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The Middle Paleolithic of the Levant*

This study explores the origin and development of the Middle Paleolithic in the Levant—a region critical for understanding the dispersal of anatomically modern humans. The technological and typological features of the regional Middle Paleolithic industry indicate its distinctiveness, opposing it to other contemporaneous industries of Africa and Eurasia. Some peculiarities concern reduction techniques relating to the emergence and spread of the Levallois and blade technique, which had local Acheulo-Yabrudian roots. ***The*** *Levantine Middle Paleolithic industry was associated with both anatomically modern humans and Palestinian Neanderthals, who had originated during the Middle Pleistocene from a taxon that was an outcome of hybridization between Homo heidelbergensis and local archaic hominins.*

Keywords: *Acheulo-Yabrudian industry, Middle Paleolithic, Mousterian, Pleistocene, Levallois, blade industry, H. heidelbergensis, H. neanderthalensis, H. sapiens.*

Introduction

In the Near East, the Levantine Middle Paleolithic is the best-studied period, and has been investigated by many renowned European and American scientists. This has had a great positive impact, as the field research carried out at deeply and well-stratified cave- and open-air sites has resulted in a rich array of data, with subsequent summarization in large monographic studies and hundreds of publications. But a negative implication is that finds originating from the same localities are scattered across scientific institutions in different countries; and it appears that some are now lost forever. The fate of Ksar Akil, a unique open-air site studied by different researchers, may serve as a sad example. Its richest collections are housed in various research establishments, but it is quite likely that some artifacts have been lost (Marks, Volkman, 1986).

In this paper, we have analyzed the published data obtained from research works focused on the Levantine Middle Paleolithic, and drawn up hypotheses on the key aspects of cultural genesis and anthropogenesis in the area at issue. While drawing general conclusions, we proceeded from the basic assumptions as follows. The Levantine Middle Paleolithic showed a fundamental difference from the African Stone Age and the European Mousterian. Its origins come from the Acheulo-Yabrudian industry, therefore it is necessary to avoid using such a term as the “Levantine Mousterian”. The Mousterian industry was developed by European Neanderthals. In the Levant, during the Middle

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Pleistocene*, an evolutionary process appears to have occurred with the arrival of *H. heidelbergensis*, resulting in the formation of *H. sapiens* (Skhul and Qafzeh) and Palestinian Neanderthals (Amud, Kebara, Tabun).

Archaeological aspect

The Levantine Middle Paleolithic technocomplexes are found to be the striking and original ones among African and Eurasian lithic industries. This particular feature has been emphasized by many researchers (Bar-Yosef, 2006; Hovers, Belfer-Cohen, 2013; and others). D. Garrod, one of the first scientists who studied the Middle Paleolithic of Israel, had recognized a lithic industry associated with Layers D, C, and B in Tabun Cave, including both the Levallois artifacts and implements that were typologically close to the Mousterian retouched tools. She identified this industry as the Levalloiso-Mousterian, distinguishing Lower Levalloiso-Mousterian (Layers D, C), which included triangular flakes and elongated blanks, as well as abundant stone tools of Upper Paleolithic types; and Upper Levalloiso-Mousterian (Layer B and the inner chamber), with numerous scrapers and rather scarce Levallois points (The Stone Age…, 1937). Moreover, both earlier and later materials constituted a certain unity in terms of technology, and differed from European collections dating to the same time period. Garrod's opinion with regard to the classification of the Levantine Middle Paleolithic was supported by the majority of scientists until the late 1940s, and her technical approach towards the study of lithic industries is still used today. Since the 1950s, researchers have referred to the Levalloiso-Mousterian as the Levantine Mousterian.

L. Copeland divided the Levantine Middle Paleolithic into three stages: Tabun D, C, and B, according to the major stratigraphic sequence in Tabun Cave, which is considered a unique Paleolithic site, with evidence showing continuity in the development of lithic industries from the Acheulean to the final Middle Paleolithic (1975). This, of course, does not rule out the possibility of long hiatuses in sedimentation and human occupation of the cave.

It is important to note that blades and stone tools of Upper Paleolithic types are found sporadically throughout the whole stratigraphic sequence of the deposits. The lower layers (G and F) yielded Tayacian industry of the advanced Acheulean; the overlying Layer E revealed non-Levallois blades, in association with the Acheulo-Yabrudian industry with bifacial tools; the upper layers of the cave (D, C, B) were dated to the Middle Paleolithic (Monigal, 2001).

The analysis of stone implements, conducted by researchers who study the Levantine Middle Paleolithic, is based mainly on their technological characteristics. A. Marks draws attention to the fact that in the process of typological analysis, all investigators recognize certain types of tools (single scrapers, end-scrapers), and note differences between backed knives and poorly retouched scrapers. However, such stone tools as recloirs, pseudo-Levallois points, denticulates and Mousterian tranchets cannot always be identified, and not all researchers include them in the typological lists. The technological characteristics of these tools are more indicative than their typological classifications (Marks, 1992).

The Levantine Middle Paleolithic holds a special place among Paleolithic industries dating to the latter half of the Middle and the earlier half of the Late Pleistocene. Firstly, there was a permanent overland passage between the Levant and Africa that could have been easily used by human and animal populations for migrating. Secondly, significant changes in environmental conditions during the period 400–50 ka BP appear to have determined the frequent changes in adaptation strategies, and enabled the emergence of innovations (or the recurrence of old techniques) in primary and secondary lithic reduction. Thirdly, environmental fluctuations caused migrations both within the Arabian Peninsula and beyond. Fourthly, the Paleolithic of the Levant—particularly that of Israel—is one of the best-studied in Eurasia. Fifthly, two taxa (anatomically modern humans and the Palestinian Neanderthals) inhabited the Levant during the Middle Paleolithic.

The Middle Paleolithic layers in Tabun Cave have been dated by different methods, and there are quite a lot of age determinations for them (Table 1). There are also other dates obtained for deposits in Tabun Cave (apart from those given in the table). Considering the age determinations for other localities discovered in the area, the Levantine Middle Paleolithic stages can be dated as follows: early—260 (250)–165 (150) ka BP, middle—165 (150)–100 (90) ka BP, and late—100 (90)–55 (50) ka BP.

The early stage in the development of the Levantine Middle Paleolithic industry is characterized by a high index of blades, elongated points, and a great variety of Upper Paleolithic tools (burins, end-scrapers, borers, truncated pieces, and backed knives) that occur in combination with scrapers of various modifications and

*We here consider the Pleistocene to be as defined by the timeframe of European chronology. The division of MIS 5 is given according to the publications of scientists indicated in references, where letter and digital symbols are used for designating periods.

Table 1. **Dates for Tabun Cave, ka BP***

Layer (after Garrod)	Subdivision by Jelinek	EU-, ESR-dates (average values)	LU-, ESR-dates (average values)	Averaged date (ESR- and US-methods)	TL-date (average values)	Sedimentary material
Crevice	–	–	–	–	–	Red soil
B	–	82 ± 14	92 ± 18	90^{+30}_{-16}	–	Soil
		102 ± 17	122 ± 16	104^{+33}_{-18}		
C	I	120 ± 16	140 ± 21	135^{+60}_{-30}	165 ± 16	"
D	II	133 ± 13	203 ± 26	143^{+41}_{-28}	196 ± 21	Silt
	V	–	–	–	222 ± 27	"
	IX	–	–	–	256 ± 26	"

*After: (Zviely et al., 2009).

notched-denticulate tools, which were more typical of the Middle Paleolithic; some types of artifacts were found to be characteristic of the Acheulo-Yabrudian industry.

L. Meignen, with consideration for her own models of *chaîn opératoire* and E. Boëda's reconstructions (1995), classifies the Middle Paleolithic cores into two groups: the first was intended for manufacturing elongated blanks (blades and points), and the second included relatively elongated blanks (blades and elongated flakes) (Meignen, 1994, 2000). The early stage of the Levantine Middle Paleolithic is characterized mostly by the primary reduction technique, which can be traced in evidence recovered from Tabun D, Rosh Ein Mor (Marks, Monigal, 1995), Hayonim, and Abu Sif (Meignen, 1998, 2000; and others). The lithic industry with a high blade index (Fig. 1) is typical of these, and other, sites located in littoral and peripheral areas of the Levant. Lithic assemblages from the Early Levantine Middle Paleolithic are dominated by convergent single-platform, bipolar and volumetric cores, including prismatic and pyramidal ones for manufacturing blades of unidirectional, bidirectional and centripetal reduction; and also by cores with platforms extending to the entire surface (or part of it) (Marks, Monigal, 1995; Monigal, 2001).

R. Shimelmitz and S.L. Kuhn, when analyzing finds from Tabun D, have identified yet another important characteristic in the systematic exploitation of cores. Blades, Levallois flakes and points were produced in a single reduction-sequence using different areas of the Levallois core surface, with simultaneous use of unidirectional technique involving core-reduction (Shimelmitz, Kuhn, 2013). This technological tradition can be clearly traced at the earlier stage of the Amudian industry identified in Qesem Cave (Shimelmitz, Barkai, Gopher, 2011).

Such a variety of technological systems of core-shaping to produce various blanks was observed in the Levantine Acheulean assemblages (Goren-Inbar, Belfer-Cohen, 1998). These researchers assumed that each morphological type reflected a specific core-reduction strategy.

The Early Middle Paleolithic artifacts from Tabun D also reflect the use of several technological systems for the manufacture of stone tools (Meignen, 2000). Populations with different techno-typological industry are thought not to have entered the Levant in the Early Pleistocene, nor in the first half of the Middle Pleistocene; therefore, the subsequent development of the Middle Paleolithic industry of Tabun C and B type was based on the already-formed Early Middle Paleolithic industry. It should be recognized that the conclusion drawn by Meignen was correct, implying that technology for producing laminar blades, typical of the Upper Paleolithic, was based on the Mousterian (Middle Paleolithic – **A.D.**) technical knowledge, which developed 150–200 ka BP, long before the appearance of morphologically modern humans (Ibid.: 166).

Evidence shows that from the very early stage of the Middle Paleolithic, blade-blanks predominated in assemblages at some localities. Thus, in Tabun D, the index of blades among intact blanks is 50.1. The blade index in the Early Levantine Middle Paleolithic is about 20, although flakes detached from cores and points were also often used as blanks for manufacturing stone tools (Monigal, 2001). This appears to have predetermined the diversity of primary reduction strategies for production of blanks. Elongated blanks found in the lower units of Hayonim Cave (215–180 ka BP), at the site of Rosh Ein Mor (210 ka BP), and also in the Lower and Middle Paleolithic layers of Misliya Cave (250–160 ka BP) resulted from flaking of Upper Paleolithic-like cores, which coexisted with Levallois cores used for the removal of shortened blanks (Fig. 2). Blades and blade-blanks were often used for different working operations involving no additional retouch. Implements showing traces of secondary reduction are dominated by scrapers,

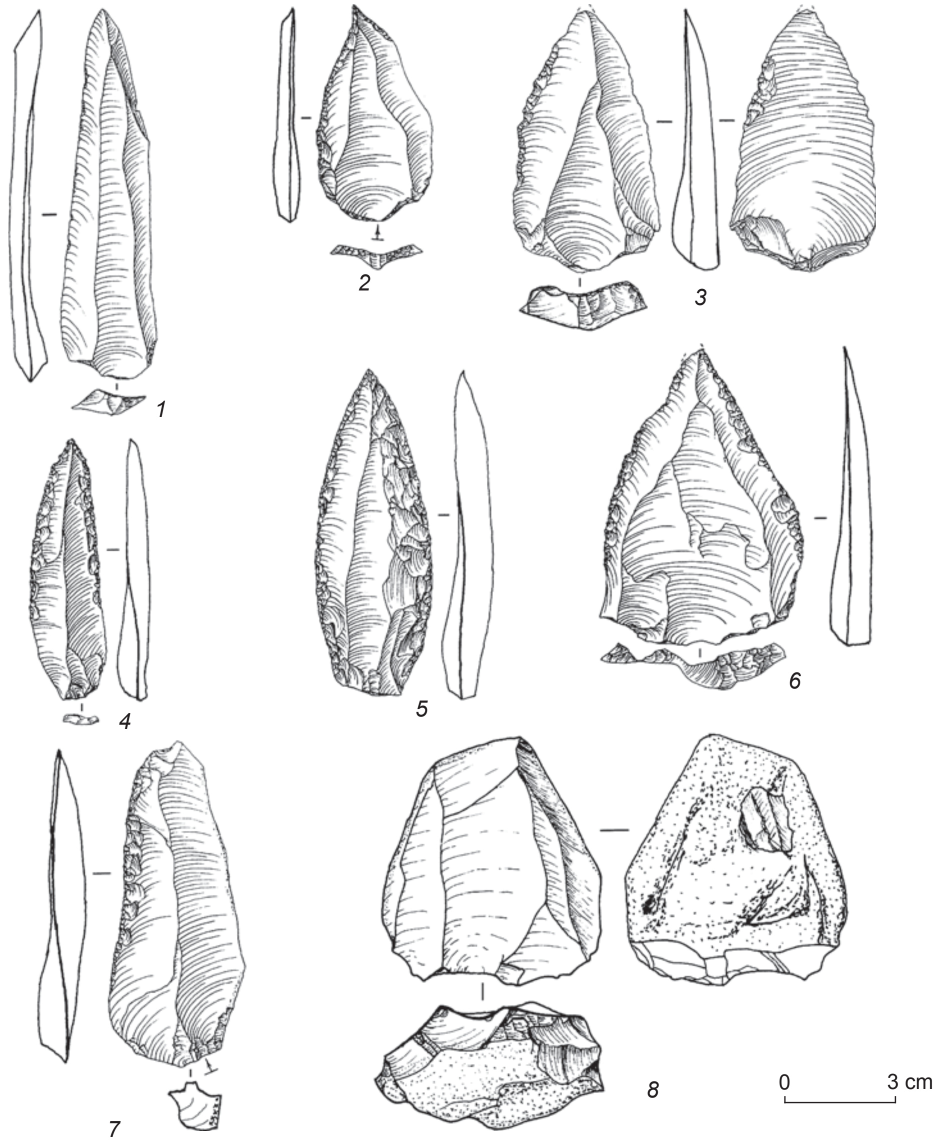

Fig. 1. Artifacts from Tabun IX (Shimelmitz, Barkai, Gopher, 2015).
1 – Levallois point; *2*, *3*, *6* – retouched Levallois points; *4*, *5* – retouched blades; *7* – naturally backed scraper; *8* – Levallois core.

elongated points, borers, truncated tools, backed knives, and other pieces.

In general, the Lower and Middle Paleolithic industry of Tabun D may be characterized by unidirectional convergent (sub-triangular in plan) cores used for the detachment of blade-blanks and elongated points. Blades of regular forms were also obtained from non-Levallois cores. Flakes and shorter broad-based points were removed from bipolar cores. This lithic industry demonstrates the use of various Levallois techniques of reduction and detachment of flakes from oval-shaped radially prepared cores. It reflects not only the dominating Levallois technology, but also other reduction strategies. The Early Middle Paleolithic industries existed for 90–100 thousand years. It is characteristic of this long period that Levallois and non-Levallois techniques, as well as use of blades and flakes as blanks, showed different utilization ratios, which was apparently due to changes in adaptation strategies. In terms of the major techno-typological characteristics, the Early Levantine Middle Paleolithic industry was close to the Upper Paleolithic industry. The similarity is manifested in primary reduction techniques and in the presence of end-scrapers, burins, borers, and some other implements.

