) is characterised by the use of blade technology and microlithisation and it is associated mainly with modern humans. These eras are then subdivided into industries or technocomplexes, which are groups of similar assemblages that are more limited in time and space.

The Middle Palaeolithic sequence of the Levant has long been subdivided in three phases based on Dorothy Garrod's 1930s excavations at Tabun Cave. They are, from early to late Tabun D, C and B. The relative elongation of Levallois points and the relative importance of blade production are among the characteristics used to differentiate these different industries (e.g. Henry ch. 2, 3). But classification of assemblages within this sequence is not straightforward, exemplified by Tor Faraj itself.

The Tor Faraj lithics were initially classified as Tabun D due to the high proportion of points and blades. Tabun D is seen as the early Middle Palaeolithic in the region (Shimelmitz & Kuhn 2013; Hershkovitz et al. 2018). When radiometric dates of 70-50 ka became available, they put the assemblage in the age range of Tabun B assemblages. Based in part on the age, this classification is now preferred for Tor Faraj (Henry ch. 4). Detailed technological analyses at Tor Faraj can be used to support the reclassification: The high proportion of blades is not a stylistic cultural attribute here, but is a strategy specifically adapted to the raw material shape employed to prepare cores for point production (Demidenko & Usik ch. 6). This leads Henry to argue the blade component is not diagnostic for the cultural attribution of the assemblages (Henry ch. 4). Similarly, Levallois points in Tabun D assemblages are generally more elongated than during the Tabun B phase, whose points are characterised by broaded bases. At Tor Faraj, broad-based points are also in evidence (Henry ch. 2), although shape variability turns out to be large.

The ins and outs of the lithic classification systems may appear esoteric, but the classification of lithics has important chronological and demographic implications. Previous consensus was that Neanderthals were associated with Tabun B industries and *Homo sapiens* with the preceding Tabun C assemblages (e.g. Henry ch. 2; Shea 2003). Tor Faraj, with no human fossils but stone tool assemblages classified as Tabun B would be associated with Neanderthals (Henry ed 2003). The new fossil discoveries as well as challenges to lithic classification make such correlations less secure. In general, the association of specific hominin populations with types of lithic assemblages seems to be ever more problematic, but new proposals are still being made.

Since 2003, Shea (2014) proposed to abandon this scheme entirely. He argues that the variability in the traditionally recognized subdivisions of the Levantine Middle Palaeolithic is underestimated and its causes ill-understood. He emphasizes that the sequence at Tabun shows evidence of sedimentary disturbance and hence is not a good yardstick. More importantly, it is unclear what kind of behavioural dimension industries capture. They may represent "cultures", but alternatively, artefact shape may be a byproduct of the organisation of lithic reduction or the functional demands faced by hunter-gatherers. Or is assemblage composition determined more by raw material characteristics than cultural choice or functional design (Shea 2014)? This problem illustrated by the fact that open-air sites appear to show much less emphasis on prepared core technology than contemporaneous rockshelter sites (Zaidner et al. 2014). This suggests that part of the difference might be functional.

The Mislya *Homo sapiens* fossil is associated with Tabun D lithics. On the back of the fossil, its discoverers hypothesise that prepared core technology is introduced in the area by a *Homo sapiens* expansion (Hershkovitz et al. 2018). In view of the sparse fossil record and the undiagnostic character of the other available fossils from the period, this proposal is tenuous at best.

The Nesher Ramla fossil belonging to a third lineage, or a Neanderthal (Hershkovitz et al. 2021; Marom & Rak 2021). The stone tool assemblage at the site is stated to have clear affinities with the assemblages at Skuhl produced by modern humans (Zaidner et al. 2021). Hence, the association of Tabun C assemblages with any species cannot be taken for granted, especially in view of the uncertain taxonomic affinity of the Tabun C2 fossil and the Neanderthal Tabun C1 fossil.

Another specific prepared core strategy is termed "Nubian". It is known from northeastern Africa, and occurrences outside Africa, e.g. on the Arab peninsula are often proposed to represent modern human range expansions outside of Africa. Yet a Neanderthal tooth from Shukbah Cave was recently suggested to be associated with a Nubian assemblage (Blinkhorn et al. 2021).

In view of the foregoing, the attribution of the assemblages at Tor Faraj to Tabun B alone is no longer sufficient reason to attribute the site to Neanderthals.

Modern humans and modern human behaviour

Henry (ch. 2, 10) argues for a gradual emergence of characteristic modern human behaviour in the Levant and suggests that it should be seen separately from biological taxonomy. For a long time, modern human behaviour was identified with a behavioural revolution taking place with the advent of the Upper Palaeolithic perhaps 50,000 years ago. Nevertheless, evidence for the much more gradual appearance of modern human behaviour had been accumulating in Africa for a long time. The new consensus was definitively summarised by McBrearty and Brooks (2000) in a paper poignantly titled "The revolution that wasn't": "modern human behaviours" arise gradually in Africa, and most behaviours generally identified as "complex" and "modern" have their oldest archaeological evidence in the African continent.

