Locals and Foreigners in the Levant during the Pleistocene.

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Introduction

The aim of this paper, without providing a full account, is examining with a critical eye several possible interpretations of Levantine Paleolithic archaeology. The Levant was and still is a geographic corridor that accommodated early migrants who settled down and deciphering their interactions with later newcomers is an intriguing question. Clearly, the history and archaeology of southwestern Asia demonstrates that the Levant served indeed as a bridge between Africa and Eurasia. Additional information is provided by recent research of palaeogenetics concerning past dispersals and admixture of Pleistocene and later Holocene populations. The amount of information on the prehistory of this vast region by investigating the so-called "green Arabia" provides rather anecdotal data when mobile hunter-gatherers exploited the environments of temporary wetlands. The only area where stable ecological conditions for human subsistence during the Pleistocene persisted was the Levant. Its landscape is enclosed between the Mediterranean Sea in the west and the Syro-Arabian Desert in the east. It is 'funnel' shaped, narrow in the south and widening in the north, at the foothills of the Taurus-Zagros arc and the upper Tigris and Euphrates rivers. The climate of the Levant and neighboring areas is dominated by cool, rainy winters and hot, dry summers, and the availability of permanent water resources within a topographic variable vegetation be it crossed from north to south or west to east, providing favourable ecological niches that attracted people through many millennia. Archaeological and palaeogenetic research demonstrate how Africans spread into Eurasia, employing as their main path the Levant, infrequently crossing though the Bab el-Mandeb straights and the Arabian peninsula. Coastal navigation during the Late Pleistocene and Holocene, whether in the Mediterranean Sea, Red Sea or the northeast Indian Ocean, increased the options of travelling routes. Taking together the archaeological records and the Pleistocene geographic conditions the following questions are:

A. Who were the first people that occupied the Levant?

B. Did new people arrive from Africa or from regions of western Asia and what was the nature of their interactions with the locals?

C. Did every group had its particular tool kit or after arrival developed their own lithic industry?

These questions address people and events from ca. 1.85 Ma to 0.012 Ma. In the course of about 1.800,000 years physical and social evolution of foraging societies took place until the first emergence of farming. Identifying the social structure of hominins and their long-term survival is a constant challenge when conducting fieldwork, analyzing finds, interpreting the material culture data, and the available fossils.

In brief, the story begins with the Early Pleistocene hominins who moved into the Levant from Africa, continued further north to spread in Asia and later in Europe. Bearers of the Acheulian toolkits did the same but were limited to Asia. The Acheulo-Yabrudian was either a local culture or a foreign one arriving from the north (*Fig. 1*).

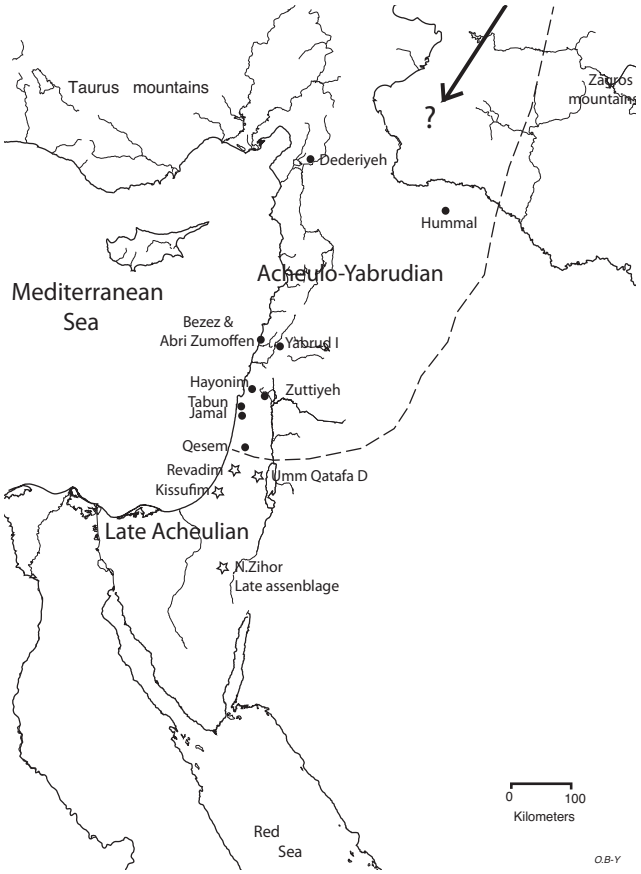

Figure 1: *The distribution of the known Acheulo-Yabrudian sites and the boundary with the Late Acheulian. The arrow marks the possible origins in the northeast.*

The Early Mousterian (or Abu Sifian) and the Middle Mousterian were probably produced by the ancestors of the Skhul-Qafzeh humans. Although the absence of fossils from the Early Mousterian does not yet allow us to support this hypothesis I believe that given the fossils of Omo-Kibish and Herto-Bouri it is only a matter of finding older fossils that will allow us to see the origins of modern human some 300,000 years ago.

Late Mousterian, if correctly identified as having been made by Neanderthals, suggests a flow from north (Anatolia?) to the south and the east (e.g., Shanidar). Similar questions concerning the direction of dispersals or the formation of new archaeological entities are posited concerning the Initial Upper Paleolithic that may have originated in the Nile Valley, the following Ahmarian representing already a local culture. The arrival of the Aurignacian culture (*Fig. 2*) that emerged in Western Europe, by sea or by land and its demise is another enigma.

Another arrival from Northeast Africa of Terminal Pleistocene foragers through the Sinai Peninsula possibly admixed with local foragers became the founders of the Natufian society (*Fig.3*). During all these stages foraging societies became local and during many or a few generations modified, some more some less, the imported tool-kits to their needs.

Discussing the four questions mentioned above should be done in the context of what is known concerning primate behavior and foraging societies. Earlier surveys of the Levantine Paleolithic will be used (e.g., Bar-Yosef 1994; Malinski-Buller 2016) but the following pages are not intended as an update. Room is given to interpretations that sometimes draw information from other geographic regions. I will try to paint a slightly challenging view of the Levantine Paleolithic sequence as a history of migrants coming in, developing bringing their cultural markers expressed in the lithic assemblage, mix or not with the locals who preceded them, and replaced or mix with the next wave of migrants.