Notably, materials dating to the Early African Middle Stone Age, MSA I, which are fundamentally different from the contemporaneous Levantine collections, also include a sizeable quantity of Upper Paleolithic

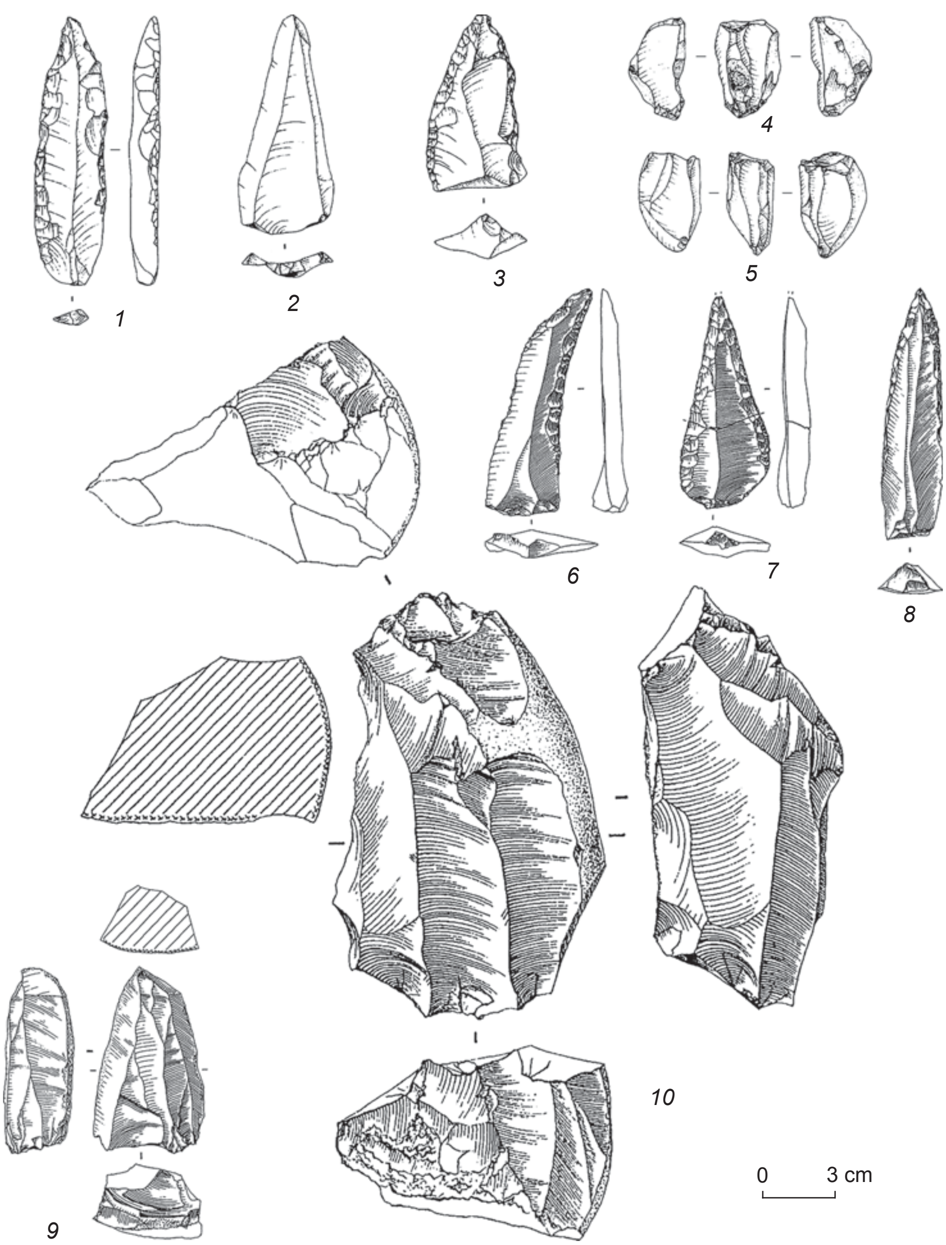

Fig. 2. Artifacts from the caves of Misliya (*1–5*) (Weinstein-Evron et al., 2015) and Hayonim (*6–10*) (Meignen, 2000).
1, *6–8* – Abu Sif points; *2* – Levallois point; *3* – side-scraper; *4*, *5*, *9*, *10* – cores.

artifacts, and represent the primary reduction strategies, which disappear at the subsequent MSA II stage. A similar tendency can be traced in the later Middle Paleolithic industry, Tabun C, which should be dated to approximately 165 (150)–100 (90) ka BP. During the Levantine Middle Paleolithic, Tabun C-type industry became significantly less laminar (Fig. 3). Cores for producing unidirectional removals of blades and Levallois points almost disappeared. Levallois points and Upper Paleolithic tools were found to be scarce. The primary reduction strategy was dominated by such a technique as the removal of classic oval-shaped Levallois flakes from radially prepared cores. Radial and bipolar reduction was characteristic of this lithic industry. The toolkit is dominated by scrapers, notched-denticulate tools, Mousterian-like points, and backed knives; there are burins and other pieces made on flakes. Scrapers include very few tools with straight edges, showing the prevalence of simple convex, double, and convergent pieces (The Stone Age…, 1937; Garrod, 1962; Marks, 1983, 1992; Jelinek, 1982a, b; and others).

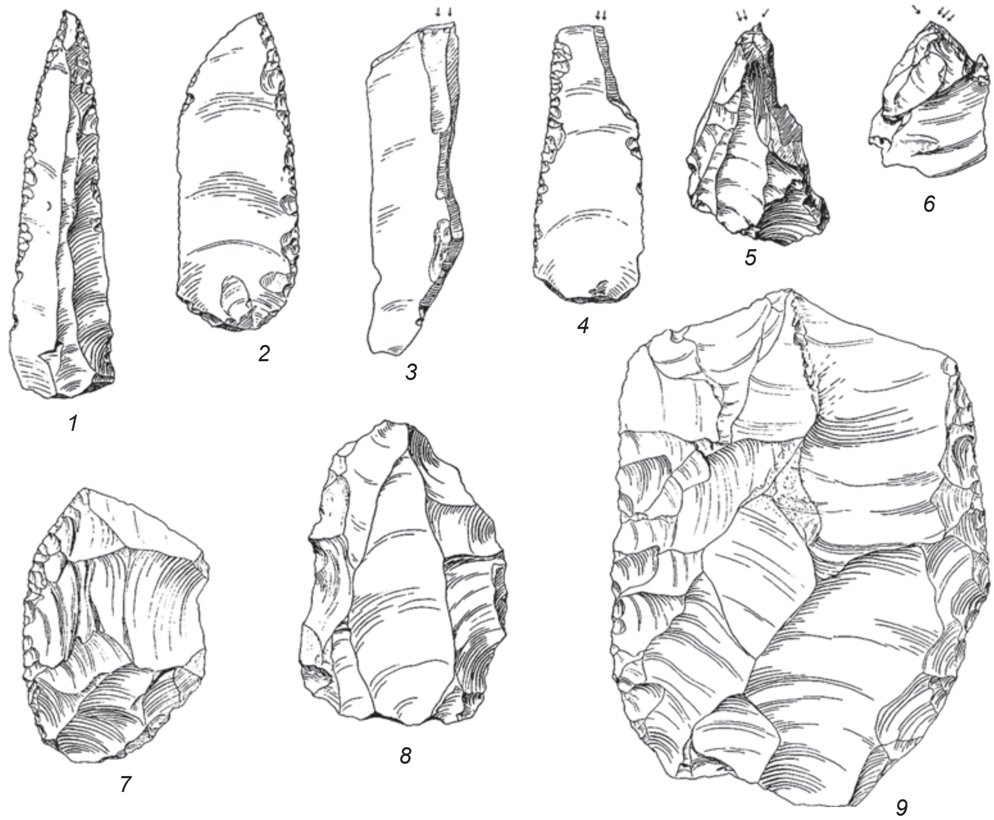

Fig. 3. Artifacts from Tabun C (The Stone Age…, 1937).
1 – point; *2* – scraper; *3–6* – burins; *7*, *9* – scrapers; *8* – core.

According to A. Marks, the differences between Tabun D and Tabun C industries resulted from the use of different reduction-strategies: in the first case, points and blades were removed from the single-platform Levallois cores triangular in plan; and in the second, blanks were detached using the radial flaking technique. Some differences in the toolkit were due to retouching blanks of various types. Changes in the reduction strategy could be associated with a specific adaptation (Marks, 1992).

Chronologically, evidence derived from Skhul and Qafzeh caves, which yielded burials of modern humans, dates to the Middle Paleolithic of Tabun C-type. Skhul Cave is a hollow under a relatively small shelter. The cave is 6 m deep and 14 m wide at the entrance facing northwest (The Stone Age…, 1937). The thickness of loose sediments in the cave is about 3 m; although breccia, which became attached to the cave walls and is situated above the level of modern-day deposits, containing the Middle Paleolithic material, suggests that the upper part of the sediments including occupation layers did not survive.

The remaining part of occupation Layer A is 20–25 cm thick. The layer covers thick strata of cave deposits (Layer B_1). Along the walls and at the entrance area, these strata overlay a series of breccia-like interlayers alternating with stalagmitic lenses in areas adjacent to the walls (Layer B_2). In some sections without breccia, it was almost impossible to distinguish between layers B_1 and B_2. The deposit of grey sand containing rounded material was recognized at the bedrock of the cave. The sinkhole of the grotto revealed a dark brown sand layer (Layer C).

Excavations at Skhul Cave, which has been completely unearthed, yielded more than 10,000 artifacts made of flint, comprising a single assemblage. Finds derived from Layer B_1 were patinated, whereas artifacts from Layer B_2 did not reveal traces of patina and looked "fresh" (Fig. 4). Broad Levallois flakes removed from radial cores, single side-scrapers made on flakes, reutilized square Levallois blade cores, Levallois triangular broad-based points with faceted striking platform, and burins are characteristic of the Skhul lithic industry. It is important to emphasize that Levallois points from the lower layer were found to be far more numerous than those from the upper one, and the percentage of untreated broad Levallois flakes from Layer B_1 was higher than that in Layer C.

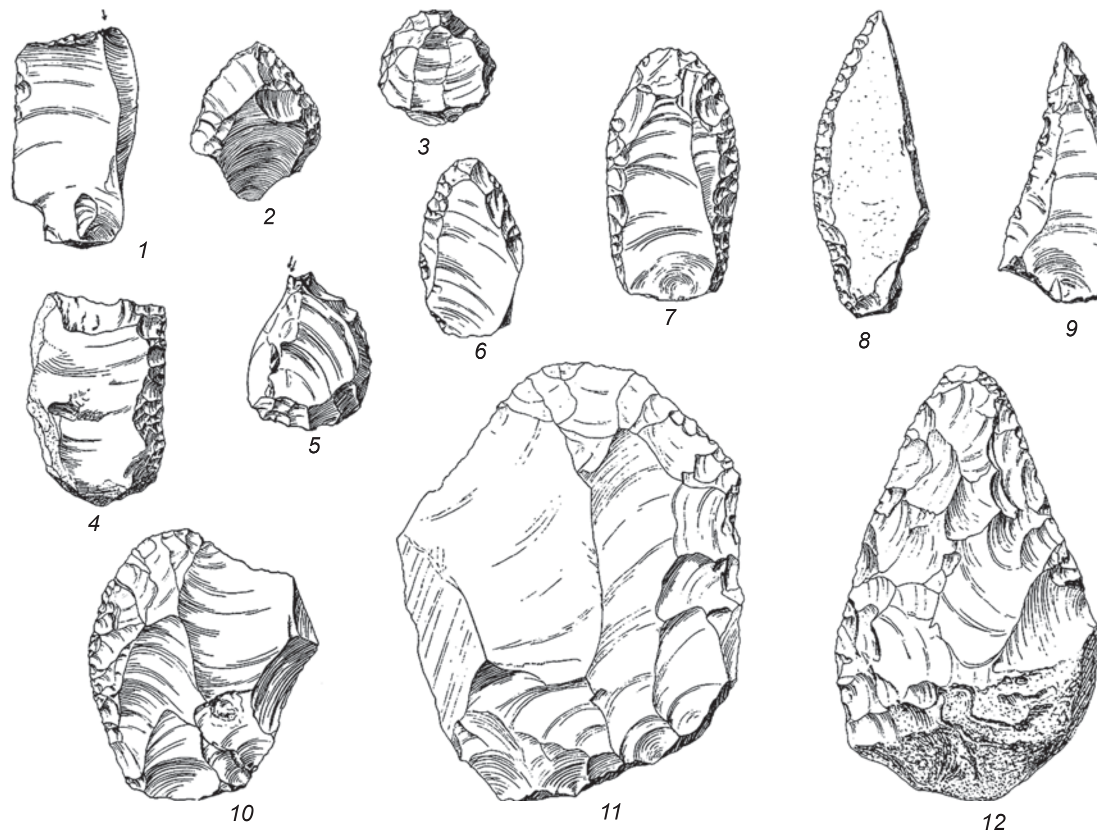

Fig. 4. Artifacts from Skhul Cave, layers B_2 (*1–7*, *10*, *12*) and B_1 (*8*, *9*, *11*) (McCown, 1934).
1, *5* – burins; *2*, *9* – retouched points; *3, 11* – cores; *4*, *6*, *7, 10* – scrapers; *8* – backed knife; *12* – biface.

Age estimates for occupation layers in Skhul Cave fall within a long time span. The first determinations were obtained at the initiative of Ch. Stringer from two bovid teeth using the ESR-method: EU-dates range from 54.6 to 101 ka BP, averaging 81 ± 15 ka BP, LU-dates range from 77.2 to 119 ka BP, averaging 101 ± 12 ka BP (Stringer et al., 1989). The following TL-dates were obtained from six samples of burnt flint: 166.8–99.0 ka BP, averaging 119 ± 18 ka BP (Mercier et al., 1993). F. McDermott has determined ages for two samples selected by Stringer, as well as for three samples from Layer B, using ESR-method, and revealed significant differences (McDermott et al., 1993).

According to McDermott, chronologically different human groups were probably represented in Skhul Cave (Ibid.), which confirms conclusions drawn by the first investigators of the cave, T. McCown and A. Keith (1939). A. Ronen also believed that burials in 2 m thick strata at Skhul Cave could have been separated by a significant time span (1976).

The age determinations obtained by McDermott make it possible to recognize an earlier group of hominins, dating back to 110–90 ka BP, and a later one, dating to 60–40 ka BP. More recently, Ronen, on the basis of the results of direct dating by ESR and U-series (Grün et al., 2005), came to a conclusion that the remains of modern humans should be dated to 102 ± 26 ka BP (2012).

Among localities in the Near East and in Eurasia generally, Skhul Cave undoubtedly holds a special place, owing to the discovery of modern human burials associated with the site. Human remains attributed to 10 individuals, which have been found in the cave, constantly come to the attention of anthropologists. We support the view of D. Johanson that this anthropological material provides insights into processes of sapienization worldwide (Johanson, Blake, 1996), and consider that DNA sequencing of both the remains from Skhul and Qafzeh caves and those of the Palestinian Neanderthals needs to be done as soon as possible.

In Israel, Qafzeh Cave has also yielded remains attributed to anatomically modern humans (Neuville, 1951; Vandermeersch, 1981; Korobkov, 1978). The cave is located 2.5 km southeast of Nazareth, facing southwest. It is 20 m wide and 12 m deep. In addition to the chamber with a high roof, which adjoins the entrance restricted from two sides by rock walls and separated from the grotto by a threshold about 1.5 m high, the interior includes the so-called "vestibule", where the paleoanthropological remains were found. Excavations were conducted in 1930–1936 by R. Neuville and M. Stekelis and in 1965–1980 by B. Vandermeersch in the outer part of the "vestibule". The researchers marked the layers differently; thus Neuville designated them from M to A from the bottom upwards, and Vandermeersch from XXIV to I.