Current views emphasise that modern behaviour is not a "package deal". The African Middle Stone Age, characterized by the use of prepared core technology, made by anatomically modern humans does not imply that they are behaviourally less sophisticated than Later Stone Age or contemporary populations (e.g. Shea 2011). Moreover, comparisons in different regions demonstrate that Pleistocene *Homo sapiens* behaviours are highly flexible. A study from Australia shows that some "modern" behaviours are absent in the Pleistocene record here, while for example, polished axes, sometimes seen as a hallmark of the Neolithic occur in the Pleistocene of Australia, far earlier than anywhere else (Habgood & Franklin 2008). Finally, we now recognise that the so-called "modern behaviours" are not limited to modern humans only. Many, such as the use of pigments, the production of complex technology, blade production, et cetera, are now also known from Neanderthals (e.g. Roebroeks & Soressi 2016; Niekus et al. 2019).

The spatial analysis at Tor Faraj was cast in the context of the modernity debate, to test if the inhabitants of the site used the space of the shelter homogeneously, or whether they conform to the expectations based on ethnographic hunter-gatherers. In view of the current state of the field, this dichotomy is somewhat simplistic. More sophisticated models in which Neanderthals structured space had already been proposed at the time of writing: e.g. an embodied structuring of space resulting in so-called Centrifugal Living Structures had been proposed (Kolen 1999).

The evidence gathered at Tor Faraj casts the inhabitants at the site as using a sophisticated organization of their way of life and their living space. Their reliance on flint from a source 20 km away suggests that their logistical organization and planning depth was well-developed. The spatial structure of the site, especially the re-definitions of flakes to cores and their repositioning to the "right" place for flint-working shows the use of mental constructs that are well-developed. The variety of phytoliths and their spatially concentrated occurrence shows that plants were used for a variety of functions, not simply nourishment.

The lithic industry, especially the evidence from the refitting study demonstrates the flexible nature of flint-knapping, to suit the raw material shape perfectly and produce Levallois points in a highly efficient manner (Demidenko & Usik ch. 6). One refitted constellation shows a core that was dedicated to blade production in a manner reminiscent of blade production during the Initial Upper Palaeolithic at Ksar Akil (cf. Demidenko & Usik ch. 6; Douka et al. 2013). The inhabitants at Tor Faraj were thus capable of adapting their production to produce different end-products.

Interestingly, from the 1930s onwards, workers in the area have observed that the Upper Palaeolithic in the region shows more similarities to the European Upper Palaeolithic, than to African assemblages (e.g. Garrod 1935; Bordes 1960, for a modern example see Slimak 2023). Hence the Upper Palaeolithic is thought to develop in the Levant, from local Middle Palaeolithic antecedents. The African Later Stone Age is characterized by the production of miniaturized debitage, mainly bladelets, often using bipolar technology (Villa et al. 2012). The main development in the local Initial Upper Palaeolithic is an increasing emphasis on blade production, and only with the Ahmarian does an emphasis on microliths enter the record. Aside from a single refitted blade core, Upper Palaeolithic elements are missing from the descriptions of the Tor Faraj assemblages discussed in the volume. Nevertheless, in recent publications, co-authored by Henry a small percentage of bladelets is reported from the site (Kadowaki et al. 2021).

The lithic assemblages of Tor Faraj appear to be typical of the Middle Palaeolithic. This does not negate their sophistication, nor the possibility of the makers to exhibit highly complex behaviours. The differentiated use of space is one such complex behaviour, although we now recognise that this is not limited to *Homo sapiens* only.

Genetics and changing views of human demography in the Levant

The past two decades have seen the emergence of a completely novel source of information on human demographic history: (ancient)DNA. As the fossil record, even in a comparatively intensively researched region like the Levant still yields surprises such as the Nesher Ramla fossil, complicating existing scenario's, this is a welcome avenue to clarify the picture of human history. Unfortunately, DNA preservation works best in cold environments, hence the Levant itself has not yet yielded any Palaeolithic ancient DNA. Yet, the interpretations of ancient genomes isolated from fossils elsewhere have large implications for our understanding of the ancient human history of the region.

Interpretations of mitochondrial DNA (mtDNA) diversity from contemporary modern human populations in the 1990s and comparisons with Neanderthal mtDNA placed the latter outside of the range of modern human variation. This provided support for the "Out of Africa" model: an evolutionary scenario where modern humans developed in Africa replaced other so-called "archaic" populations in an evolutionary "winner-takes-all" scenario (Krings et al. 1997). It was further thought that *Homo sapiens* expansion across the old world followed a southern route Henry (ch. 2), working with this state of knowledge, specifically leaves open the possibility of cultural and biological links between Neanderthals and modern humans.

The genetic picture has been revolutionized in the last 20 years. Neanderthal nuclear DNA demonstrates that modern humans and Neanderthals did interbreed (Green et al. 2010). Further, aDNA analyses led to the discovery of a previously unsuspected population in southern Siberia, Denisovans, at first only known from aDNA (Reich et al. 2010). Combined with the analysis of early modern humans in Eurasia (Hajdinjak et al. 2021), a radically different picture of the demographic developments leading to the current modern populations populating the world has taken shape over the past two decades.