Comments on Human Social Evolution

In the efforts to decipher the history of early hominins, at least since 2.6 Ma ago, the tendency is to rely on the living primates with minor additions from studies of recent foragers, in order to describe their social structure, group size, environmental adaptation, degree of communication, the making of stone tools, as well as the success or failure in securing their subsistence. While natural selection of

Figure 2: *The distribution of Aurignacian sites and the general area of the Ahmarian.*

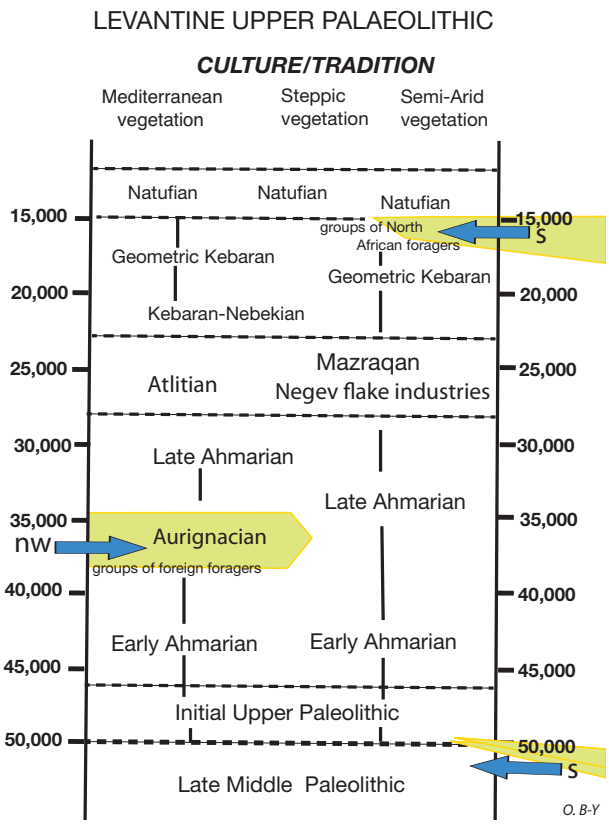

Figure 3: *The main cultural entities of the Levantine Upper Paleolithic sequence. Note the directions from which migrants arrived in this region. NW=Anatolia or Europe, S=Northeast Africa.*

the individual, is a long accepted stance by biologists, the idea that 'group selection' was a critical trait in social evolution was not favored in the past. Yet recently, it is back on stage in discussions concerning societal evolution. In this domain we also need to take into account that the evolution of the neocortex size is tied with the evolution of the social brain (e.g., Gowelett *et al.* 2012). Accordingly, group size is calculated and group size of Homo ergaster and Homo erectus is estimated to comprise 50-100 individuals, while groups of H. heidelbergensis, Neanderthals and modern human are considered to comprise 100-180 people (Gowlett *et al.* 2012, figs 1 and 2). The latter number reflects the number of individuals who keep close communication but the writers note that some 500 people would be a 'mega band" and 1500-2000 a tribe. These numbers support the information discussed by Birdsell (1973) who named the basic unit as the "Dialectical tribe" that secure the required population size for viable reproduction.

In taking such studies into account we should consider the evidence for convergence such as already noted by Darwin who wrote that "there is good evidence that the art of shooting with bows and arrows has not been handed down from any common progenitor of mankind, yet the stone arrowheads, brought from the most distant parts of the world and manufactured at the most remote periods, are…almost identical; and this fact can only be accounted for by the various races having similar inventive or mental powers"(Darwin 1871.p. 225). We can add other convergent inventions such as pottery making and metallurgy but should ask the question whether this could have happened many more times during the time of 1.7/1.6 through 0.25 Ma since the making of the first Acheulian handaxes (bifaces) to the appearance of the Mousterian. Moreover, it is argued whether the emergence of inventions that occurred within the social arena happened within the context of a small or large population (e.g. Vaesen *et al.* 2016 and references therein).

I rely in the suggested interpretations concerning Paleolithic cultures on conceptual models derived from the literature on primate behavior and modern foraging societies. Numerous sources provide information and comments on social organization, population size, the emergence of inequality, total fertility rate, infanticide, densities of humans per 100km?, ecological conditions expressed as estimated carrying capacity, and existence of physical conflicts (e.g., Kelly 2013; Gat 2015 and references therein). I will also incorporate estimates of group size (also referred to as 'tribes'), territoriality and boundaries, rate of technical innovations and issues of group-cum-population extinction.

Finally, there is always an issue of the terminology employed in prehistoric research. After two centuries we still use the chronological subdivision of the Paleolithic into Lower, Middle, and Upper. In the Levant we have divided the latter into Early Upper Paleolithic and Epi-Paleolithic, thus departing from the Eurocentric term. We also got rid of 'Mesolithic' but adopted the term 'Neolithic' as defined already in the 19th century. This terminology caused researchers to try and study the transition from the Lower to the Middle Paleolithic as if these terms are as valid as two different taxons, instead of concentrating on the cultural changes identified as Oldowan, Acheulo-Yabrudian, Mousterian, Ahmarian, etc. For simplifying the current presentation I will use industrial/cultural terms within the chronological frame of the Pleistocene. However, I am fully aware that those who choose to avoid anthropological terms because they are not sure how these represent the 'people with no name' refer to the periodic terms as if they are 'prehistoric cultures' such as the current use of Early Epipaleolithic and Middle Epipaleolithic as if synonymous with two different cultures.

The Oldowan in Southwestern Asia

The material culture of early hominins in Africa (ca. 2.6 Ma), comprising simple stone tools, is considered as the marker of hominin creativity because "creativity lies at the root of the cultural diversity of modern humans. Intimately linked with notions of progress and improvement, it propels much of the dynamics of change and diversity in major cultural undertakings of contemporary cultures such as science, art, design or engineering. "(Hovers 2012, p. 51). Primates may use stone objects as recorded in Africa and Southeast Asia. However, some of this evidence of tool using by chimpanzees in western Africa was not examined as possibly indicating imitation by watching their human neighbors (Mercader *et al.* 2007; Hovers 2012). A somewhat similar situation could have occurred when Homo habilis made the first sharp stone tools like contemporary paleo-chimps, and the knowledge was spread by imitation from one group to the other. The distribution of this rather simple 'know how' is probably explained if groups of Homo habilis fissioned and regrouped frequently.