According to Neuville, the Middle Paleolithic layers are those from M to F; and according to Vandermeersch, those from XXIV to XI. Neuville describes the Middle Paleolithic industry of Qafzeh as Levalloisian, showing an abundance of Levallois points. They include few elongated pieces. Most Levallois points are broad-based, with faceted striking platforms. These points reveal no retouch, or were produced mainly with a single-row retouch on one edge. Scrapers were manufactured from flakes removed from radial cores, and constituted 15–20 % of all pieces. Notched-denticulate tools were recorded in considerable numbers; notches, burins, and backed knives were recovered as well. Some occupation layers contained preserved hearth features. Neuville unified the whole industry from Qafzeh into a single techno-typological complex, and considered that it appeared to have been developed locally.

In 1930, during the excavations, Neuville and Stekelis recovered human remains belonging to 7 individuals, and in 1934 they managed to find numerous fragments of human skeletons: in particular, four craniums. Vandermeersch excavated skeletons of another 14 individuals. One of those finds known as Qafzeh IX, a skeleton of a female of the age of about 20, who was buried with her legs bent, was found to be the most complete and showed a good state of preservation. Only several centimeters away from Qafzeh IX, there was a child's skeleton (Qafzeh X) buried in a very flexed position (Zubov, 2004). These individuals shared one burial pit.

The average date for all layers in Qafzeh is 92 ± 5 ka BP (Kaufman, 2002). The ESR-dates for modern human remains obtained from teeth are as follows: 100 ± 10 and 120 ± 8 ka BP (Grün, Stringer, 1991).

The Tabun C Middle Paleolithic industry is generally characterized by the prevalence of radial core-reduction, according to E. Boëda (1988). Flakes of various sizes, removed from such cores, were used as blanks for many implements—scrapers of various modifications, notched-denticulate tools, and others. Archaeological evidence includes triangular broad-based Levallois points with faceted striking platforms in the form of *chapeau de gendarme*. These pieces were often left unretouched, or in the opposite case, there was primarily a single-row retouch made on one edge.

Characteristic of the final Middle Paleolithic industry of Tabun B is the predominance of single-platform unidirectional Levallois cores (aimed at detachment of short broad-based points, which are also represented in the lower deposit), blades, and radial cores for flakes removal. The toolkit is dominated by side-scrapers and their other modifications, backed knives, and notched-denticulate tools (Fig. 5). L. Copeland considered the final Middle Paleolithic in the Levant the latest combination of lithic industries of Tabun D and Tabun C types (1975).

In the Levant, the multi-stratified sites of Raqefet, Kebara, Amud, Emireh, Ksar Akil, Boker Tachtit and others, with cultural layers dating back to the final Middle Paleolithic overlaid by the Upper Paleolithic deposits, were subjected to archaeological investigation. Field research in Kebara Cave, located on Mount Carmel, was carried out in the 1930s by D. Garrod and T. McCown, who identified the Early Natufian, Late Upper Paleolithic, and Middle Paleolithic layers. Renewed excavations have made it possible to specify the stratigraphy and recognize four Upper Paleolithic layers overlying the final Middle Paleolithic deposits (Bar-Yosef et al., 1992; Sarel, Ronen, 2003; Meignen, Bar-Yosef, 2005).

Among the finds from Kebara Cave, flakes resulting from recurrent Levallois core reduction, dating to the Late Middle Paleolithic, predominated. Blanks were removed by unidirectional convergent knapping from cores with convex flaking surfaces. Lithic analysis of finds from all layers suggests that the primary removal of blanks was almost the same. Blades recovered from the lower layers XII and XI constituted 30 % of Levallois blanks. In the upper layers X and IX, broad-based Levallois points were found more frequently. Materials from layers VIII–VI provide evidence that the tendency to produce pieces of sub-triangular forms, along with the sub-rectangular ones, was maintained. Lithic assemblages from each occupation layer included retouched tools constituting about 3–4 %.

L. Meignen and O. Bar-Yosef conducted a comparative analysis of the Middle Paleolithic industry from Kebara and technocomplexes of some other sites in the Levant (1992). According to these researchers, the main characteristic features of the lithic industry from the cave were flakes and short broad-based points corresponding to the Tabun B industry. The Kebara industry was also found to be close to the finds from layer XXVIII in Ksar Akil, Amud, and especially from layer B in Sefunim Cave.

TL and ESR age estimates for the Middle Paleolithic layers in Kebara provided dates that lie in the range of 48–66 ka BP (Porat et al., 1994) (Table 2).

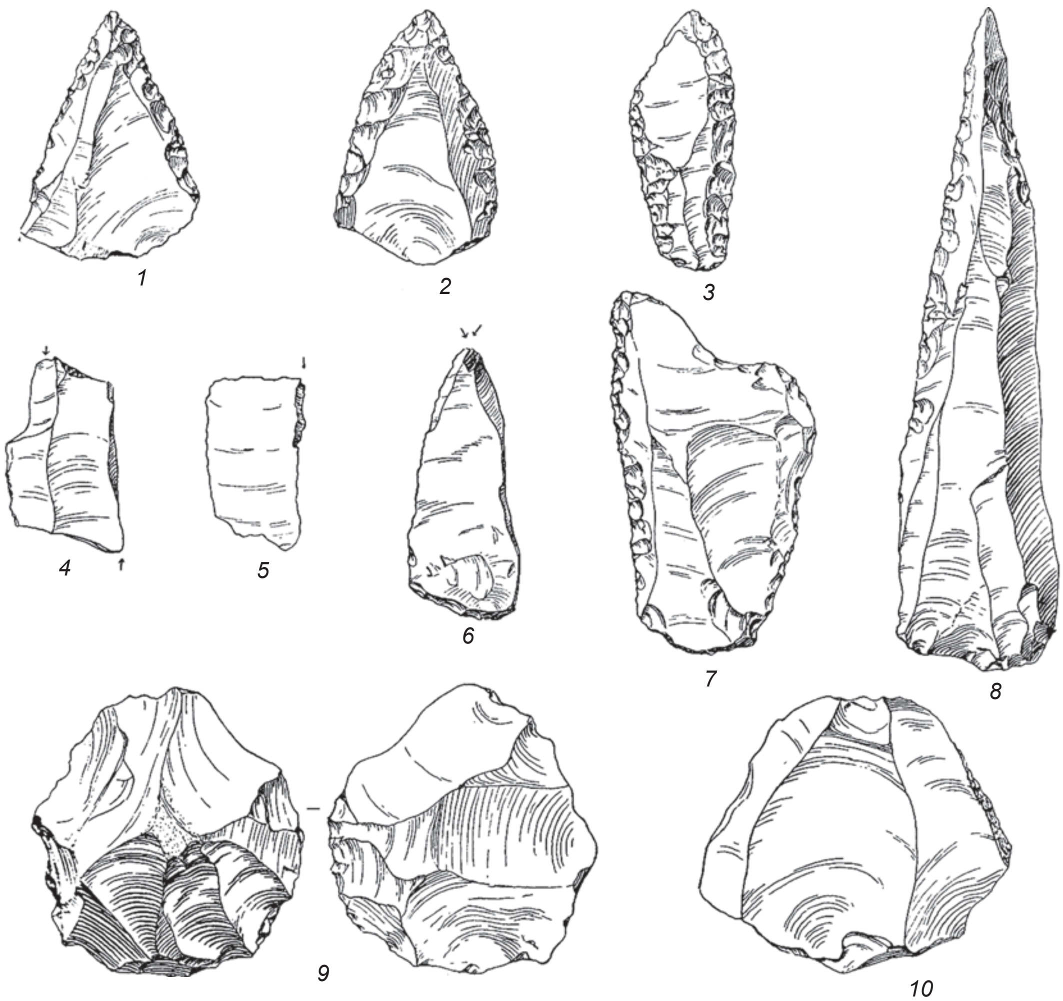

Fig. 5. Artifacts from Tabun B (McCown, 1934).
1–3 – retouched points on triangle-shaped flakes; *4–6* – burins; *7* – scraper; *8* – Abu Sif point; *9*, *10* – cores.

Table 2. **Dates for Kebara Cave, ka BP***

Layer	TL-method	ESR-method	Other methods
	Charred flint		Dental enamel
VI	48.3 ± 3.5	53.9 ± 4.6	–
VII	51.9 ± 3.4	66.7 ± 6.0	–
VIII	57.3 ± 4.0	58.2 ± 5.4	–
IX	58.4 ± 4.0	–	–
X	61.6 ± 3.6	–	60 ± 6.0 (EU)
			64 ± 6.0 (LU)
XI	60.0 ± 3.5	65.1 ± 5.1	–
XII	59.5 ± 3.5	58.9 ± 5.5	–

*After: (Porat et al., 1994).

Excavations at Kebara Cave have yielded fragments of a child's skeleton (Kebara I), and also a rather well-preserved postcranial skeleton of a male individual at the age of 25–35 (Arensburg et al., 1985; Vandermeersch, 1969, 1981). The man was buried in a shallow pit in a supine position. His height was about 170 cm. Anthropologists have identified a hyoid bone among the individual's remains (*os hyoideum*), showing almost no anatomical difference from that of modern humans, indicating the capacity for speech. Morphologically, the hominin revealed similarity to individuals from Skhul Cave, although he was more massive. The anthropological finds recovered from the occupation layer were associated with numerous stone tools, dating back to the final Middle Paleolithic of Tabun B-type.

Anthropological finds, morphologically close to Kebara I, were discovered in a small cave of Amud (Watanabe, 1968; Rak, Kimbel, Hovers, 1994; Ohnuma, 1992). The lithic industry from this locality can be generally characterized by the basic technological and typological features typical of technocomplexes dating to the final Middle Paleolithic of Tabun B-type. The assemblage is dominated mainly by cores of two types: sub-triangular in plan, unilateral for removal of short points with faceted striking platform (*chapeau de gendarme*); and radial, for detachment of flakes. A small number of cores can be attributed to non-Levallois cores for blade production. Blanks include about 55 blade-like flakes, 750 sub-triangular and triangular spalls, and about 200 blades with parallel edges and with a length of twice the width.

Among retouched tools, it is possible to distinguish points with fine retouch applied primarily from a dorsal side, end- and side-scrapers on blades and laminar spalls, scrapers on flakes (mainly double and convergent), and also flakes and blades with fine retouch on the edge.

The following Upper Paleolithic artifacts are noteworthy from among the stone tools: chamfered pieces (*pièces à chanfrein*), borers, borer-like pieces, and end-scrapers. Some points reveal bases with fine retouch; they show resemblance to similar tools from Emireh. K. Ohnuma, having compared the lithic industry from the Upper Paleolithic layers B_4 and B_2 in Amud, came to a conclusion that the implements derived from both layers, in spite of few differences, demonstrate significant similarities and can be attributed to the Levantine Mousterian of Tabun B-type (1992: 103).

Of specific interest is the burial of a young male (Amud I). This individual can be distinguished among all Neanderthals for his height (over 180 cm) and cranial capacity (according to some sources, 1740 cm^3, according to others, 1800 cm^3). Along with the typical Neanderthal features (pronounced supraorbital torus, retreating forehead, a low skull vault, and others), this individual demonstrated traits distinguishing him from the European "classic Neanderthals": a higher skull vault; rounded occiput without a chignon; smaller teeth; mental protuberance, beginning to take shape; robust mastoid processes of temporal bone, and others. Many anthropologists associate Amud I with the Palestinian Neanderthals, who were close to representatives of the Skhul-Qafzeh group.

Another site with anthropological finds was studied in Dederiyeh Cave, Syria, 60 km northwest of Aleppo (Akazawa et al., 1993, 1995a, b; 1999). This is a large cavity (about 15 m wide at the entrance, 60 m deep, with a maximum width of 40 m), with a vaulted dome over 10 m high. The cave is located at the height of 450 m asl on the left bank of Wadi Dederiyeh. Excavations were conducted at the entrance, yielding the Natufian stone tools; and inside the cave, where the final Middle Paleolithic industry and two burials were found. One of the burials contained a well-preserved child's skeleton. The total number of buried individuals found during the excavations included no less than four children and six adult and young people. Data resulting from the excavations at Dederiyeh Cave have not been widely published in the Russian scientific literature, compared to materials on the study of the Middle Paleolithic in Israel; therefore, they will be discussed here in more detail.

The main excavation area at the back of the cave, where the Neanderthal burials and the final Middle Paleolithic industry were identified, exposed the sequence including 15 geological units. Given the abundance of archaeological evidence, researchers divided the units into several sub-layers. The stratigraphic sequence of cave deposits is generally clearly seen: the interfaces between the layers are distinguishable, except for areas adjacent to the walls. All 15 units were integrated into four strata from bottom to top: the fourth one, layers 15–12; the third, layers 11–7; the second, layers 6–4; and the first, layers 3–1.

The lower stratum yielded a small number of artifacts: two Levallois cores with negative scars from single-sided removal of points, one radial core for flake-removal, convergent and double scrapers on flakes and blades, and retouched laminar spalls. Thus, the lower layers included scarce artifacts associated with the lithic industry typical of the final Middle Paleolithic of Tabun B-type. Layer 13 revealed the crown of a first maxillary molar.

The overlying layers of the third stratum contained a greater quantity of stone tools, which corresponded completely to the finds from the lower deposits. The lithic assemblage included cores of Levallois types for removal of short broad-based Levallois points with faceted striking platforms, as well as radial cores for detachment of flakes. Debitage was dominated by Levallois flakes. Points, blades, and retouched flakes constituted a high percentage. There were backed knives, notched-denticulate tools, retouched broad-based points, single- and double side-scrapers (each with a straight and a convex edge) made on flakes and blades, end-scrapers on blades, and retouched blades and flakes. Layer 11 yielded the burial of a 2-year-old child. The bones were found lying in anatomical order in a specially dug pit. A flake lay on the bones of a thoracic section. The remains of a hearth were identified near the burial.

The second stratum also revealed lithic artifacts typical of the final Middle Paleolithic. These were mainly cores of Levallois type for production of shortened points and flakes. Materials from this stratum and underlying layers represented the single technique of core-trimming and use of flakes and blades. Retouched blades, points, and flakes contributed significantly to the assemblage. Excavations yielded double single and convergent side-scrapers with straight and convex edges made on flakes and blades; cortically backed knives; end-scrapers and burins; and retouched flakes and blades. Layer 6 revealed several combustion features in association with bones of wild animals. A number of hominin remains were recovered from layers 5 and 4.

In the abundance of finds in the uppermost strata, layer 3 can be distinguished. Stone implements were found in several sub-layers, and their techno-typological characteristics showed no differences from those of the tools recovered from the underlying layers. Layer 3 also contained hearths, with fragments of animal bones and charred plant remains scattered nearby. This layer yielded the partial skeleton, with a facial skull showing a good state of preservation.

All the stone implements of the final Middle Paleolithic that were found in Dederiyeh constituted a single assemblage, typical of Tabun B as regards their techno-typological characteristics. Cores were dominated by Levallois forms for the detachment of shortened points and radial flakes. Points, flakes, and blades were subjected to retouch. Scrapers predominated in the tool assemblage. According to the type of working edge, they can be classified into two major groups: straight, and convex or concave. The edges were intensely retouched. The percentage of scrapers grew from the bottom to the top. All layers contained Upper Paleolithic stone tools. Among typical finds were burins and end-scrapers. Their number also increased from the bottom up.

Radiocarbon analysis carried out on six samples shows that the site of Dederiyeh Cave can be dated to the period between 48,100 ± 1200 ka BP and 53,600 ± 1800 ka BP. Researchers note that the latter date reaches the limit of the radiocarbon dating method, and do not exclude a greater age of the lower layers. Humic acids showed the period from 48 to 55 ka BP.