There are genetic traces inside the Neanderthal genome of very early interactions with modern humans. An early range expansion of *Homo sapiens* from Africa brought the two populations into contact and led to the Neanderthal mtDNA and Y-chromosome being completely replaced by an early *Homo sapiens* version (Petr et al. 2020). This evidence tallies well with the fossil from Misliya cave demonstrating modern human presence outside Africa much earlier than expected (Hershkovitz et al. 2018). The inheritance of mtDNA and the Y chromosome are inherited directly from the mother and the father respectively. There is no recombination as with the "normal" chromosomes and inheritance is from a single parent. This makes a "winner-takes-all" evolutionary scenario much more likely for these variants of the DNA than for the nuclear DNA. The early *Homo sapiens* population involved in this introgression did not leave a genetic legacy in the African populations ancestral to modern-day modern human populations. So ironically, the mtDNA that originally led to the idea that Neanderthals were genetically outside the range of modern human variation and did not interbreed, was itself an originally modern human genetic contribution, resulting from interbreeding!

The analysis of nuclear DNA of Neanderthals demonstrates that modern humans outside of Africa carry a small (~2%) but recognisable Neanderthal contribution that Africans lack (Green et al. 2010). This suggests that Neanderthal introgression into *Homo sapiens* genomes took place in the populations ancestral to all modern non-Africans, so during the early stages of the final modern human range expansion outside Africa, likely in the Levant, likely at some point between 100.000 and 50.000 years ago (Sánchez-Quinto & Lalueza-Fox 2015).

Another important development is the identification of so-called "ghost populations", archaic populations other than Neanderthals and Denisovans who contributed to the modern human genome, but who we cannot tie to specific fossils yet (Veeramah & Hammer 2014). These contributions have been isolated from the DNA of contemporary populations and they verify the possibility that other archaic humans were present in the period under discussion, perhaps exemplified by fossils such as at Nesher Ramla.

Finally, DNA of early modern human fossils found in Europe, encountered with the so-called "Initial Upper Palaeolithic" (IUP) shows recent Neanderthal ancestry (Hajdinjak et al. 2020). IUP populations may have interacted with Neanderthals in Europe. Yet, they do not appear to contribute to the gene-pool of subsequent European populations tied to the well-known Aurignacian culture (Hajdinjak et al. 2020). The Upper Palaeolithic populations associated with the later Pleistocene and Mesolithic hunter-gatherer occupations appear to only carry DNA from earlier introgression events, presumably taking place in the Levant.

Current views of the emergence of modern human populations emphasise that even though the bulk of our genetic material has an African origin, our population history involved many different populations both inside and outside of Africa, the occupations at Tor Faraj date to this period of interactions.

Conclusion: The Levant, modern human behaviour and Tor Faraj

The search for the origin of modern behaviour is no longer the most productive approach to study why and how behavioural complexity is developed. It underplays the flexibility with which sophisticated behaviours developed in differing populations of large-brained human species both inside and outside Africa. Complex, sophisticated behaviour in Africa can be argued to be as old as our species (Shea 2011). It was thus developed prior to the occupation of the Levant by *Homo sapiens* populations. At the same time complex behaviours were developed by Neanderthal populations as well (e.g. Niekus et al. 2019; Roebroeks & Soressi 2016).

While the origins of such behaviours are far older than the later part of the Levantine Middle Palaeolithic, the region's archaeological record still holds great significance for our understanding of the development of the specific behaviours exhibited by modern human populations outside of Africa. Despite intensive searching, no really clear similarities that can point to a cultural ancestor – descendant relationship with African assemblages have been definitively established. Hence, the Upper Palaeolithic whose descendant industries are recognised across large parts of Eurasia develops in the Levantine melting pot.

The analysis at Tor Faraj highlights the foundation from which the Upper Palaeolithic will develop. The volume reviewed here excellently illustrates the sophistication of a late Middle Palaeolithic technological system, reduction sequence that efficiently produces the preferred pointed blanks. It is tempting to see the single refit sequence at Tor Faraj as signalling that its occupations foreshadow the development of Upper Palaeolithic industries with an increasing focus on prismatic blades inside the Levant.

In all Late Middle Palaeolithic (between 100.000 and 50.000 years ago) is arguably the most important period in the history of the Levant up to the current day. At this time the region is home to the coalescing populations whose genetic legacy of a mix of overwhelmingly African *Homo sapiens* DNA with some Neanderthal genetic introgression characterises all human populations outside the African continent. Culturally, the region brings forth the characteristic archaeological signature of the Upper Palaeolithic. It is the bearers of these cultures that will disperse across much of Eurasia. To understand these behaviours, we need more meticulous excavations and sophisticated analyses such as these reported here, in addition to the brute force of geo- and biochemical analysis of DNA and stable isotopes. This made "Neanderthals in the Levant" a delight to read.

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