When the observations that primates can make stone tools or use other objects such as tree branches, are taken into account they illuminate the origins of technology (de Beauune 2004). The

known Oldowan artifacts are categorized as produced by hand-held percussion assisted by hammerstones that result in detaching flakes from cores (originally natural nodules). Alternatively the bipolar technique for obtaining flakes is hitting a nodule placed on a larger stone that serves as an anvil. The process is the same as nut cracking. These basic techniques were employed by early hominins and was used among modern humans in both the Old and New World. However, the term Oldowan is generally reserved to the African and similar contexts in Western Asia that are dated prior to the emergence of the Acheulian complex around 1.7/1.6 Ma.

Given the known Paleolithic record of the Levant it will be difficult to study migrations through this region without looking for the sources of the human groups in Africa for most but not all the cases. At the same time we need to look where migrants arrived when we have not yet the evidence to trace their paths through the Levant or another region. For the earliest known dispersal we therefore need to examine the case of Dmanisi. Early hominins practiced the knowledge of making simple stone and possibly wooden tools, that unfortunately were not preserved, were apparently the bearers of the 'know-how' that facilitated the first Homo erectus, some 1.85 Ma ago, to make it to Dmanisi in the Caucasus area (Ferring *et al.* 2011). On their way through the Levant hominin groups adapted to the Levantine resources that definitely do not characterize an African savanna (Bar-Yosef and Belmaker 2011).

The systematic excavations at Dmanisi produced the remains of five individuals identified on the basis of their skulls as close relatives of the African Homo erectus (Lordkipanidze *et al.* 2013). Even further away, at the eastern end of Asia, skeletal remains generally demonstrate similar characteristics. Not surprisingly the lineage that dispersed during some 200,000 years across this continent produced essentially the same Oldowan core-and-flake industry (Leakey 1971; Dennell 2009). Assemblages of similar composition were reported from various Levantine sites as briefly mentioned below, some of which are chronologically cotemporary with the Acheulian sequence.

But before we delve into the issue of prehistoric migrations that allowed the dispersal of human populations across the globe, it is worth mentioning that certain scholars did not believe in Paleolithic migrations as potential causes for population replacements. When looking for information about hominin dispersals it seems that mammal carnivores are probably the best comparison. There, males disperse more than females but in new places, giving up natal philopatry, they need to ensure that reproduction is secured. We therefore need to view the movements away from 'home' as a group adventure. Individual movements from group to group should be based on prior knowledge of the geography and this will fall within the category of gene flow. Groups that became isolated are most probably doomed to die. The latter would probably occur when ecological isolation evolves due to natural hazards such as a climatic fluctuation, floods, or severe droughts. In this context two questions arise. First, 'what path did the hominins of Dmanisi took when they left Africa? Did they pass through the Levant or took another way?' and second, 'Did the population of Dmanisi after 1.77 Ma continued to spread in Eurasia?' There is no easy answer to the first question. We note that one potential way for the arrival of Homo erectus in the Caucasus area is based on their chosen or accidental path through the Levant. The Levantine predictable year-round vegetal and animal food sources along the coastal plain and the Jordan Valley or the Jordanian plateau, as well as the Euphrates and Tigris rivers further north secured hominins' survival.

In searching for early temporary hominin stations, 'Ubeidiya, the well-known site is later by some 300,000 years from Dmanisi (and see below). Still there are a few Levantine localities such as Borj Kinarit on the Lebanese coast, that might have been earlier than 'Ubeidiya, to propose that the Levantine Corridor was the road to the Caucasus. This view portrays the Levant as the main optimal path into Eurasia that was used many times by groups of prehistoric hunter-gatherers. An alternative path could have been through the straights of Bab el-Mandab at the southern gate of the Red Sea. One may argue that this is not an easy path even when the sea level was lower. However, archaeological investigations in Arabia suggest that at least several groups of early Homo erectus foragers were successful in crossing the straights. Current studies reveal that both Oldowan and Acheulian artifacts were found in Djibouti and Yemen (Petraglia 2003). We assume that the Asian road took Homo erectus through Oman, the coastal plain of the Persian Gulf and through the Zagros foothills to the Caucasus. Yet we still need further archaeological data to verify it.

An additional aspect, rarely discussed, is related to the nature of migrations and its difference from gene flow. Often, concerning the early Paleolithic we do not have the information from the field how migrations took place on a generational scale. Did

one group or several moved into a new territory and stayed there and only the next generation moved on? How the breeding system was maintained? This is not an easy issue even when we discuss human movements or large-scale migrations of modern humans that occurred 60/50,000 years ago or during the Neolithic Revolution. While adopting one hypothesis or another, we should consider events of extinction due to the failure of the breeding system, climatic hazards, or survival mixing with local foragers. Paleogenetic evidence demonstrated that the latter occurred when modern humans met contemporary Neanderthals. I therefore assume that it did happen also in earlier times. But in the same vein we should consider physical conflicts that resulted in extinctions.

Early Acheulian

In western Asia second in antiquity to Dmanisi, for the time being, is 'Ubeidiya in the Jordan Valley where numerous bone and artifact bearing layers were traced in a geological sequence of 150 meters long, exposed in more than one trench (Bar-Yosef and Goren-Inbar 1993). The site is dated to ca. 1.2-1.6 Ma on the basis of faunal correlations and preliminary paleomagnetic investigations (e.g., Bar-Yosef and Belmaker 2011). The dominant types of the local environments exposed within the sequence of 'Ubeidiya are lake-shore and deltaic deposits as well as rare dry wadi channel deposits. Numerous species of mammals, reptiles, birds, fish and mollusks comprise the faunal assemblages (e.g. Tchernov 1986; Belmaker 2009; Gaudzinski 2004).

Early paleoecological reconstructions of 'Ubeidiya suggested affinities with the African savanna. However, comparisons of the entire mammalian community indicate its similarities with that of Dmanisi and sites in the Mediterranean basin attributed to the Late Villafranchian. These observations support Tchernov's earlier contention (1986) that the origins of the Levantine fauna is mainly Eurasian with but a few older African 'stragglers' and ecologically it does not represent an ecological continuation of the African environments frequented by Homo erectus (Belmaher *et al.* 2002). In addition, cut marks, and percussion marks on mammalian bones reflect the use of meat and marrow exploitation by hominins (Gaudzinski 2004).