During the excavations in the cave, faunal remains of different species were also found. The lower stratum contained the bones of wild goat and mouflon. The predominance of bones attributed to these species was recorded in the third stratum, and the number of remains of steppe inhabitants (such as gazelle, rhinoceros, horse, and also temperate zone animals including red deer, wild boar, and buffalo) showed the increase as compared to the underlying layers. The bone-remains of animals representing temperate-zone species were found to predominate in the upper layers; the bones of red deer constituted about 30 % of all the faunal remains. A comparative analysis of the faunal remains revealed significant differences between the animals whose remains were represented in the fourth and the first strata. The explanation provided by researchers is that the deposition of the upper layers occurred in more humid conditions, and the area near Dederiyeh Cave was covered with forests. This may have resulted in the increase of scrapers in the upper occupation layers.

A well-known Shanidar Cave in Iraq, which also yielded Neanderthal remains, was studied by R. Solecki during four seasons (1953, 1960, 1975; and others). The site is located in a gorge bisecting the slopes of the Bradost mountain range, at an elevation of about 360 m above the level of the Great Zab River. The entrance to the cave, facing south, is 25 m wide and 8 m high; the cave is 40 m long and has a maximum width of 53 m. The loose sediments in the cave, 14 m thick, included four occupation layers. Three layers (A, B, C) are attributed to the Neolithic–Upper Paleolithic. Layer D, with a thickness of more than 8 m, is dated back to the final Middle Paleolithic. Its exposure showed that there were five collapses of the ceiling, indicating earthquakes. Anthropological evidence attributed to *H. neanderthalensis* was found under a heap of stones.

Stone artifacts recovered from the very bottom of the cave suggest that the hominin occupation of the cave started at the beginning of the process of filling the cavity with loose sediment. A small amount of heavily exhausted cores and debitage may provide insight into the primary reduction. Exhausted radial cores are evident among nucleuses. In addition to flakes, small broad-based elongated points, as well as blades, were identified. It is obvious that not only radial, but also Levallois cores were used for detachment of points and blades, as well as non-Levallois forms to produce blade-blanks. Lithic assemblage was dominated by single scrapers with straight, convex and curved edges, as well as by convergent scrapers made on blades and laminar flakes. There were many flake- and blade-tools with abrupt retouch. Solecki found four small-sized points with thinning of the ventral base, which he attributed to the Emireh-type. Unfortunately, data about stone implements from Shanidar Cave were published only partially. In general, they demonstrate similarity to Late Middle Paleolithic artifacts from both the Levant and the rest of Southwest Asia.

No reliable age determinations have been established for the Middle Paleolithic industry of Shanidar. Solecki suggested that the occupation of the cave started in the Early Würm stadial, about 100–80 ka BP. The top of Layer D produced a radiocarbon date of 46,900 ± ± 1500 ka BP (Bar-Yosef, 1998).

Morphologically, the Shanidar Neanderthals are somewhat different from those of Europe and Palestine, the latter being represented by Amud, Kebara, and Tabun. The total number of Shanidar individuals is nine, including seven adults and two children; the number of crania is five. The most informative find is Shanidar I, represented by both cranium and postcrania. The cranium shows a number of Neanderthal features, such as a strong and continuous supraorbital torus, a pronounced occipital bun ("chignon"), low forehead, midfacial prognathism, and absence of chin or canine fossae, etc. A.A. Zubov subscribes to the view of those who find certain similarities between Shanidar and the Western European "classic Neanderthals", opposing them to Skhul and Qafzeh humans. The Shanidar individuals, however, display certain progressive characteristics, suggesting their deviation from Western European Neanderthals toward anatomically modern humans. Zubov disagrees with the view that Shanidar humans resemble "classic Neanderthals" of Western Europe in all respects (2004: 299).

E. Trinkaus' view of Shanidar Neanderthals deserves attention (1983). In his words, the group is relatively homogeneous despite certain individual variations and what might be seen as two morphological variants. Several features of these humans attest to evolutionary stasis. Only the facial skeleton displays certain changes over time: it is more flattened and archaic in earlier group members, and shows some midfacial prognathism in later ones.

A detailed analysis of the various trait-systems in Shanidar Neanderthals and other Near Eastern humans of the Late Pleistocene has revealed evolutionary changes occurring in that territory and in Europe in parallel. They concern both cranial and postcranial features and general robustness. Near Eastern Neanderthals show some changes in the proportions of teeth, and considerable variation in their size. Dental variability, skeletal robustness, and cranial archaism in certain Near Eastern Neanderthals oppose them to contemporaneous anatomically modern humans. The facial skeleton, however, sets them apart from robust Middle Pleistocene hominins, evidencing a tendency toward less robustness and anatomical modernity. While being more archaic than the anatomically modern humans in terms of postcranial skeleton and anterior teeth, the Shanidar humans show facial reduction that is highly relevant to interpreting the evolutionary changes, some of which may have been caused by cultural innovations.

The Shanidar hominins are of interest to scientists from yet another point of view: the body of the Shanidar I individual, who died in a rock-fall due to an earthquake, as suggested Solecki, was covered by his tribesmen with large limestone blocks and smaller rocks. According to anthropologists, this individual had lost his arm while alive. A one-armed man could not have survived at that time without support and help from the other members of his group. The burial of Shanidar IV provides insight into social relationships within the population. After burying the dead in a special hollow, his tribesmen covered the grave with flowers and medicinal herbs (Solecki, 1975; Lietava, 1992). The final Middle Paleolithic in the Levant is associated with the Palestinian Neanderthals, who showed significant morphological differences from the Western European "classic Neanderthals". The lithic industry of Tabun B-type, according to Meignen and Bar-Yosef, also differs substantially from the European Mousterian industries (2002).

Since the techno-typological characteristics of the Levantine Mousterian have been described in many publications, we will focus only on several Middle Paleolithic localities in the Levant, and will not discuss such important sites as Nahr Ibrahim Cave, the final Middle Paleolithic complexes of Ksar Akil, Boker Tachtit, and others. All the Middle Paleolithic localities in the Levant, according to the three stages (phases) Tabun D, C, and B, are different in terms of stone tools, but comprise a single techno-technological complex that had evolved for more than 200,000 years. The complex was changing under the environmental conditions and during contacts with populations from the adjacent areas. However, in general, from our point of view, the development of the Levantine Middle Paleolithic industry was mainly autochthonous, and was associated with modern human populations and the Palestinian Neanderthals.

The issue of how the development of the Middle and Upper Paleolithic in the Levant occurred, successively or discontinuously, has remained the subject of debate for over 80 years. Its resolution is hampered by the fact that the sequence of cultural horizons at multilayered Paleolithic sites cannot always be fully recognized, despite the improvement of geochronological methods; and the correlation of data resulting from techno-typological and comparative analysis of evidence from the Levant is sometimes impeded; researchers focus their attention on technological analysis to the detriment of typological examination, compare materials obtained during the field archaeological studies, regardless of the degree to which the finds have been studied (this particularly affects the results when the percentage of various tool-types is compared); research materials from the same site are kept different storage places (for example, the site of Ksar Akil), etc.

There are two key points of view on the provenance of the Levantine Middle Paleolithic. A hypothesis about the peculiarity of the Levantine Middle Paleolithic (Acheulo-Mousterian) and its difference from the Western European was seemingly first suggested by Garrod (The Stone Age…, 1937). We think that Bar-Yosef has fairly concluded that the Middle Paleolithic assemblages of the Levant represent a special unity within the context of the African and Asian Middle Paleolithic industry (2006). The important role of the technology of blade production using Levallois and non-Levallois reduction strategies is one of the main features distinguishing the Lower and Middle Paleolithic Levantine industries from the African industries of the same periods.

During the African Stone Age, the Levallois flaking system was the most commonly used technology; however, as H. Crew showed (1975), it differed from the Levallois reduction strategy used in the Levant. Levallois (proto-Levallois) primary reduction technique initially appeared at Gesher Benot Ya'aqov during MIS 18–20 (Goren-Inbar, 2011: Ill. 8, *1*). With regard to continuity in the Levantine Paleolithic, it is necessary first of all to refer to a unique sequence of occupation layers in Tabun Cave. The lowermost occupation layer G yielded notched-denticulate tools with abrupt retouch, single side-scrapers, isolated amorphous burins, chopper-like pieces, and other stone tools. Cores are represented by shortened pyramidal, single-sided shapes for detachment of amorphous blades and blade-flakes, and also by those showing traces of irregular reduction. The overlying layer F showed high frequencies of burins and end-scrapers. Four Levallois cores have been distinguished among those with single- and double-platform.

Materials of the lower layers G and F in Tabun Cave suggest that Levallois and laminar knapping was used for primary reduction; but as a whole, the technology of producing blanks for toolkit manufacture was aimed at detachment of flakes from cores. A. Jelinek pointed to a minimal role of the Levallois technique in a technological characteristic of the lithic industry from the two underlying horizons (1975). However, owing to the presence of Upper Paleolithic tools (burins, end-scrapers), this industry may be interpreted as considerably advanced.

Materials from the overlying layer E included three facies or three industrial complexes: 1) Yabrudian, mainly aimed at producing flakes and manufacturing Quina-type scrapers; 2) Acheulean, related to predominant manufacture of bifaces, scrapers, and flakes; and 3) Amudian, intended for production of Upper Paleolithic blades and tools (Copeland, 2000). In the early 1980s, Jelinek, on the basis of his excavations, came to the conclusion that all alternating facies of the layer E industry, including the Amudian, pertained to the same Mugharan industrial tradition. He explained the presence of various facies by adaptation of ancient populations to various environmental environments (Jelinek, 1981, 1982a, b). In his opinion, the Amudian tradition developed gradually on the basis of preceding local cultural traditions, while the Levalloiso-Mousterian industry was derived from the Mugharan tradition.

In our opinion, the materials of the Acheulean localities in the Levant allow the conclusion that blade and Levallois technology played not a leading, but an important role in production of blanks for the manufacture of tools in the industry of ancient Levantine populations. During the Acheulo-Yabrudian stage of the final Acheulean, the significance of blade technologies considerably increased. This resulted, already in the Upper Paleolithic, in the appearance of cores prepared for the subsequent production of blanks. Among these cores, four typological groups should be distinguished: unifacial, radial, Kombewa, and Levallois for production of flakes. Properly speaking, they were rather close in terms of production technique, from the stage of primary shaping of blanks to the detachment of flakes from them. Therefore, the questions of where one or another type of cores first appeared, or how and when it spread to other regions of Eurasia, can be discussed endlessly (Derevianko, 2016a, b). When comparing the final Acheulean industry of the Levant and those of Africa and Europe, Bar-Yosef notes that the Acheulo-Yabrudian assemblage can be regarded as a local complex, geographically restricted in its distribution to one region (1994: 257). In the Amudian industry of the Late Acheulean, blade-blanks played a significant role in tool manufacture. This is clearly illustrated by the study of Qesem Cave, Israel (Barkai, Gopher, Shimelmitz, 2005; Shimelmitz, Barkai, Gopher, 2011; and others).

The Levantine Middle Paleolithic was developed on the basis of the Amudian industry, which appeared approximately 400 ka BP (Shimelmitz, Barkai, Gopher, 2011). In our opinion, the evolutionary development of the Middle Paleolithic industries of Tabun D-, B-, C-type seems to have taken place up to the Upper Paleolithic. It is obvious that for 200,000 years, changes in paleoenvironmental conditions, various adaptation strategies, short-term contacts with human populations from the adjacent areas, and other factors introduced some innovations into the Middle Paleolithic technocomplex in the Levant. Moreover, the Upper Paleolithic core-reduction techniques and the Upper Paleolithic tool-types could have appeared as far back as in the Lower Paleolithic, and subsequently disappeared with time; the Levallois flaking system could have also appeared and vanished during such a long period of time.

The opponents of the continuity approach to the development of the Levantine Paleolithic from the Acheulean to the final Middle Paleolithic present different arguments in order to prove their position. Here are some of them. The Middle Paleolithic sites of Tabun D-type are found in arid zones in the interior of the Levant, and the sites of Tabun C-type are located mainly along the coastline; the Tabun C-type Mousterian disappeared with the arrival in the south of the region of Neanderthals, who brought the Tabun B-type Mousterian about 75 ka BP, or yet continued to exist after the appearance of this species until the time when *H. sapiens* migrated into the Levant with the Upper Paleolithic technologies; primary and secondary reduction strategies changed in certain periods during the latter half of the Middle and the earlier half of the Upper Pleistocene. The hypothesis about discontinuity in the development of the final Acheulean and Middle Paleolithic industries is also based on differences in the percentages of blades, flakes, and other types of stone tools.

All researchers, including ourselves, can clearly see a certain mosaic pattern in primary-reduction strategies and the shaping of some tool types; and in the percentage of stone artifacts, revealed throughout the Acheulean and the Middle Paleolithic in the Levant. For example, in the Early Middle Paleolithic of Tabun D-type, there occur pyramidal cores of the Upper Paleolithic type, and Upper Paleolithic stone tools, which can hardly be found at the Middle Paleolithic sites of Tabun C-type; and again they appear in the final Middle Paleolithic of Tabun B-type. From our point of view, some differences in the Levantine Paleolithic industry were due to changes in environmental conditions, which induced humans to develop new adaptation strategies. A similar variability of the Paleolithic industries can be observed in Africa, Europe, Altai, and other regions. According to C.A. Tryon and S. McBrearty, changes in hominin adaptation strategies during the Acheulean to Middle Stone Age transition in Africa were gradual and diverse (Tryon, McBrearty, 2006). The same situation can be observed in the Levant (Goren-Inbar, 2011), but this does not imply that a single line of development was discontinued in the Paleolithic industry.

The study of the processes resulting in the emergence of blade technologies in Africa and Eurasia, as well as specifics of their distribution, show that in the same areas, during the Middle and Late Pleistocene, blade technologies and the Levallois flaking system appeared and disappeared repeatedly; coexisted with flaking techniques; and dominated or played insignificant roles in the production of stone tools. The complexity in the development of lithic industries was not always associated with migration processes. Owing to the arrival of people with a different tool industry in an area with a local population, either diffusion of cultures could have taken place; or the replacement of the indigenous population by immigrants, resulting in replacement of the whole technocomplex. In the Levant, from our point of view, the so-called discontinuity in the Middle Paleolithic industries of Tabun D-, C-, and B-type had nothing to do with the appearance of a different population in the region; it was the result of the evolution of the lithic industry over two hundred thousand years. Archaeologists cannot trace this process in its details.

All researchers of the Levantine Middle Paleolithic believe that 130–100 ka BP, a population of anatomically modern humans migrated into this region from Africa. This is evidenced by anthropological finds from the caves of Skhul and Qafzeh. Further, we shall shortly discuss the development of the lithic industry in South, East and North Africa, whence anatomically modern humans could have migrated into the Levant in a time span from 200 to 80 ka BP.

The earliest occurrence of blade technology in Africa was identified in the Kapthurin Formation, Kenya. The sites of GnJh-42 and GnJh-50 associated with member K^13 recognized in the deposits of this formation were studied and dated by $^{40}Ar/^{39}Ar$ method to 545 ± 3 and 509 ± 9 ka BP (Johnson, McBrearty, 2010). Over 95 % of all blanks at both sites were flakes (including fragments and angular spalls); 2.7 % constituted blades and their fragments. At the sites of GnJh-3, -15, -17, the younger lithological layers also revealed a laminar industry showing no technological association with the earlier one (McBrearty, Bishop, Kingston, 1996; McBrearty, 1999; McBrearty, Brooks, 2000; Derevianko, 2015).