The lithic assemblages at 'Ubeidiya include a variety of forms mostly correlated with various raw materials (Bar-Yosef and Goren-Inbar 1993; Belfer-Cohen and Goren-Inbar 1994). The local hominins employed operation sequences that fit the particular type of raw material. Core-choppers and flakes were mostly made of flint. Spheroids were shaped from limestone cobbles, most of them weighing ca. 0.5 kg with the largest one about several kilograms. This observation raises the issue of classification as well as the function of the spheroids. For example, spheroids in Olduvai (Bed I, II) are made of quartz cobbles and their final shape resulted from pounding (Schick and Toth 1994). However, those recovered in Ain Hanech (Algeria) were made of limestone, similar to those at 'Ubeidiya. Experimental studies demonstrated how they were shaped from larger limestone cobbles and produced a considerable amount of flakes (Sahnouni *et al.* 1997). The spheroids in both sites do not show the same typical pounding traces as the African ones. Their interpretation as cores is feasible although it leaves us wondering why in the presence of a large number of flint flakes hominins needed softer, more brittle, limestone flakes. Flint flakes provide sharper edges but perhaps the limestone flakes were desired for a particular activity. Or the rounded shapes of the spheroids were the goal of the production and the subspheroids (i.e. the 'cores') were simply the failed ones. Finally, handaxes, trihedrals, quadrihedrals (the latter a unique form) and picks were made mainly of basalt, fewer of flint and rarely of limestone.

This industry was assigned to the Early (or Lower) Acheulian due to the presence of (either few or numerous) handaxes, in most but not all the contexts. This situation resembles the assemblage of layer 16-18 at Hummal (in the el-Kowm oasis, Syria) where the small sample contains cores, flakes and a couple of spheroids, but no bifaces (Wegmüller 2011). The most noticeable phenomenon at 'Ubeidiya is the direct correlation between the size of the artifact category and the type of raw material that reflects hominins' learning and experience. The smallest pebbles and cobbles on the beaches of the 'Ubeidiya lake were flint, larger ones were both limestone and basalt. Basalt was common in the hilly area as recorded in layers K24-25 which accumulated in a wadi channel that reached the beach of the lake (Bar-Yosef and Goren-Inbar 1993).

The size of the basic group of Homo erectus 'Ubeidiya is an interesting issue. Was it small like an average band of modern foragers (n=25) or larger? There is no easy way to answer this query. One can hardly imagine that the area known from the excavations at the site was occupied repeatedly by just one group of ca. 25 individuals. Such an assertion demands a response to the issue of viable reproduction. It would be more reasonable to expect that given the variable, rich environments of both sites

with the abundance of animal and vegetal food resources, we should assume the following two factors: first, group's size was more like that of primates such as ca. 80-100 members (Dowlett *et al.* 2012) and second, that bands were living in close proximity. For the site of 'Ubeidiya we should adopt a wider view of the central Jordan Valley. The beaches of 'Ubeidiya lake extended across the valley and were at least some 60 kilometers all around, and perhaps more. Such lush environments provided additional localities for human seasonal/temporary camps that today are only represented by the small exposed area of the excavations. Thus, a larger social entity of some 500 hominins or more may have exploited successfully during many millennia the variable Mediterranean ecology of the Central Jordan valley.

The Acheulian Sequence in the Levant

The Acheulian sequence of southwestern Asia was traditionally subdivided on the basis of lithic typology into three "phases": Lower, Middle and Upper Acheulian. However, with new analysis of additional collections and further dating this schematic subdivision becomes almost obsolete. Until recently assemblages were incorporated in each "phase" on the basis of the morphological and metrical attributes of the bifaces. In general the degree of refinement and symmetry of the handaxes were the criteria for their relative age, when actually these attributes probably reflect the degree of skill and the amount of reshaping. Today the general subdivision is just into Early and Late Acheulian (e.g., Malinsky-Buller 2016).

Over two hundred Acheulian occurrences were recorded in the Levant, southeastern Turkey, and the Zagros region. Their contributions to the chronological and techno-typological sequence is described elsewhere (e.g., Bar-Yosef 1994; Goren-Inbar and Sharon 2006; Malinski-Buller 2016). However, the number of excavated sites is still small. The so-called "Middle Acheulian" is best known from systematically collected samples in river gravels along the Nahr el Kebir, the Orontes and the Euphrates Valley in Syria as well as finds collected in Joub Janine in the Beqa'a Valley, Lebanon and Evron-Quarry in the coastal plain, Israel. Chronologically they were all assigned to the late Lower and early Middle Pleistocene. However, analysis of assemblages in the southern Levant that were attributed to this 'phase' on the basis of the dominant biface forms, could be also attributed to the Upper Acheulian (Malinsky-Buller 2016). The geographic distribution of the Late Acheulian contexts is an important issue already mentioned elsewhere (Bar-Yosef 1998) in the context of geographical distribution of social entities that will be discussed below. The possible contemporaneity between makers of different lithic industries, namely, the 'core and flake' industry and Acheulian, raises the issue of boundaries and survival of groups within a metapopulation. A unique case of local cultural independence is represented by the excavations at Gehser Benot Ya'aqov.

Gesher Benot Ya'aqov

Younger by at least 400,000 years than 'Ubeidiya, the site of Gesher Benot Ya'aqov is situated in the northern Jordan Valley and dates to ca. 0.78 Ma, the boundary of the Bruhnes and Matuyama palaeomagnetic epochs. It stands out due to the exceptional large amount of information on faunal, plant remains, use of fire, rich stone artifact assemblages and the local paleoecology (e.g., Alperson-Afil 2008; Melamed *et al.* 2016). Among the fauna, the elephant remains (Palaeoloxodon antiquus) are rather impressive. The estimated duration of the archaeological levels in the formation can be estimated as 10-50,000 years.