In Africa, continuity cannot be traced between the Acheulean localities in the Kapthurin Formation, nor even between these and the Middle Stone Age localities. The latter are perhaps best-studied in the south of the continent, where a lot of deeply stratified cave sites, rock-shelters, and open-air sites are located. The beginning of the Middle Stone Age (MSA) is identified at the Paleolithic sites by the disappearance of bifacial tools, cleavers, and other pieces typical of the Late Acheulean. Chronologically, the transition boundary is defined differently: from 250 to 200 ka BP. R. Singer and J. Wymer, relying on archaeological evidence from the excavations on the Klasies River, recognized several stages in the development of the Middle Paleolithic industry in southern Africa: MSA I, MSA II, Howiesons Poort, and MSA III (1982).

The laminar flaking system is characteristic of the early MSA I; however, technologically, it is not associated with the lithic industry recovered from the Kapthurin Formation.

The early MSA I, in terms of major techno-typological characteristics, is significantly different from the preceding and the subsequent stages. During MSA I, blades were removed by a soft hammer; and in MSA II their production involved use of a hard hammer, and common use of faceted striking platforms. According to S. Wurz, blanks detached from cores at these two stages showed significant differences. At the earlier stage, as compared to the later, the platform width of blades and points was much smaller, and values of the ratio of the blank's length to platform's length were higher. In MSA III, points were considerably shorter than in MSA II and MSA I (Wurz, 2005: 433). In Blombos Cave, the middle section of the culture-bearing deposits, designated as phase M2, yielded a number of bifacially flaked stone artifacts and over 20 bone tools that appear to have been used as points and awls (Henshilwood et al., 2001). They produced the following TL dates: 76 ± 7, 105 ± 7, and 105 ± 9 ka BP (D'Errico et al., 2005). The overlying cultural layer contained Still Bay artifacts. This layer revealed about 400 bifacially worked points, including those with finely shaped hafts, over 10 bone tools, and a bone-fragment with engraved horizontal lines. They were dated by the TL-method to the period from 67 ± 7 to 82 ± 8 ka BP (Ibid.), and by the OSL-method to 75.2 ± 3.9 ka BP (Jacobs, Wintle, Duller, 2003). Pyramidal cores were found to be typical of both Howiesons Poort and MSA I stage. The Howiesons Poort sites produced smaller blades of geometric form, with blunted, retouched backs and small striking platforms, suggesting the removal of blanks from cores using a soft-hammer technique. According to researchers, they were aimed at the manufacture of composite tools.

Geometric backed tools are diagnostic of the African Middle Paleolithic. In the south of the continent, these tools appeared in the Fauresmith industry, which is thought to be transitional between the Lower and Middle Paleolithic; in its central part, in the very beginning of the Middle Stone Age, they occurred in the Lupemban industry. However, they were most abundant in the Howiesons Poort stage. Geometric tools appear to have been used as the insets for composite tools such as points, knives, and daggers, which most likely had wooden bases, like those dating back to the Upper Paleolithic and Mesolithic. Many researchers attribute the Howiesons Poort industry to the period between 80 (70) and 50 ka BP.

Archaeological evidence dating to MSA III contains no geometric stone tools; this industry is generally described as more archaic. In southern Africa, the blade technology of the Upper Paleolithic type emerged about 30 ka BP. Thus, no continuity can be traced in the development of the lithic industry in this area: blade technology appeared in the Acheulean (its relation to the Early Middle Paleolithic has not been established yet), then vanished from the record, and emerged again in the Upper Paleolithic. It is impossible to explain such a phenomenon by the replacement of population alone. The emergence and disappearance of blade technologies could have been associated not only with the arrival of new populations, but also with changes in adaptation strategies caused by changing environmental conditions and implying the development of new approaches in primary and secondary lithic reduction (Derevianko, 2015). Lithic assemblages of the Middle Stone Age in southern Africa include no technocomplexes that would somehow correspond to the primary and secondary reduction technologies, or to the toolkit-types, of the Levantine Middle Paleolithic industry.

Another line of the Middle Stone Age industry's development can be traced in the north and northeast Africa. In the north, the Aterian industry can be considered the most distinguishable. In previous issues of this journal, characteristics of the Aterian have already been briefly described (Derevianko, 2015, 2016b).

The Aterian industry is characterized mainly by the use of the Levallois reduction method (McBurney, 1967). Its major strategies involved the production of points, flakes and blades. A diagnostic element of this tradition is represented by stemmed tools. First of all, these include points with retouched tips and stems. Retouch could have been single- and double-row. Stems are observed on side-scrapers, end-scrapers, borers, and burins, which indicates that the Aterian population used multifunctional composite tools and reliable hafting techniques widely. Lithic assemblages associated with the Aterian sites are dominated by scrapers with various modifications, and also include notched-denticulate pieces and backed knives. At a later stage in the development of this culture, a variety of points became popular, including those with a rounded and slightly pointed stem, a triangular and asymmetrical base, and bifacial foliate points. The Upper Paleolithic tools such as scrapers, burins, blades with blunted edge, and others, as compared to the Middle Paleolithic implements, were scarce.

The dating of the Aterian industry constitutes a challenging problem. In the last century, this lithic industry was radiocarbon dated to 40–20 ka BP. But the application of new dating methods has radically changed the understanding of the issue. The site of Dar es-Soltan near Rabat yielded the OSL-date of 110 ka BP (Barton et al., 2009). The age of sites with a similar lithic industry, located near Temara, is close to this value. A sample derived from the lower Aterian layers at the cave of Mugharet el' Alyia is dated to a range between 62 ± 5 ka BP and 81 ± 9 ka BP (Wrinn, Rink, 2003). The Aterian industry appears to have emerged about 112–110 ka BP and existed for a long time. No features of its influence on the Levantine Middle Paleolithic industries have been recognized. The isolated Aterian sites are known in Arabia. One such locality, with a surface cultural horizon, was discovered at the southwestern edge of the Rub'al Khali desert. The site has yielded 300 Aterian artifacts, which, according to H. McClure (1994), can be dated to 30–20 ka BP.

In North Africa, the finds recovered from the cave of Haua Fteah in Cyrenaica, located between the Maghreb and Egypt, reflect more fully the dynamics in the development of the Middle and Early Upper Paleolithic industries. The thickness of its loose sediments reaches 14 m. On the basis of techno-typological characteristics of archaeological evidence, Ch. McBurney recognized the deposits dating to three periods: pre-Aurignacian, Levallois-Mousterian and Upper Paleolithic (1967). According to his definition, the earliest deposits, pre-Aurignacian, corresponded to the lower stratum (ca 0.5 m). Among lithic implements, McBurney mentions flat prismatic unidirectional and bidirectional cores. The toolkit (about 80 spec.) includes bifacially worked chopper-like pieces, burins, end-scrapers, side-scrapers, fragments of a leaf-shaped point, borers, and other tools. Judging by the major characteristics, the lithic industry from the lower occupational layer in Haua Fteah Cave cannot be associated with the Near Eastern Aurignacian. It is likely to be relevant to the Early or Middle Stone Age of North Africa; owing to scarcity of evidence, it is impossible to draw final conclusions. The industry indicates the use of blade technology for manufacture of stone tools from blades.

In Northeast Africa, two industries were recognized in the Nile Valley: the Early Nubian, falling within MIS 5e (~130–115 ka BP), and the Late Nubian, dating to MIS 5a (~85–74 ka BP) (Mercier et al., 1999; Van Peer, Vermeersch, Paulissen, 2010). The first one is characterized by Lupemban-type bifaces. They are mostly lanceolate and elongated-triangular in shape. Denticulate and notched-denticulate pieces made of blades and flakes are found to be typical of the toolkit. The lithic assemblage is dominated by scrapers with various modifications. The main diagnostic features, distinguishing the Early Nubian Complex from the Late Nubian Complex, are the presence of bifacial tools and the specific preparation of cores.

There is a considerable time-gap between the early and late Nubian complexes. Thus, at the site of Taramsa-1 in the Lower Nile Valley, these two complexes were isolated from each other by a sand deposit dating back to MIS 5d (117 ± 10 ka BP) (Van Peer, Vermeersch, Paulissen, 2010). At Sodmein Cave in Egypt, a Late Nubian horizon was found to overlie an Early Nubian layer. These two lithic industries are thought to be separated by a time span of ~115–85 thousand years. No localities with the Nubian Complex, dating to this chronological interval, are known in Africa (Usik et al., 2013; Rose, Marks, 2014; and others). During this time period, the Nubian Complex appeared in Oman and Yemen, South Arabia. The Nubian Complex assemblage at Aybut Al Auwal in Dhofar, South Oman, was dated to about 106 ka BP (Usik et al., 2013), which, according to the researchers, corresponds to the time when carriers of this industry migrated into the Arabian Peninsula.

The Nubian Levallois technology did not significantly influence the Levantine lithic industry (Rose, Marks, 2014). However, we think that contacts and gene-flow between the Levantine population and the people from the southern regions, who created the Nubian Levallois technology, cannot be ruled out. A low impact of the Nubian technology on the Levantine Middle Paleolithic industry may be due to the movement of human populations from Africa to Arabia along the southern route; and after the environmental conditions in the Near East became arid, migration flows appear to have significantly decreased. People with the Nubian Complex, who migrated from Africa, are associated by researchers with anatomically modern humans (Vermeersch et al., 1998; Armitage et al., 2011; Van Peer, 1998; Usik et al., 2013; Rose, Marks, 2014; and others).

The discussed Early and Middle Stone Age industries of Africa convincingly indicate that there wasn't any intensive migration flow from this continent that could have brought another technology to the Levant and replaced the local population in the region. It is likely that some human groups from Africa—for example, creators of the Nubian Complex (anatomically modern humans)—came into contact with the Levantine populations upon entering Arabia, and assimilation processes involving migrants and indigenous peoples could have occurred; however, this did not exert a great influence on the Middle Paleolithic industry. Anatomically modern humans (Skhul and Qafzeh) appear to have evolved in the Levant, rather than migrated from Africa.

The second wave of migration from Western Europe is widely thought to have been moving into the Levant in the Late Middle Paleolithic (80–60 ka BP); however, from our point of view, a comparative analysis of lithic industries of the final Middle Paleolithic in the region and the European Mousterian provides no evidence to support this theory.

The origin of the final Middle Paleolithic industry of Tabun B-type in the Levant was associated with the Tabun C-type industry. Having studied the sequence of operation of tool manufacture at Kebara, Meignen and Bar-Yosef came to a conclusion that the unidirectional Levallois technique, which was widespread in the Near East, differed from the Levallois strategies, which were most frequently used in Egypt, Nubia, and Libya. These differences are also revealed by comparison of the Levantine lithic industries with the Middle Paleolithic techno-typological complexes of Western Europe (Meignen, Bar-Yosef, 1992: 144). We suggest that the Palestinian Neanderthals also evolved in the Near East, and were morphologically different from the Western European Neanderthals.

Various Levantine sites dating back to the final Middle Paleolithic produced evidence indicating that the Levallois flaking system with some modifications was used mainly for production of stone tools; whereas contemporaneous localities in Europe revealed various flaking techniques, such as Levallois, Quina, and discoid (Meignen, Bar-Yosef, 2002). This conclusion constitutes, from our point of view, another reason not to attribute the Levantine Middle Paleolithic to the Mousterian industry, and not to assign the Palestinian Neanderthals to those from Western Europe (Derevianko, 2016b).

Anthropological aspect

Over the last 80 years, in the Levant, the caves of Tabun, Skhul, Qafzeh, Kebara, Shanidar, Dederiyeh, and others have yielded a considerable number of hominin remains dating to MIS 5 and 4. As from the first discoveries of anthropological evidence in the caves of Tabun and Skhul, their stratigraphic positions, ages, taxonomic affinity, etc. have become the subject of intense debate. The first researchers of Tabun and Skhul caves put forward different interpretations of bone remains. T. McCown believed that the paleoanthropological finds from Skhul Cave represented two different anthropological types (1934). One group (burials III, VI–X) is earlier, another one (I, IV, and V) is later. Subsequently, this point of view was supported by A. Ronen (1976). He suggested that the 2 m deep deposits of layer B, which yielded the burials, had accumulated over a long period. A. Keith, who also studied these paleoanthropological finds, believed that they could be attributed to Neanderthals, but noted that they were more recent than European Neanderthals. McCown and Keith included the Skhul hominins into the species of *Paleoanthropus palestinensis* (1939). Morphological differences between the paleoanthropological finds from the caves of Tabun and Skhul were explained by possible hybridization between Neanderthals and Cro-Magnons.

F. Howell, however, expressed a somewhat different point of view with regard to these finds. He considered hominins from the caves of Skhul and Qafzeh to be an intermediate link in the evolution between Tabun Neanderthals and early modern humans, and defined them as proto-Cro-Magnons (Howell, 1958). Later he suggested that the mandible from layer C in Tabun Cave could be attributed to *H. sapiens* (Howell, 1999). At present, scientists share the view that two taxa existed in the Levantine Middle Paleolithic: early modern humans (Skhul and Qafzeh) and Neanderthals (Tabun, Amud, Kebara). Owing to the accumulation of archaeological and skeletal evidence from Levant dating back to the Middle and Late Pleistocene, there has been a discussion regarding the continuous or discontinuous development of the Lower, Middle, and Upper Paleolithic industries, as well as the process of human occupation of this region.

Scientists express different views about the issue of continuity in the Levantine Middle Paleolithic industries, and about the fate of early modern humans and Neanderthals (Stringer, Andrews, 1988; Arensburg, Belfer-Cohen, 1998; Shea, 2001; Meignen, Bar-Yosef, 2002; Kaufman, 2002; Hovers, 2006; Hovers, Belfer-Cohen, 2013; and others). Certain researchers believe that both taxa inhabited the Levant simultaneously for a short period of time, and attempt to trace their evolution on the basis of features indicating continuity in the Middle Paleolithic industries. Others reject the possibility that Levantine Middle Paleolithic assemblages originate from the Acheulo-Yabrudian industry, and assume that early modern humans migrated from Africa, and Neanderthals migrated from Europe, each with their own lithic industries.

J. Shea is the most consistent supporter of the idea of discontinuity in the development of the Middle and Upper Paleolithic, whereby early modern humans (Skhul, Qafzeh) were replaced by Neanderthals and the latter by *H. sapiens*, who arrived 50–40 ka BP from Africa into the Levant. He proposed scenarios of competitive displacement and extinction due to climatic changes, based on the idea that cultural, biological, and social relations among *H. sapiens* were more advanced than among Neanderthals (Shea, 2001, 2003, 2006, 2007, 2008; and others). One must agree with his assertion that no reliable evidence has been currently provided, leaving room for the possibility of coexistence of Neanderthals and early modern humans in the Levant. However, it is by no means certain that all Middle Pleistocene localities in the region have been identified and completely excavated. Undoubtedly, new sites will be discovered in the area, although, perhaps not as impressive as Skhul, Qafzeh, Tabun, Amud, and Kebara. From our point of view, archaeological evidence from the Middle Paleolithic sites in the Levant allows one to suggest the simultaneous dispersal of early modern humans and Neanderthals in the region. We do not consider it necessary to debate with Prof. Shea, but will make an attempt to present briefly our point of view and understanding of the processes associated with the dispersal of hominins in the Levant during the Middle and Late Pleistocene; although we perceive that many points of our hypothesis may draw strong criticism.

Our concept is based on the fact that continuity can be traced in the Lower, Middle, and Upper Paleolithic industries of the Levant, and the indigenous population dispersed across the region over the Lower and Middle Paleolithic. Of course, this did not exclude contacts with populations that migrated to the Near East and the Arabian Peninsula from the adjacent areas of Africa, Iran, and others, because of climatic changes or for other reasons. During short-term contacts, an exchange of genetic material could have taken place. The arrival of populations from Africa or from other regions in the Levant in the Lower/Middle Paleolithic would have resulted in acculturation, and in case of antagonistic relations, in complete replacement of the local people. Such events would have been reflected in evidence from Paleolithic sites. The possible short-term contacts of the autochthonous population with people from the adjacent areas could have resulted in some cultural diffusion. In this case, both a gene-flow and an exchange of some innovations in lithic reduction may have occurred. Such relations might have been established, for example, between the Levantine population and early modern humans, who developed the Afro-Arabian Nubian technocomplex, which has been recorded in Oman on the Arabian Peninsula (Rose, Marks, 2014).

Lithic industry (with the radial primary reduction system) found near the Jubbah paleolake, Arabia, reveals a technological similarity to the Levantine Middle Paleolithic assemblages of Tabun C-type; and short Levallois points with faceted bases, removed from unidirectional convergent flaking surfaces of cores from Jebel Katefeh 1, are technologically close to Levallois points of Tabun B (Crassard, Hilbert, 2013). J. Rose and A. Marks suggest that this was due to either cultural diffusion, or southward invasions by Levantine Mousterian (Neanderthal – **A.D.**) groups at the times of optimal environmental conditions. The researchers also assume that there was some other similar demographic and cultural evidence (Rose, Marks, 2014: 75). Short-term contacts with migrants did not result in the replacement of the local population, but only stimulated a gene-flow and an exchange of some innovations in lithic technology.

Many archaeologists studying the Levantine Middle Paleolithic suggest that two taxa migrated into the area: early modern humans from Africa, and Neanderthals from Southern Europe. Researchers differ in their assessment of the time when anatomically modern humans migrated from Africa to the Levant. According to O. Bar-Yosef, one of the most recognized scientists in the field of the Paleolithic, the exodus of human populations from the African continent could be attributed to the chronological interval of 110–90 ka BP (1987, 2000; and others). But one of his co-authored papers, with consideration of climatic changes in Africa and the Arabian Peninsula, suggests an earlier date for the dispersal of these populations in the Levant, 140 ± 10 ka BP (Frumkin, Bar-Yosef, Schwarcz, 2011). Such a wide range of values explains the difficulties associated with the correlation of dates resulting from different approaches. Use of even one and the same method often provides discordant results. Many scientists suggest that anatomically modern humans entered the Levant from Africa about 120 ka BP (Stringer, 2012; Shea, 2007; and others).

Some skeletal finds come from Ethiopia; and despite the lack of such evidence in the East Sahara and the Arabian Peninsula, as noted by Bar-Yosef et al., the presence of hominins in the region can be inferred from the availability of lithic industries along the supposed migration route (Frumkin, Bar-Yosef, Schwarcz, 2011: 448). From our point of view, archaeological evidence indicating the migration of early modern humans in the Levant at that time has yet to be demonstrated.

Humans could have entered the Levant from Africa following two routes: through the Levantine corridor, and via the mainland and shelf of the Bab-el-Mandeb Strait when sea levels were low. Two lithic industries were developed in Northeast Africa: the Aterian and the Nubian Levallois. We have already discussed above a possible association between the Middle Paleolithic industries in the Levant and northeastern Africa, and came to the conclusion that those represented different techno-typological complexes. Early modern humans associated with the Nubian Levallois industry did come from Africa to Arabia during MIS 5e and developed the Afro-Arabian Nubian technocomplex (Usik et al., 2013; and others). At this time, Arabia was a region with the most favorable environmental conditions for vegetation; whereas the Sahara, like North Africa as a whole, experienced a period of strong aridization, which occurred after 115 ka BP (Drake, Breeze, Parker, 2013).

The Nubian Levallois technocomplex could have influenced the Levantine Middle Paleolithic only indirectly. The origin of the Levantine Middle Paleolithic industry of Tabun C-type was associated with technocomplexes of the Early Middle Paleolithic of Tabun D-type; and its development did not undergo significant changes, as would be expected in the event of acculturation with the arrival of early modern humans, and even more so if replacement of the indigenous people by migrants had occurred.

In our view, it is unlikely that populations associated with the Nubian Levallois complex, and early modern humans employing a different lithic industry, migrated from Africa to the Levant at the same time. No archaeological evidence thereof exists.

Another hypothesis was suggested in connection with the finds discovered in Misliya Cave in the Levant. This cave is located on the western slopes of Mount Carmel. Excavations carried out at the site revealed occupation layers dating to the final Lower–Early Middle Paleolithic (Zaidner, Weinstein-Evron, 2012). The Middle Paleolithic layers, with an excavation area of 20 m^2, have yielded numerous lithic artifacts. The industry is characterized by laminar flaking, including the Levallois method. The Levallois technique is represented mainly by unidirectional cores sub-triangular in plan, which were used primarily for removing sub-triangular points and flakes. The toolkit includes points and retouched blades. The lithic industry recovered from this cave was similar to that found at Hayonim Cave.

The Middle Paleolithic layer contained skeletal remains: a partial maxilla, four isolated teeth, a phalanx, and a patella. These finds can likely be attributed to early modern humans (Hershkovitz, Zaidner, Weinstein-Evron, 2013). TL age estimates obtained for the 2.5–3.0 m thick Middle Paleolithic layer vary over a wide range. All researchers agree that the finds from Misliya Cave and the Early Middle Paleolithic materials from Tabun and Hayonim caves fall within the timespan between 250–165 ka BP (Valladas et al., 2013). The final Middle Paleolithic of Misliya Cave corresponds to the Early Middle Paleolithic of Tabun C-type, 165 ± 16 ka BP (Mercier, Valladas, 2003).

With regard to some differences in the final Lower Paleolithic and Early Middle Paleolithic industries from Misliya Cave, researchers agree that a new population arrived in the Levant about 250 ka BP. It could have been associated either with Neanderthals from Europe, or with early modern humans from Africa (Valladas et al., 2013).

We think that there is insufficient evidence to draw such a conclusion. The first part of this paper discussed the Late Acheulean blade industry, dating to ca 280 ka BP, recognized in the Kapthurin Formation. The assemblage differs from an earlier blade industry, with an age of over 500 thousand years (recovered from the older deposits of the same formation, and associated with human remains attributed to *H. rhodesiensis*) and shows no similarities to the Acheulo-Yabrudian industry of the Levant. The Middle Stone Age (MSA I), too, is dissimilar to the Levantine Middle Paleolithic. The Middle Paleolithic industries of Northeastern Africa had nothing in common with the contemporaneous Levantine assemblages. Therefore there is no reason to infer that early modern humans migrated to the Levant from Africa 250 ka BP, or to associate the Middle Paleolithic industry from Misliya Cave with the African lithic industries. No known Mousterian industries in Europe could have provided a basis for the development of the Early Levantine Middle Paleolithic. Hence, based on the available archaeological and anthropological evidence, we consider it very unlikely that early modern humans from Africa or Neanderthals from Europe had migrated to the Levant around 250 ka BP. It is much more probable that the Levantine Middle Paleolithic originated from the Acheulo-Yabrudian.

Continuity in the development of the Levantine Middle Paleolithic suggests a hypothesis about the colonization of this region during the Middle and the first half of the Late Pleistocene by populations evolving towards sapienization, resulting in the development of two taxa in the area, including anatomically modern humans and the Palestinian, or Southwest Asian, Neanderthals.

According to some writers, in Africa, the process of speciation appears to have taken place on the basis of *Homo erectus* sensu lato about 0.9–0.8 Ma BP. *H. erectus* gave rise to a new species that has received various names: *H. heidelbergensis*, *H. rhodesiensis*, archaic *H. sapiens* (Rightmire, 1996, 1998; Bräuer, 2008, 2010, 2012; Hublin, 2001, 2009; and others). We will now outline the fate of a new taxon, *H. heidelbergensis*/*rhodesiensis*, in Africa and Europe. Many specialists consider it ancestral to anatomically modern humans*. Skeletal finds from Africa and Eurasia, dating to the Middle and the first half of the Late Pleistocene, display a mosaic of taxonomic traits and high variability. Therefore, the many fossils are interpreted in completely

*This issue is discussed in numerous publications.

different ways, and it is absolutely unrealistic to consider all viewpoints.

There is no single scenario of evolution from *H. heidelbergensis* to anatomically modern humans and to Palestinian Neanderthals. Anthropologists often assign various taxonomic diagnoses to the same finds, which is quite understandable. It is more difficult to understand why hominins from the same site, who were broadly contemporaneous and used the same lithic industry, are sometimes attributed to different species. One of the reasons may be the mosaic morphology of the Middle Pleistocene hominins and the lack of criteria for assessing the taxonomic importance of various morphological traits. For example, J. Schwartz and A. Tattersall believe that Qafzeh 1, 2, 9, and 11 represent *H. sapiens*; but other individuals from the same site cannot be unambiguously attributed to that species (2005: 600).

Archaeologically, it is unlikely that two different species or subspecies using the same lithic industry coexisted at one and the same site. Biologically, it seems more logical to explain the presence of individuals showing different "taxonomic" affinities at one and the same site by polymorphism within a single population.

We will now briefly outline a hypothesis regarding the evolutionary development of *H. heidelbergensis/rhodesiensis* in Africa and Europe.

In Africa, the evolution of this species is evidenced by fossils such as Bodo, Kabwe 1, 2, Saldanha, Ndutu, Eyasi 1, 2, Salé, Elandsfontein, etc., spanning the interval between 600–200 ka BP. This evidence reflects a mosaic pattern of archaic and modern features. Anthropologists differ in their taxonomic assessments of these finds, and the role they played in the development of the human lineage: recognition of *H. sapiens* sensu lato; classification of a polymorphic species, *H. sapiens*, into several separate sub-species; recognition of three different communities or groups, etc. (Bräuer, 2010, 2012). In our view, *H. heidelbergensis* and *H. rhodesiensis* represent the same polytypical species, playing an important role in human evolution: in Europe, it gave rise to *H. neanderthalensis*; in Africa, to *H. sapiens*; in the Near East, to two closely related species—*H. sapiens* and Palestinian Neanderthals.

Skeletal remains attributed to early archaic *Homo sapiens* were found mainly in East Africa; others come from North and South Africa. In this region, the transition from the early archaic to anatomically modern *H. sapiens* occurred as a continuous anagenetic evolution, without any speciation events (Bräuer, 2008, 2012; Mbua, Bräuer, 2012).

The origin of anatomically modern humans is a contentious issue. G. Bräuer attributes all fossils within the 300–200 ka BP interval to the intermediate late archaic *Homo sapiens* group. Members of this group are KNM-ER 3884 from Ileret (270 ka BP), Laetoli 18 (250 ka BP), Eliye Springs (date uncertain), Florisbad (260 ka BP), and Jebel Irhoud 1 and 2 (190–170 ka BP). Continuity between early and late archaic *Homo sapiens*, in Bräuer's view, is documented by the Rabat fossil (250 ka BP), and the transition from the archaic to the early modern *H. sapiens*, by Omo 1 and 2, Herto, Singa, etc. (Bräuer, 2008, 2012; Mbua, Bräuer, 2012). G.P. Rightmire believes that for approximately 800 thousand years after the emergence of *H. heidelbergensis*, this taxon evolved in two directions: toward *H. neanderthalensis* and toward *H. sapiens*, eventually giving rise to those two taxa by the end of the Middle Pleistocene. He views Florisbad, Laetoli, and Jebel Irhoud as a stage in the emergence of *H. sapiens* in Africa. At the beginning of the Late Pleistocene, in the process of speciation, early modern humans such as those from Klasies River Mouth, Skhul, and Qafzeh, definitely emerged (Rightmire, 2001, 2009; and others).

In Europe, the Acheulean industry appears about 600 ka BP together with *H. heidelbergensis*. This, it appears, was the starting point of their evolution toward *H. neanderthalensis*, who appeared 450 ka BP or somewhat earlier (Hublin, 1998). The results of mitochondrial DNA sequencing suggest that hominins from Sima de los Huesos, who lived about 430 ka BP (Arsuaga et al., 2014)—or about 530 ka BP, according to another estimate—were more closely related to Denisovans than to Neanderthals, although morphologically they shared a number of traits with the latter* (Meyer et al., 2014). Later, the analysis of nuclear DNA from two bone samples indicated affinities of Sima de los Huesos humans with Neanderthals rather than Denisovans (Meyer et al., 2016). Specifically, the nuclear DNA extracted from the AT-5431 femur and from an incisor found at Sima de los Huesos show those humans to be close to early Neanderthals or to a group ancestral to these, but not to Denisovans. Geneticists believe that the mitochondrial gene-pool of Neanderthals had undergone significant changes after their separation. The whole genome sequencing showed that the most recent common ancestor of Neanderthals and Denisovans had lived 473–381 ka BP.

The results of DNA sequencing warrant two tentative conclusions. First, members of the *H. heidelbergensis* taxon, who were associated with the Acheulean industry and migrated from the Near East to Western Europe some 600 ka BP, had retained affinities with Denisovans in their mitochondrial genome, and with Neanderthals

*Regrettably, no cranial or postcranial bones suitable for reconstructing the physical type of Denisovans were found in this cave.

in their nuclear genome. Alternatively, the Sima de los Huesos population belonged to the Neanderthal lineage, which had preserved certain Denisovan markers in its mitochondrial genome.

In 1993, human remains covered with calcite were discovered near Altamura in southern Italy (Lari et al., 2015). The mitochondrial DNA of this individual reveals unambiguous Neanderthal affinities. Its age estimates, according to the Th/U-method, are 130 ± 20 and 172 ± 15 ka BP. Apparently, Denisovan markers had disappeared by that time. Around 270–250 ka BP, the Levallois primary reduction technique emerged in Western Europe. This, in our view, may be related to a migration from the Near East in the final Lower or Early Middle Paleolithic. Or, the Levallois technique might have been an outcome of short-term contacts, or a diffusion of innovations. Therefore, the Western European Mousterian may have been influenced by the Acheulo-Yabrudian complex of the Levantine final or Early Middle Paleolithic.

In Levant itself, the evolution of *H. heidelbergensis* proceeded in a different fashion. The skeletal evidence thereof is scarce, and mostly relates to Israel. The earliest remains come from the Lower Paleolithic site of Ubeidiya, dating to 1.4 Ma BP. The bifacial tools from Ubeidiya, which are the earliest in Eurasia, testify to the first migration wave of people associated with the bifacial industry. Among the finds from Ubeidiya are several cranial fragments (UB 1703, 1704, 1705, 1706), an incisor (UB 1700), and a molar (UB 1701). P. Tobias (1966) attributed them to the genus *Homo*, and E. Tchernov (1987), described them as "*H. cf. erectus*". The subsequent examination of the fossils yielded a worn right lower lateral incisor (UB 335), which revealed some affinities with *H. ergaster* (Belmaker et al., 2002). In our view, the Ubeidiya humans were members of the *H. erectus* taxon.

Another Paleolithic locality in Israel is Gesher Benot Ya'aqov where the 34 meter thick sedimentary sequence spans the period of MIS 20–18, or at least 50 thousand years (Feibel, 2004; see (Derevianko, 2016a) for a review of the vast literature). The abundant and diverse lithic industry, according to certain experts, falls into four basic types: bifaces (hand-axes); cleavers; flakes and flake tools; cores and core tools. In our view, the Gesher Benot Ya'aqov industry may have originated from that of Ubeidiya, even though they are separated by a huge chronological gap. The excavator of Ubeidiya, N. Goren-Inbar, claims that this industry cannot be described as either African or Asian: its peculiarities are mostly due to local origin, and only partly to external influences (1992: 67).

The Gesher Benot Ya'aqov, we believe, could be attributed to *H. heidelbergensis*. About 800 ka BP, members of this taxon migrated from Africa to Eurasia and began to disperse across this continent. *H. rhodesiensis* continued to evolve in Africa, eventually resulting in the emergence of *H. sapiens* about 180–150 ka BP. *Homo heidelbergensis*, who migrated from Africa to Levant, could have been the common ancestor of three closely related but still distinct taxa: *H. sapiens*, *H. neanderthalensis*, and Denisovans (Stringer, 2012).