Most of the industry was manufactured from basalt with fewer artifacts of flint and limestone. The high frequency of cleavers made of basalt flakes (Goren-Inbar *et al.* 2011) provides an African aspect to this industry and may indicate its geographic origins. This could be the evidence for a new movement of hominins from Africa into the Levant (Bar-Yosef 1994). Similar industries, either early or late Acheulian, with cleavers, were traced in the Arabian peninsula along the Red Sea coast and inland. Apparently their makers moved between wetlands that allow temporary survival enabling the "leapfrog" advance of local mobility (Shipton *et al.* 2014). A similar situation was recorded in the context of Nahal Zihor in the southern Negev (Ginat *et al.* 2003). Accepting that this was yet another path of migration is a reasonable conclusion. With the almost absence of a developed cleaver industry in the Levant, except for isolated finds, the question is where did the original makers went next? Was it India where a similar industry such as Attirampakkam (Pappu *et al.* 2011) was recorded in other locations?. This site is paleomagnetically dated to a reversed magnetic period with no evidence for the Jaramillo (0.97) or Olduvai (1.77-1.95 Ma) normal events, and is therefore suggested to have been occupied sometime between 1.07 to 1.77 Ma. Using 26Al/10Be dating technique the age of 1.51±0.07 Ma was obtained. Undoubtedly, this requires further explorations.

A bird's view of Eurasia as the receiving end of African migrations raises two possible interpretations. First, that the making of the Acheulian in places far from each other and the immense geography of Southeast and East Asia we may expect convergence of hominin technological expressions in the same sense as cited above from Darwin's writing. Second, that the Acheulian of India was not initiated independently but arrived with the Homo erectus groups who moved from western to eastern Asia and colonized the southern subcontinent. With currently available information it is yet not easy to support either of the two hypotheses.

Acheulian and Core and Flake industries - one or two different populations?

The current state of Lower Paleolithic research demonstrates that the earliest knapping techniques produced the Oldowan industry. Core and flake assemblages are present across Eurasia to be followed by the Acheulian almost everywhere. However, the former is found to be generally contemporary with the latter and the question posited in the literature of the 20th and early 21th centuries is: Do core and flake assemblages represent a different group of people or are they special task, seasonal camps of the Acheulian?

A special case within the Early Pleistocene records of the Levant that enforces the presence of a different group of people, possibly contemporary with the bearers of the Early Acheulian handaxes is Bizat Ruhama (Zaidner 2013 and references therein). The site is located in the southern coastal plain or the northern Negev. Excavations in a few trenches demonstrate that the anthropogenic remains are embedded within a sandy 20-50 cm thick layer that stretches over 6-8,000 m^2. It is dated by paleomagnetic observations and the extinct fauna of Pontoceros ambiguus or Spiroceus together with Equus cf. tabeti to the Matuyama reversed polarity chron. Other faunal elements include large bovine, possibly Bison sp. and gazelle. Evidence for intentional bone breaking for marrow extraction and a few cut marks reflect the exploitation of the available game. The site is considered to indicate relatively dry conditions but was probably in the vicinity of a wetland.

Artifacts were produced mostly from small, rounded chert cobbles although larger ones were also present, retrieved from nearby Pliocene exposures of conglomerates. Direct percussion and bipolar technique, representing two rather complex operational sequences, enabled detaching numerous flakes of which about half, often the thicker ones, were notched, trimmed, and used as cores (Zaidner 2013).

The exact age of the site within the Lower Pleistocene is essentially unknown. It could be older than 'Ubeidiya and thus belong to the time of the first "out of Africa" that preceded Dmanisi. On the other hand it could be later and fall in the range offered by the 'Ubeidiya contexts. In this case, as suggested by the excavator, it demonstrates a general contemporaneity with the Early Acheulian. Moreover, the presence of large cobbles means that handaxes could be made. But there are none in the Bizat Ruhama assemblages. This type of industry had its own characteristics and although its chronological place is probably during the Early Pleistocene, it suggests a general contemporaneity with the Early Acheulian.

British archaeologists faced a similar problem. The Clactonian (core and flake dominated) and the Acheulian were discovered in numerous sites causing archaeologists to argue whether the Clactonian was made by the makers of the Acheulian assemblages or by different people. Finding several isolated bifaces within rich Clactonian assemblages were interpreted as a seasonal or special task site of Acheulian makers either due to special adaptations to climatic fluctuations, or the use of the same local raw material sources.

Cores and flakes in caves were documented as earlier layers than the Late Acheulian sequences in Tabun and Umm Qatafa caves. They were referred to as similar to the European Clactonian-Tayacian. Whether these are remains of an Acheulian temporary camp or not can be tested by searching for typical flakes that were obtained from handaxe making and resharpening.

Observations are also important when the geographic distances between the two kinds of sites are taken into account. Core and flake assemblages could be located hundreds of kilometers away from Acheulian camps, or just a few km away or, depending on our interpretations, included within the same stratigraphic sequences as observed by the original excavators of Tabun and Umm Qatafa caves. It is easier to accept the proposal that the same hominins were responsible for making both toolkits when they are located in proximity in two close localities in the coastal plain such as the two localities of Kefar Menahem (Lulim) and Kefar Menahem West (KMW) where 'core and flake' products with no bifaces characterize the two excavations (Barzilai *et al.* 2006). On the basis of TT-OSL analysis KMW is dated to the range of 468- 442 Ka (Malinsky-Buller 2014; Malinski-Buller *et al.* 2016). The core and flake component is similar to Revadim, an Acheulian site just a few km away (Malinsky-Buller *et al.* 2011; Malinsky-Buller 2016).

Revadim is a large site situated in the same environment of the coastal plain (Marder *et al.* 2011; Malinski-Buller *et al.* 2016). Due to the detailed analysis of the core and flake component in KMW a clear similarity to the same component in the Acheulian of Revadim was demonstrated. This speaks in favor of the interpretation that the lithics were produced by the same hominins who also, somewhere else, made bifaces (Malinski-Buller 2014; Malinsky-Buller *et al.* 2016). As the dates of Revadinm are placed from 500-400 Ka one may assume a general contemporaneity. In the lack of better dates I suggest to follow the British case that the two contemporary industries were made by different groups of people. Such distinction is more easily accepted when the sites are located far away.

A good example is Dursunlu, a site that probably postdates the Jaramillo subchron, exposed in lignite beds in central Anatolian (Güleç *et al.* 1999). A rich collection of micro and macro mammals dominated by Megaloceros (a deer species common also in the Levant) was associated with a small assemblage of quartz flakes, some flint artifacts and spheroids, and no evidence of handaxes. As a side note, one should recall the nearly absence of Middle Pleistocene Acheulian contexts in western Anatolia, Greece and the Balkans and the rest of Eastern Europe. The presence of the Acheulian in Western Europe raised the question whether the makers of these assemblages crossed the Mediterranean Sea through Sicily or the Gibraltar straights. Hence, if this interpretation is correct then the dispersal of the Acheulian from Africa took more than one path.