Having migrated from Africa to the Levant, *H. heidelbergensis* evidently encountered the local *H. erectus* populations. The contact resulted in acculturation, whereby the immigrants borrowed many elements of the autochthonous lithic industry. Eventually the Gesher Benot Ya'aqov industry acquired many features opposing it to the African Acheulean. The fossil record of the Levant is scanty, and new finds are needed to test this hypothesis.

The diversity and mosaic nature of human evolution in Africa and Eurasia in the Pleistocene are addressed in numerous studies. The central issue concerns the ways those humans progressed toward *H. sapiens*, whether without speciation (within a single evolving species *H. sapiens* sensu lato with several subspecies) or by splitting into several species such as *H. heidelbergensis*, *H. helmei*, and *H. sapiens* (Bräuer, 2012).

Human fossils have been unearthed from three more Middle Pleistocene sites in Israel. As early as 1925, a frontal bone, a right zygoma, and an incomplete sphenoid were found in the Mugharet el-Emireh cave, with an industry contemporaneous with the Amudian. They are known as the Zuttiyeh remains, and their taxonomic attribution is debatable.

According to B. Vandermeersch, the Zuttiyeh individual was an archaic *H. sapiens*. Rightmire contends that the Zuttiyeh frontal could belong either to an early Neanderthal or to a direct ancestor of Skhul and Qafzeh humans. The Acheulo-Yabrudian industry of this site, dating to 350–300 ka BP, suggests that this was an archaic African population similar to Bodo, Elandsfontein, Kabwe, Eyasi, and Ndutu (Rightmire, 2009). Bräuer (2008) associated Zuttiyeh with early archaic *H. sapiens*.

Freidline et al. (2012: 237–238) have analyzed the competing views regarding the Zuttiyeh remains, and proposed four hypotheses.

The first hypothesis is that Zuttiyeh was a local member of a Middle Pleistocene species *H. heidelbergensis/rhodesiensis*, widely distributed in Africa and Europe and apparently ancestral to both Neanderthals and anatomically modern humans.

The second hypothesis is related to the accretion model, which assumes a prolonged evolution of the Neanderthal lineage in Western Europe. Zuttiyeh might have been related to its southwestern members, defined as either *H. neanderthalensis* or *H. heidelbergensis* sensu stricto, a chronospecies antecedent to Neanderthals.

The third hypothesis assumes that there was a regular gene-flow between Africa and the Near East in the Middle and Late Pleistocene. In this context, Zuttiyeh was the predecessor of *H. sapiens* in Africa.

The fourth possibility is that Zuttiyeh and other Near Eastern hominins (Skhul, Qafzeh, and Neanderthals) either belonged to the regional *H. sapiens* lineage or, like African Middle and Late Pleistocene hominins "with deep roots", were ancestral to *H. sapiens*. If so, Zuttiyeh must reveal affinities with Near Eastern hominins (Ibid.: 238).

Indeed, researchers conclude that Zuttiyeh does resemble Near Eastern Neanderthals such as Shanidar V, and early humans such as Skhul V; but also European Middle Pleistocene hominins like Arago XXI. According to Freidline et al., their results do not warrant an accurate taxonomic diagnosis of Zuttiyeh, but suggest that this fossil represents a population ancestral to both Neanderthals and *H. sapiens*, or an unspecified population that existed immediately after the split between those two species (Ibid.).

A femoral shaft and a worn lower molar from layer E of the Tabun Cave have been attributed to archaic humans (Trinkaus, 1995).

Finds from Qesem Cave are more informative (Hershkovitz et al., 2011). Its rich lithic industry is Amudian and autochthonous, showing no affinities with either African or European assemblages (Barkai, Gopher, Shimelmitz, 2005; Gopher et al., 2005). Fossils include maxillary and mandibular teeth. Hershkovitz et al. have proposed three hypotheses to account for their morphology.

(1) Inhabitants of Qesem Cave were members of an archaic human population who lived in the Near East 400–200 ka BP; their teeth, despite certain plesiomorphies, indicate closer affinities with Skhul and Qafzeh than with Neanderthals (Hershkovitz et al., 2011). This idea, Hershkovitz et al. believe, is supported by archaeological finds, specifically by the Levallois industry with a high share of blades and blade tools, testifying to the local sources of the Amudian.

(2) The Neanderthal lineage in southwest Asia was as ancient as in Europe, where it emerged in the Middle Pleistocene. This, in the authors' view, is contradicted by the fact that anatomically modern remains from Skhul and Qafzeh are later than those from Qesem, but earlier than most Neanderthal fossils from the Levant.

(3) This hypothesis proceeds from the fact that mandibular teeth from Qesem were found in deeper layers of the cave than were maxillary teeth; but are smaller than the latter and, unlike them, show no plesiomorphies. This may suggest that upper and lower teeth represent various taxa, testifying to population replacement.

Misliya Cave yielded an Early Middle Paleolithic industry dating to 250–165 ka BP, a maxillary fragment with intact I^2–M^2, four separate teeth, a phalanx, and a patella, representing early modern humans or Neanderthals (Valladas et al., 2013).

In sum, the fragmentary human fossils from the Levant, broadly dating to 350–150 ka BP, do not warrant unambiguous diagnosis at the species level, but exhibit both apomorphic and plesiomorphic traits. Possibly they represent the next stage in the evolution of *H. heidelbergensis*, combining traits of early *H. sapiens* and *H. neanderthalensis*.

It is also possible that *H. heidelbergensis* of the Levant, like those of Sima de los Huesos, retained genetic affinities with Denisovans. This idea is supported by an eastward migration from the Levant ca. 350–300 ka BP, reaching the Altai ca. 280 ka BP (Derevianko, 2001). Denisovan DNA was extracted from a fossil found in layer 22 of Denisova Cave, and the presence of Denisovans is archaeologically documented throughout most of the stratigraphic sequence up to layer 9.

Importantly, because the Sima de los Huesos humans combined Neanderthal and Denisovan features in their gene-pool (Meyer et al., 2014), *H. heidelbergensis*, who had migrated from Africa to Levant about 800 ka BP, may have hybridized with local populations and taken part in the acculturation process. Subsequent evolution eventually resulted in the emergence of three related taxa: *H. sapiens*, Neanderthals, and Denisovans. The Denisovan genome included a signal of an unknown hominin, who had diverged from the common lineage ca. 1 million years ago (Prüfer et al., 2014). Archaeologically, this divergence is paralleled by the Acheulean migration from Africa to Levant about 1.4 Ma BP, as documented by the Ubeidiya industry. Hybridization may account for genetic affinities between *H. heidelbergensis* and Denisovans.

With regard to later Levantine fossils from the MIS 5–4 timespan, two views have been proposed. Certain experts believe that they all represent a single population close to early modern humans (Kramer, Crummett, Wolpoff, 2001; Arensburg, Belfer-Cohen, 1998; and others), whereas others attribute the Tabun, Amud, and Kebara remains to Neanderthals, and those from Skhul and Qafzeh, to early *H. sapiens* (Tchernov, 1992; Jelinek, 1992; Vandermeersch, 1992, 1997; Stringer, 1992, 1998; and others).

The stratigraphic position, age, and taxonomic status of certain finds, especially those from Tabun, are disputable. Fossils from layer C include an incomplete female skeleton (Tabun I), a mandible (Tabun II), an incomplete femur (Tabun III), metacarpals, and hand phalanges (Tabun IV–VI). The female skeleton is believed to have been associated with the upper part of layer C, although it was found 85 cm above the mandible, and D. Garrod did not exclude its redeposition from layer B (The Stone Age…, 1937). This idea was supported by certain later researchers (Bar-Yosef, Callander, 1999; and others).

The Tabun I skeleton and the Tabun II mandible are sometimes attributed to Neanderthals (Stefan, Trinkaus, 1998; Trinkaus, 1987; and others), and sometimes to anatomically modern humans of Skhul and Qafzeh (Quam, Smith, 1998; Rak, 1998). The controversy stems from the lack of agreement regarding the diagnostic criteria of *H. sapiens*. The discrepancies are especially acute in the interpretation of the Levantine fossils of the last interglacial period and the beginning of the last glacial period. This may be partly due to the paradigm shift in the study of human evolution in the last 50–70 years, following the extension of the archaeological and biological databases, the acknowledgment of the early age of *H. sapiens*, and the appearance of paleogenetic data.

Until the mid-20th century, the influential unilinear theory held that human evolution had proceeded in stages such as Australopithecines—early archaic *Homo* (*H. ergaster*, *habilis*, *erectus)*, broadly termed "Archanthropus"—late archaic *Homo* (*H. neanderthalensis*, or "Paleoanthropus")—anatomically modern humans (*H. sapiens*). All fossil humans who had lived in Africa and Eurasia before 150 ka BP, but later than early archaic *Homo*, were often merged under the "Paleoanthropus" category. In the late 1900s, Neanderthals were subdivided into pre-Würmian ("atypical"), "classic" Neanderthals of the Würm glaciation, and those of Palestine. Although hominins of the late, middle, and early Upper Pleistocene were no longer called Neanderthals, their Middle Paleolithic industry in Northern Africa was still referred to as Mousterian.

In the late 1900s, when Neanderthal markers were believed to be virtually absent in modern human DNA, the idea that Neanderthals were but a side branch seemed to have gained critical support. Even *H. erectus* was sometimes regarded as an evolutionary dead end, resulting in a huge gap between Australopithecines and *H. sapiens*.

Eventually, two competing hypotheses were elaborated. According to the first, monocentric view, anatomically modern humans originated in Africa and dispersed across Eurasia between 80 (or 70) and 50 ka BP, with complete replacement of archaic populations or with some hybridization. The alternative multiregional hypothesis has been supported by new results of Neanderthal DNA sequencing, and by facts relating to the new sister species of Neanderthals, the Denisovans. These facts indicate a small-scale hybridization between several hominin subspecies in the Late Pleistocene. S. Pääbo (2014) speaks of a "metapopulation", or a macrospecies, which included Neanderthals, Denisovans, anatomically modern humans, and other groups engaged in occasional or regular interbreeding.

We suggest a new hypothesis that takes into account the results of genome sequencing, recent archaeological and anthropological discoveries, and the views of other specialists in human evolution. A polytypic species, *Homo heidelbergensis/rhodesiensis*, emerged about 800 ka BP in Africa. In the Middle Pleistocene, as a result of the evolution and divergence of *H. rhodesiensis* in Africa (as indicated by differences between lithic industries found in the south, east, and north of the continent), as well as gene-flow, anatomically modern humans appeared 200–150 ka BP. In Europe, *H. heidelbergensis* evolved into *H. neanderthalensis*, showing a greater variability. In the Near East, predominantly in the Levant, three genetically and taxonomically close taxa emerged on the basis of *H. heidelbergensis*: anatomically modern humans, Palestinian Neanderthals, and Denisovans. About 300 ka BP, populations using blade/Levallois technology (ancestors of Denisovans) migrated from the Levant into Eastern Eurasia. In the Altai and, judging by the lithic industry, in Central Asia, migrants from the Near East (Denisovans) with certain Neanderthal components in their gene-pool contributed to the origin of *H. sapiens altaiensis*. In East and Southeast Asia, beginning from the initial dispersal of *H. erectus* in the region, convergent evolution towards *H. sapiens* occurred. Certain populations from the Near East advanced as far as Southeast and East Asia. As a result, some modern populations display Denisovan and Neanderthal alleles inherited from late *H. heidelbergensis*, who had migrated from the Levant about 300 ka BP. Recent findings suggest that the development of modern humans was based on *H. sapiens africanensis*. Members of this ancestral species eventually migrated to Eurasia. In Europe, they hybridized with *Homo sapiens neanderthalensis*; in the southern part of North and Central Asia, with *Homo sapiens altaiensis*; and in East and Southeast Asia, with *Homo sapiens orientalensis* (Derevianko, 2011). These processes co-occurred with acculturation (Ibid.). It is possible that new sub-species of *Homo sapiens*, which likewise contributed to the gene-pool of the modern mankind, will be recognized in Eurasia in the future.

Of course, new archaeological and anthropological data are needed to test this hypothesis. Sequencing the DNA from Skhul, Qafzeh, Amud, Kebara, Manot, and, if possible, from Zuttiyeh, Qesem, and Misliya would be of critical importance.

In our view, the already available evidence speaks in favor, not only of continuity in the development of the Lower and Middle Paleolithic industries, but also of genetic continuity between hominin populations that dispersed across the region in the Middle and Late Pleistocene.

Despite the scarcity of human fossils from the Levant dating to MIS 11–6, and the divergence of hypotheses, the fact that no other population with a different lithic industry appears to have migrated to this region suggests the following assumption. Populations with the Acheulean industry (*H. heidelbergensis*), which had migrated from Africa into the Levant about 800 ka BP, stayed in the area for several hundred thousand years. Adaptive divergence, gene-flow, and other evolutionary processes, as well as short-term contacts with populations from adjacent regions, resulted in the emergence of modern humans, represented by Skhul and Qafzeh fossils; and of Palestinian Neanderthals, represented by Tabun, Amud, and Kebara fossils. This hypothesis is supported by a homogenous Levantine lithic industry, which falls within the timespan between 400–40 ka BP.

At the Acheulo-Yabrudian stage, a new taxon appeared in the region, as evidenced by finds from Qesem Cave. Its members resembled later humans from that area—Skhul and Qafzeh (Ben-Dor et al., 2011). The abundance of hominin remains from the Middle Paleolithic layers in the Levantine caves (Qafzeh, Skhul, Zuttiyeh, Tabun), and the fact that the Acheulo-Yabrudian complex has no parallels in Africa, indicate that both biological and cultural evolution proceeded in situ (Ibid.: 9). Researchers conclude that a new human species emerged in the Levant. This conclusion supports our cautious hypothesis about the evolution of *H. heidelbergensis* in the Levant during MIS 5–4.

Skeletal evidence from Skhul, Qafzeh, Tabun, Amud, and Kebara indicates the accretion of modern apomorphies and the decrease of plesiomorphic features. Modern apomorphies appear to be more strongly pronounced in Skhul and Qafzeh humans than in those from other caves. Both anatomically modern humans and Neanderthals of the Levant are highly variable and mosaic. Let us discuss this issue in more detail.

Assessing the taxonomic status in this case is difficult, not only because different criteria are used, but also because of the problems related to the stratigraphic context of the finds. R. Grün et al. estimate the age of Skhul, Qafzeh, and Tabun at 130–100 ka BP. The presence of both early modern humans and Neanderthals in the Levant during MIS 5 complicates the attempts to separate these populations in time and space (Grün et al., 2005: 332). At the same time, the ESR date of dental remains from Tabun C1 is 120 ± 16 ka BP, suggesting that the tooth-fragment probably got to Layer C from Layer B (Grün, Stringer, 2000). The last assumption is supported by the re-examination of the excavation's diary (Bar-Yosef, Callander, 1999).

There is no agreement about the stratigraphic position of fossils from Tabun, their age, and their taxonomic affinity. Some researchers attribute Tabun I to Neanderthals, others to anatomically modern humans. Some think that the mandible, which was found 85 cm below Tabun II and can be reliably associated with Layer C, reveals similarity to Skhul and Qafzeh counterparts (Quam, Smith, 1998; Rak, 1998); others believe that it can be attributed to a Neanderthal (McCown, Keith, 1939; Trinkaus, 1987, 1993; Ronen, 2012; and others).