The evidence from Dursunlu in Turkey and further westward in sites in eastern and Mediterranean Europe is interpreted in favor of the position that the 'non-Acheulian' industries were made by different people. Accepting this position than the question is 'what was the nature of relationship between the makers of the 'core and flake' industries and the bearers of the Acheulian?" One can choose from the three options of how different tribes of foragers when they first meet treat each other namely, ignore the newcomers, join them, or kill them (e.g., Gat 2015 and references therein). However, the nature of the confrontations between the two groups can change through time.

The issue of potential contemporaneity of the different industries and my proposal to identify the social structure of past Paleolithic hominins on the basis of their tool making techniques require a few general comments. The current literature on the production of stone tools recognizes the role of imitation, teaching and learning processes that operate at the level of every group both vertically -parents to child, and horizontally- among peers or other adults. Groups within the "dialectical tribe" striving to secure biological viability are expected to share the same tools (as well as a set of symbols) or other objects that serve as markers of their identity. Differences in the level of expertise, often attributed to the age of the knappers, sometimes can be traced. Our current knowledge of past operational sequences of various groups of foragers as the 'know how' that was responsible for the formation of lithic, bone, and antler assemblages becomes the means for recognizing 'people with no names'. Past proposals by skeptics that insisted that a degree of individualism among Paleolithic groups in the making of stone tools should not allow us to identify the social markers of a particular social entity, in my view, were proven wrong. Moreover, it is not the nature and availability of raw material that determines 'how' or 'why' humans made particularly shaped tools, but their technological concepts. These observations take into account the learned skill from an early age, like languages, of 'know how' expressed in the chaîne opératoire (operational sequence) and the skill of the flint knappers. This knowledge was passed on from one generation to another during several or many millennia as we observe also among cultures of modern humans. The roots of this behavior are to be found in the early Paleolithic.

The general contemporaneity of Acheulian and core and flake industries lasted until the mid-Middle Pleistocene. None of the explanations above is satisfactory when we consider the needed size of a biologically viable population. In an anecdotal perspective perhaps when rare bifaces are found in contemporary core and flake contexts it could have been a case of exchanging gifts.

The Acheulo-Yabrudian

My concepts and ideas about the making of stone tools influence my interpretations concerning the Acheulo-Yabrudian entity. Its chrono-stratigraphic position was secured at sites geographically apart by 450 km as the crow flies. Through this area Acheulo-Yabrudian contexts are found above the Late Acheulian and below the Mousterian, as in Hummal, el-Kown basin (Al Qadi 2011; Jagher and Le Tensorer 2011), Dederiyeh cave (Akazawa *et al.* 2017), Hayonim cave (personal observation), Tabun, Zuttiyeh cave, Misliya and Yabrud I. In Bezez cave the Acheulo-Yabrudian overlain by the Mousterian while in Abri Zumoffen it is overlain by the Amudian (Copeland 2000). In both sites the "beach industry"(i.e. the Acheulo-Yabrudian) is a core-and

flake one. Its presence and relationship with the other, clearly defined assemblages on site, is intriguing. Surface material assigned to this industry was also found in Ain el Beidha in the Azraq basin, Jordan (Copeland 2000). In Qesem cave it is the only entity present but the base of the deposit has not been reached as yet (Gopher *et al.* 2005). The dating by ESR and TL methods provided a chronological range of ca. 400 to 250/220 Ka (Mercier *et al.* 2013 and references therein). The only well know human remains, a fragmentary skull was found in Zuttiyeh is currently attributed to the basal Middle Pleistocene population that could have been the ancestors of both the Neanderthals and modern humans (Freidline *et al.* 2012). A collection of human teeth from Qesem has been considered as portraying a few traits suggesting some affinities with the Neanderthals but mostly show a closer similarity to the archaic modern Skhul-Qafzeh remains (Herhskovitz *et al.* 2011).

Three "facies" or combinations of different frequencies of the same tool types represent the Acheulo-Yabrudian: one is dominated by small bifaces ('Acheulian'); the second - by numerous side scrapers, déjété scrapers, and transverse scrapers often shaped on thick flakes resembling Quina scrapers ('Yabrudian'); and the third comprises some backed blades and/or many unretouched blades as well as rare bifaces ('Amudian'). Jelinek (1982) suggested the term "Mugharan Tradition" to include all three facies, attributing it to the Middle Paleolithic. The Acheulo-Yabrudian at Qesem is characterized by a rich blade industry (Amudian) and Quina scrapers, with a very few handaxes (Yabrudian) (Parush *et al.* 2015).

The geographic distribution of the Acheulo-Yabrudian is an interesting phenomenon that has far reaching social implications. The southern boundary (Fig. 1), cuts across the southern Levant, leaving out the Negev and probably the southern Jordan. The distribution of the northern Levantine sites shows that the makers of the Acheulo-Yabrudian successfully survived in the Mediterranean belt (e.g., Dederiyeh) as well as in the steppe (e.g. el-Kowm); therefore their absence in the Negev, well documented, means that the imposed boundary was because of social rather than ecological considerations. Current hypothesis suggests that the southern semi-arid lands was occupied either by Late Acheulians as a good number of sites was reported (Ronen *et al.*1972; Grosman *et al.* 2011). If indeed the southern boundary will stand additional field research, then the next question is: 'was the Acheulo-Yabrudian a native culture of the Levant - a 'descendent' of the Late Acheulian, or did it arrive as a successful suite of foreign groups of hunter-gatherers? Assuming that the last option is correct then possibly the original homeland of these people could have been the Caucasus. Layers 5b-4b in Treugol'naya cave, a site on the northern slope of the Caucasus at about 1500 m above sea level, are characterized by Quina scrapers, a few simple forms of bifaces (called 'proto-bifaces'), partly made on flat pebbles, and no blades (Doronichev 2008 and references therein). This industry is dated by ESR (EU and LU) from 406±15 to 365±12 in the MIS 11, or even earlier. Still, whether this was the origin of the Levantine Acheulo-Yabrudian or non-Levallois Quina type assemblages in Western Europe, needs further research.

Late Middle and Upper Pleistocene

Stratigraphically the Mousterian industries sequence is characterized by the presence of various methods of the Levallois techniques in variable frequencies and is present, though with some chronological gaps, at Tabun cave. Most other caves across the Levant produced only portions of this sequence including sites such as Tor Faraj and Tor Sabiha in the south, Kebara, Qafzeh, Amud, and Shovakh in the Mt. Carmel-Galilee area, Ksar Akil, Naame, Nahr Ibrahim and Keoue along the Lebanese coast, Yabrud II, in the Anti-Lebanon mountains, Dederiyeh and Uçagizli in the north and Jerf Ajla and Douara in the Palmyra oasis. Open-air sites from the semi-arid areas such as Rosh Ein Mor, Nahal Aqev and Farah II through the better watered localities such as Nesher Ramlah, Ein Qashish and Quneitra, together with Hummal and Umm el-Tlel in the el-Kowm basin provided additional information that raised the issue of how we can relate these sites both chronologically and culturally to the cave occupations.

The earliest Mousterian (Tabun D-type or Abu Sifian) industry, currently dated by TL to 250/220 to ca. 140/130 Ka (for details see Shea 2004) is directly deposited above the Acheulo-Yabrudian where the latter is found, and exhibits an entirely different set of operational sequences as well as tool types. The main characteristic of the early Mousterian industry compared to its predecessors is that there are no bifaces in the toolkit, except in clear cases of admixture with older industries for one reason or another. . its' most prominent characteristic is a blady component produced by the Levallois method for points (e.g., Meignen 1998, 2011). The resulting elongated retouched points are known as Abu Sif points (Bordes 1961). Their presence is a very particular marker when compared to all later Mousterian industries.

The appearance of the Levallois technique raises the same issues motioned earlier as regards the making of bifaces. Was it necessarily the result of a technological invention that emerged in remote regions and spread about by migrants?. If this is acceptable than the Levallois makers derived from one region and distributed this knowledge while migrating to other regions and what we see in the archaeological record are the places where they or their descendants arrived in different times.

Indeed, the evidence from Hayonim cave demonstrates a marked degree of human mobility that is beyond annual or bi-annual shifting camps according to seasonal opportunities (Stiner *et al.*1999). Among the best indications are the frequencies of microvertebrates per cubic meter reflecting the time when the cave was inhabited by the Barn Owls devoid of human occupation. The second indication of temporality is the number of artifacts per cubic meter when TL dates are taken into account because sediment accumulations in this cave as in other Mediterranean caves were generally due to anthropogenic activities (Goldberg and McPhail 2006, p.185). Comparing Hayonim Early Mousterian occupation with those of the Late Mousterian in Kebara produced it appears that while one cubic meter in Hayonim cave, accumulated during ca. 10/15,000 years, contained 270-300 artifacts (larger than 2 cm) and rich assemblages of microfauna. In Kebara cave, one cubic meter, accumulated during ca. 3,000 years, contained ca. 1300 artifacts and very little microfauna. In addition, a major "midden" of processed animal bones, and numerous imbricated fireplaces testified for semi-sedentary human occupations (Speth *et al.* 2012). These observations reflect differences between mobile groups and semi-sedentary ones.

The next Mousterian variant is the so-called middle Levantine Mousterian (or Tabun-C type). The deposits at Skhul and Qafzeh caves produced two sets of human burials. Morphometric-geometric analyses attributed them to the same lineage resembling the African fossils from Kibish-Omo (ca. 200 Ka) and Herto Buri (ca.165 Ka). The Levantine specimens date to ca. 130-85 Ka.. One may wonder if the first pioneers, the ancestors of the Skhul-Qafzeh group, were effectively the producers of the early Mousterian or Abu Sifian. If we accept that the arrival of those archaic modern humans was earlier than the dated human specimens then their dispersal into other areas of Asia, is already indicated by the presence of same artifacts in Djruchula, a cave site in the Caucasus (Meignen and Tushabramashvili 2006).

The last major Mousterian facies is the Late Mousterian or the Tabun B-type (80/75- 50/48 Ka). It was uncovered in caves and open-air sites from the north in Southeast Turkey to southern Jordan. Still human fossils were uncovered only from Dederiyeh, Douara, Ksar Akil, Tabun, Amud, Kebara and Geula caves with the recent addition of the newly discovered skeletal remains in Ein Qahsish, an open-air site (Hovers *et al.* 2014 and references therein). Most remains are attributed to the Neanderthal meta-population although not all scholars agree on this. This issue will be resolved when the retrieval of aDNA from human bones in this region, characterized by wet winters and dry summers, will be made possible.

The lithic industry was manufactured through the use of the Levallois technique in several operational sequences for producing flakes, blades and the well-observed triangular Levallois points as well as the small series of fully retouched points (e.g., Dederiyeh, Kebara). In brief, for those who accept the definition of the human fossils as Neanderthals (although not as the classical Neanderthals of Western Europe), their presence is interpreted as the result of migration possibly from southeast Europe or Anatolia. The motivation for this movement is possibly the cold MIS 4 (ca. 75-65 Ka BP) in northwestern and central Europe. The ability of these migrants to quickly adapt to the local environments is reflected in their ecological spread from the Mediterranean phytogeographic regions through the steppic and semi-arid areas including oases such as el-Kown and Palmyra (e.g., Boëda *et al.* 2008; Hauk 2011).

Human Cultures since ca. 50/47Ka cal BP

The issues involved in what was once called the Upper Paleolithic Revolution were tied with the "out of Africa" of modern humans based on the genetics evidence and on the other hand referred to a suite of cultural changes recognized in the European and in many localities across Asia. Many of the inventions attributed to this time were shown to have emerged earlier in Africa.

The change in the Levant is best documented in Boker Tachtit in the Negev, Ksar 'Akil in the Lebanese mountains (Marks 1993) and Üçа?ızlı in the northern edge of the Mediterranean coast (Kuhn *et al.* 2009). The lithic assemblages are referred to as Initial Upper Paleolithic. Their uni - and bi-directional core reduction strategies for blade removals produced a few reversed (Y-type) Levallois points. Facetted platforms reflect technical continuity, and in accordance with the idea that Modern humans arrived through the Nile Valley. The origin of their lithic technology as proposed earlier (Bar-Yosef

2000) stemmed from the 'Nubian core' industries in localities such as Taramsa in the Nile Valley and is now supported by recent work in Arabia and the Negev (Rose and Marks 2014; Goder *et al.* 2016). Based on calibrated dates from Boker Tachtit and the IUP in the Levant dates to ca. 47/46 Ka cal BP.

The next cultural phase locally demonstrates a technological continuity from the IUP through the production of the blade/bladelet assemblages considered as the Early Ahmarian industry. All scholars noted the appearance for the first time of the large variety of el-Wad points among the retouched pieces. It appears that stratigraphically the Ahmarian was deposited above the IUP assemblages, exhibiting a noted variability which can be expected if indeed it reflects a shared 'know how' among groups who established themselves in a new land and became the local culture of foragers that lasted for many millennia.

Most of the recorded Early Ahmarian contexts are located in the Mediterranean zone and the steppe belt such as Uçagizli, Ksar Akil, Manot, Kebara, Wadi Kharar16, near the Euphrates river ((Barzilai *et al.* 2016; Kuhn *et al.* 2009; Rebollo *et al.* 2011; Kadowaki *et al.* 2016) and Abu Noshra I and IV in Wadi Feiran in south Sinai (Phillips 1988), or areas once forested such as in Wadi Hassa and Jebel Qalkha area in southern Jordan (Henry 1995; Goring-Morris and Belfer-Cohen 2003 and papers therein). Techno-typologically those assemblages portray a great similarities and the little differences observed by various scholars require a longer discussion, beyond the scope of this paper.

Currently the main debate concerns the dating of the Early Ahmarian, mostly because it is considered by some scholars as the origins of the Proto-Aurignacian of Western Europe, a subject that needs a detailed discourse. Dating the sequence of Ksar Akil produced two sets of dates in spite of the different labeling of the layers (one series excavated before and the other after the Second World War). One set (Douka *et al.* 2013) suggests that the dates of the IUP layers therein are ca. 42/41-39 Ka cal BP. Yet a new study of essentially the same sequence (Bosch *et al.* 2015) indicates that the dates of layer XXIV marking the onset of the IUP are 44.9-43.6 Ka cal BP. When the Bohunician (Czech Republic) demonstrated a clear affinity with the early assemblages of Boker Tachtit (Škrdla 2003) supporting the westward migration of Levantine foragers. Locally, in central Europe, the major differences between the Bohunicain in Moravia and the local Mousterian it was concluded that the new culture could not have its origins in this region thus supporting the Levantine contribution.

The deposits above the IUP in Ksar Akil are those of the Early Ahmarian from Layer XXI through layer XII reach a time range up to ca. 40/39 Ka cal BP. These readings are close to the new dates from Manot cave where the Early Ahmarian dates ca. 46-42 Ka cal BP while the Aurignacian in this site dates to ca. 39-33 Ka cal BP (Barzilai *et al.*2016). In Kebara cave, where the IUP is missing, the sequence suggests unmodeled dates of ca. 45-40 Ka cal BP for the Ahmarian (Rebollo *et al.* 2011) while earlier dating project indicated that the Aurignacian was ca. 37-36Ka cal BP. In Mughr el-Hamamah IUP and early Ahmarian lithics are dated to ca. 45-40Ka cal BP (Stutz *et al.* 2015). Inter-site differences are not only the results of dating disagreements but, in my view, the expected differences in the nature of cave occupations.

In addition, open air sites such as the Abu Noshra sites in Wadi Feiran, south Sinai were dated to ca. 40-34 Ka cal BP (Phillips 1988). Their industry shows the same variability found among Ahmarian contexts across the Levant. In the northern Levant the site of el-Kharar produced one date of 37.6 Ka cal BP (Kadowaki *et al.* 2015).

The continuous sequence of local groups of foragers was disrupted by the invasion of foragers bringing in an Aurignacian Tradition. Their assemblages are characterized by the classical Aurignacian elements such as nosed, carinated scrapers and Dufour bladelets, as well as body decorations such as pendants from deer teeth, and a proliferation of bone and antler tools, including split-base points (Belfer-Cohen and Bar-Yosef 1981). They differ from the European toolkits by having the el-Wad point, a local invention, that resembles the Font Yves point in France and the Krems point in central Europe. Possibly these are the elements that mark the Levantine, local, impact, possibly through the Early Ahmarian that moved westward into Europe. Another striking cultural similarity with the west European Upper Palaeolithic traditions includes rock art manifestations, e.g. the figuratively incised limestone slab (a "horse") from an Aurignacian context at Hayonim cave (Marshack 1997).

The Levantine Aurigancian did not survive. Geographically these groups were encircled by the locals, bearers of the Ahmarian tradition (Fig. 2). Hence, the demise of these foreigners was expected. The stratigraphy of sites such as Ksar 'Akil demonstrates that the following local entities, the so-called Late Ahmarian, continued to survive. The same is demonstrated by the dating of open-air sites contem-

porary of the Aurignacian. The continuous development of the Late Ahmarian techno-typology saw the emergence of the Mazraqan and the Epi-Paleolithic industries such as the Kebaran, Nebekian and their descendants (Goring-Morris and Belfer cohen 2003 and papers therein). But invasions from the south did not cease (Fig. 3). The last one, during the Termianl Pleistocene (ca. 16-15 Ka cal BP), was that of the makers of the Mushabian and Ramonian industries who arrived from the Nile valley through northern Sinai and carried among their mircolithic the Helwan lunates. Their interbreeding with the local population as genetically demonstrated (Lazaridis *et al.* 2016) created the Natufian culture.

Final comments

The aim of this paper was to try and look critically at the Paleolithic sequence of the Levant with an eye on past migrations. For this purpose I adopted what I feel is an emerging view of what lithic industries designate. The current literature on the production of stone tools recognizes the role of imitation, teaching and learning processes that operate at the level of every group. Members are expected to share the same tools or other objects that serve as the markers of social identity.

The entire Levantine Paleolithic sequence demonstrates how a region in the position of being a continental crossroad, could be colonized more than once by foreign humans. Newcomers develop their own cultural traits by either keeping techno-typological knowledge carried from their original homeland or modify them to fit their new ecological and social conditions. Local cultures survived for many millennia but at one point faced another wave of foreigners who either keep their identity or mixed with the locals.

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