Stringer et al. believe that all fossils from Tabun come mainly from Layer C and are associated with Neanderthals (Schwarcz, Simpson, Stringer, 1998). Tabun Layer C yielded a TL-date of about 150–190 ka BP and an ESR-date of about 105–160 ka BP; but the date within 130 ka BP seems to be more correct. Hence, Neanderthals did not migrate into the Levant from Western Europe 75 ka BP, but had occupied Tabun Cave before *H. sapiens* appeared at Skhul and Qafzeh. This does not necessarily mean that Neanderthals arrived in the Levant earlier than did anatomically modern humans. Some suggest that early modern humans, whose skeletons were discovered in Skhul and Qafzeh, as well as the Tabun I Neanderthal, are contemporaneous (Grün et al., 2005; Ronen, Gisis, Tchernikov, 2011). And, as many believe, the morphology of Skhul and Qafzeh humans is unambiguously modern.

Human remains of ten individuals varying in age—eight male and two female—were recovered from Skhul Cave. Three cultural layers were revealed. Layer A included mixed Natufian, Aurignacian, and Late Upper Paleolithic industries. Layer B, divided into the upper sub-layer B1 and the lower B2, produced all human fossils and Middle Paleolithic artifacts. Layer C yielded few artifacts (McCown, 1934). According to Grün et al. (2005), if one assumes that the sedimentation of fossil-bearing deposits occurred over a relatively short period, then their best age estimate would be 135–100 ka BP.

Skhul fossils demonstrate a mosaic pattern of cranial and postcranial morphology. This may account for the fact that until recently, these remains were associated with Neanderthals, who had allegedly migrated to the Levant from Europe (Vandermeersch, 1981) or Africa (Andrews, 1984).

On the basis of the variable morphology of the fossils and their different stratigraphic positions, McCown and Keith (1939) subdivided the Skhul population into two chronological groups: early (III and VI–X) and late (I, IV, V). A. Ronen (1976) subscribed to this view. According to D. Kaufman (2002), the existence of these two groups does not necessarily imply that there was a long chronological gap between them.

The cave-dwellers of Skhul show anatomically modern characteristics, such as tall stature (173–179 cm), and very low orbits combined with broad faces (Zubov, 2004). In certain respects, though, they resembled Neanderthals.

The best-preserved skeleton is Skhul V, a male aged 30–40, tall and gracile. His cranial capacity is 1518 cm^3, the vault is high, the orbits low, and the face is rather high and broad*. The metric and non-metric traits of the supraorbital area of Skhul V links this individual to Mladeč V and Brno I, indicating a morphology intermediate between Neanderthal and modern. The zygomatic bones are morphologically modern, and the angle between the frontal and the temporal processes (115º) also falls within the modern range. The shape of the frontal process links Skhul V to Oberkassel 1 and Kabwe, whereas the angles defining neurocranial shape reveal affinities with Amud, Kabwe, and Ngandong XI. The mandible is in some respects similar to Amud, Le Moustier 1 and 2, Oberkassel 1 and 2, and other Neanderthals.

Cranially and post-cranially, too, Skhul V has retained a number of Neanderthal features. Other Skhul individuals combine evolutionarily derived and ancestral traits, their proportion in the face, braincase, and postcranial bones being different. According to S.V. Vasiliev (2006: 163), the results of the statistical analysis support the conclusion that facial traits evolved more rapidly than did those of the braincase, and the evolution of dimensions proceeded at a higher rate than that of descriptive structural characteristics.

The Qafzeh skeletal series is larger than that from Skhul, numbering fifteen anatomically modern individuals (Ronen, 2012). The TL-date generated from charred flint is 92 ± 5 ka BP. Direct dating by ESR-method yielded more reliable estimates: 100 ± 10 and 120 ± 8 ka BP (Grün, Stringer, 1991).

The best-preserved remains are those of Qafzeh IX, a female aged about twenty. Beside her, an infant was buried: apparently this was a double burial. The cranium is characterized by a high vault, a gently sloping forehead, a relatively weak supraorbital relief, a strongly protruding chin, a round occiput without a bun or sharp curvature, an anatomically modern zygomatic area, a canine fossa, thin cranial walls, and a cranial capacity of 1554 cm^3 (Zubov, 2004: 348). The well preserved Qafzeh VI cranium is likewise anatomically modern. Generally, the Qafzeh individuals are closer to anatomical modern humans than are those of Skhul.

*The concise description herein of Skhul V is based on: (Zubov, 2004; Vasiliev, 2006).

The excavations in the Ras el-Kelb Cave, situated in the homonymous mountain range, have yielded a Middle Paleolithic industry reminiscent of Tabun C: flakes detached from discoid cores, various types of scrapers, notched-denticulate pieces, and a few Levallois points and blades (Copeland, 1978). In the same horizon, three human teeth were found. One of them, apparently that of a 16- to 20-year-old male, is a large premolar combining anatomically modern and Neanderthal traits (Vallois, 1962). Two other teeth, an upper second molar of a person aged about 23, and an upper second deciduous molar, appear more modern than Neanderthal teeth.

Anatomically modern humans of the Near East coexisted with Neanderthals. Western European Neanderthals of the 120–40 ka BP range were cranially and postcranially polymorphous, while displaying a progressive accretion of derived traits. Near Eastern Neanderthals such as those from Tabun, Amud, Kebara in Israel, Shanidar in Iraq, and Dederiyeh in Syria differ from their later Western European counterparts by a lesser expression of Neanderthal apomorphies, and by being closer to anatomically modern humans.

The Tabun I female was mentioned above. Her stature was 154 cm, her cranial capacity 1271 cm^2. The cranium is low, the forehead sloping, the supraorbital torus strong, and there is almost no chin. The mandibular ramus is wide and robust, with a high and wide coronal process and a shallow notch. These (and other) peculiarities suggest that among all the individuals buried in Mount Carmel caves, Tabun I is the closest to Western European Neanderthals. The same is true of other fragmentary human remains from Tabun Cave.

Skeletal elements of several individuals were unearthed from Amud Cave. Amud I, a young male buried according to a special rite, is the best preserved. The remains of other individuals from that cave are fragmentary, and do not warrant taxonomic assessment.

Amud I has been described by several anthropologists, who noted both plesiomorphies and apomorphies in its morphology, and compared its taxonomic status with that of African and European specimens. The individual was some 180 cm tall, had a gracile skeleton, and a cranial capacity of 1740–1800 cm^3. Descriptively, his supraorbital region attests to Neanderthal affinities (low glabella and virtual absence of supraorbital sulcus at the ophrion level) (Vasiliev, 2006: 150–151). Metrically, Amud I resembles Shanidar I, Skhul IV, Arago XXI, and Tabun I. There is a zygomatic notch, which is not typical of Neanderthals, and there is no eminence at the base of the frontal process of the maxilla. Dimensions and indices of the zygo-maxillary region link Amud I with Oberkassel 1, Sungir 1, Fish Hoek, and Skhul V. The trigonometry of the facial skeleton reveals similarities with Skhul V, Florisbad, Sungir 1, and Gibraltar 1. The mandible shows a modern tendency in certain aspects; even an incipient chin is present. Vasiliev notes several more traits in which Amud I resembles both Neanderthals and anatomically modern humans. Bräuer (1984) describes Amud I as a Late Archaic *Homo sapiens*.

Descriptions of Amud I published by other anthropologists suggest that this individual combines characteristics of classic Western European Neanderthals and early anatomically modern humans of Africa, Levant, and Eastern and Central Europe. It is unlikely that such a mosaic pattern was caused by hybridization. In our view, it mirrors evolutionary processes, such as adaptation and divergence, within a single polymorphic species *H. heidelbergensis* in Africa and Europe.

The Amud I skeleton was found in the upper part of the stratigraphic sequence spanning the 70–53 ka BP interval (The Amud Man…, 1970). Its probable age is somewhat above 50 thousand years.

The most contentious find is Kebara 2. The remains are those of a 25–35-year-old male, who was buried in a shallow pit in a supine position with arms folded on his chest. The cranium was missing, but a mandible and postcranial skeleton are well preserved. The stature is tall by Neanderthal standards (above 170 cm). The skeleton is more robust than that of Amud I. The hyoid has a modern shape, indirectly evidencing capacity for speech. The chin is incipient. Most postcranial bones have a modern appearance. The estimated age of the burial is approximately 60 thousand years.

Five crania and postcranial remains in a varying state of preservation were found in the Shanidar Cave. The best preserved cranium, Shanidar I, like other remains from that locality, shows numerous Neanderthal traits. Generally, in our view, the Shanidar individuals are intermediate between Palestinian and Western European Neanderthals.

Remains of fifteen individuals were unearthed from the intrusive layers of the Dederiyeh Cave. Two skeletons from burials 1 and 2 are those of children aged about two. More than a half of the other remains, too, are infantile (Akazawa et al., 1999). The skeletons from burials 1 and 2 are the best preserved. While differing to some extent, they combine Neanderthal and anatomically modern features. Dederiyeh 2 has more gracile postcrania than does Dederiyeh 1, and displays more pronounced cranial and dental affinities with Western European Neanderthals. Specifically, there is no chin. Dederiyeh 1 shows incisor shoveling and a Carabelli cusp. Remains from Shanidar and Dederiyeh, like those from Mount Carmel caves, then, display a combination of Neanderthal and anatomically modern traits.

On the basis of a brief review of anthropological evidence from the Levant, dating to the Middle and the first half of Late Pleistocene, some conclusions may be drawn.

1. To date, archaeological data do not support the idea of two Levantine lineages evolving in parallel on the basis of *H. heidelbergensis*, viz. anatomically modern humans and Neanderthals. However, such a scenario cannot be excluded, given the continuity between the Acheulean and Middle Paleolithic industries.

2. Hominin remains from the 0.3–0.2 ka BP interval (Zuttiyeh, Qesem, Misliya) reveal a greater expression of modern apomorphies and a lesser expression of plesiomorphies.

3. At the turn of 130–120 ka BP, two lineages, *Homo sapiens* (Skhul, Qafzeh) and *Homo neanderthalensis* (Tabun, Amud, Kebara), can already be recognized; members of the latter lineage demonstrate features opposing them to Western European Neanderthals.

4. The Acheulo-Yabrudian and the Levantine Middle Paleolithic industries do not indicate migration from Africa or Europe into the region. Two taxa representing two evolutionary lineages, and employing similar lithic industries, appear to have coexisted in the Levant. This, of course, did not exclude their short-term contacts with populations from adjacent regions and a gene-flow between them.

5. Evolution of modern humans, like that of Neanderthals, occurred in the Levant. Other regions of the Near East were involved in this process as well. In terms of morphology and socio-cultural context, the Palestinian Neanderthals were closer to early modern humans of the Levant, than to Western European Neanderthals. This is evidenced, not only by the lithic industry, but also by burials showing elements of rituals, as well as by other manifestations of social solidarity (the burial of a one-handed man in Shanidar).

6. Levantine populations representing two evolutionary lineages reveal a stronger mosaic pattern and greater variability than do European Neanderthals.

The fate of early modern humans and Levantine Neanderthals after 50 ka BP is debatable. One can agree with the conclusions made by B. Arensburg and A. Belfer-Cohen on the basis of a comparative analysis of Middle Paleolithic human remains in Israel: those of "Neanderthals" do not display a complete set of Neanderthal features, whereas those attributed to anatomically modern humans do show certain Neanderthal traits. Early modern humans, like "Neanderthals", demonstrate high morphological variation. Facts demonstrate that "Neanderthals" and anatomically modern humans occupied the same areas, sometimes even the same caves (Arensburg, Belfer-Cohen, 1998: 320). Therefore it is difficult to agree that early modern humans were displaced from the Levant by Neanderthals, or vice versa (Shea, 2001, 2007, 2008; and others).

Remains of anatomically modern humans can be approximately dated to 130–75 ka BP, and the earliest Neanderthal fossils (Tabun I, II, etc.) to 130 (125) ka BP; i.e. two related taxa coexisted in the Levant at the beginning of the Early Pleistocene. All researchers note a high variability and a highly mosaic pattern in many morphological features, which supports our hypothesis about the possible evolution of the two related taxa in the Levant during the Middle Pleistocene. They reveal similarity, not only in physical features, but also in the characteristics of stone tools, and in the burial rite.

Few remains of Levantine early modern humans are later than 75 ka BP, and remains of Palestinian Neanderthals contemporaneous with Tabun I, Kebara, and Amud are few also. However, Paleolithic sites discovered in the Levant suggest that the earlier indigenous population lived there throughout the Late Pleistocene, and the homogenous Middle and Upper Paleolithic industries do not testify to any migrations from Africa or Europe. It is inappropriate to argue that all cave and open-air sites in Levant have been discovered and completely excavated. In the future, these lacunae will undoubtedly be filled. In our view, the Levantine Upper Paleolithic was mainly autochthonous, even though anatomically modern humans played a key role in the origin of the Late Nubian industry (Derevianko, 2011).

Recently, an anatomically modern braincase was found in the late Middle Paleolithic layer of the Manot Cave, Israel, dating to 54.7 ± 5.5 ka BP (Hershkovitz, 2015). On the basis of morphological differences between this specimen and most fossils from Skhul and Qafzeh, Hershkovitz et al. believe that the Manot individual was hardly a direct descendant of those humans. At the same time, they point to a high within-group and between-group variation in these populations, so any conclusions are provisional. The chronological gap between Skhul and Qafzeh, on the one hand, and Manot, on the other, may be filled in the future when fossils later than 75 ka BP are discovered. The idea that the Manot individual was a migrant from Africa is not upheld by archaeological finds. No lithic industries of African origin dating to 70–50 ka BP have so far been found in the Levant.

The Manot individual may have resulted from hybridization, which occurred when anatomically modern humans associated with the Late Nubian Levallois Complex, had migrated to Levant from Arabia. To test this idea, DNA samples from early modern humans, Palestinian Neanderthals, the Manot individual, and the Upper Paleolithic man from Ksar Akil need to be examined.

Conclusions

1. In the Early Middle Pleistocene, about 800 ka BP, a new species, *Homo heidelbergensis/rhodesiensis*, emerged in Africa. *H. rhodesiensis* did not migrate from this continent, and gave rise to anatomically modern humans about 200–150 ka BP.

2. The first migration wave of *H. heidelbergensis* from Africa appears to have reached the Levant about 800 ka BP. The hybridization between migrants and the indigenous population in this region resulted in acculturation, which is evidenced by the materials from the site of Gesher Benot Ya'akov.

3. The second migratory wave of *H. heidelbergensis*, using the Acheulean industry, reached Europe about 600 ka BP, resulting in the emergence of a Western European Neanderthal.

4. Genetic analysis revealed that the genome of a *H. heidelbergensis* individual from Sima de los Huesos showed Denisovan affinities in mtDNA, and Neanderthal affinities in the nuclear genome. The Denisovan gene-pool also included genes related to an unknown hominin who had diverged from the common lineage about 1 Ma BP (Prüfer et al., 2014). These were likely inherited by Denisovans from *H. heidelbergensis*, who received these alleles during the migration from Africa to the Levant, by hybridization with an autochthonous Levantine population about 800 ka BP.

5. In the Levant, over the entire Middle Pleistocene, the development of two evolutionary lineages occurred on the basis of a hybrid taxon (*H. heidelbergensis* + autochthonous populations): early anatomically modern humans and Palestinian Neanderthals, showing a mosaic morphology and numerous shared features in cranial and postcranial skeleton. About 300 ka BP, some Levantine populations migrated into East Asia. About 280 ka BP, this wave of migrants reached the Altai, as evidenced by finds from the lowermost occupation layer 22 in Denisova Cave (Derevianko et al., 2003). DNA sequencing of samples from Denisova layers 22, 12, and 11 resulted in the identification of a new taxon, Denisovan, who had lived in the Altai during the Middle and Late Pleistocene. The migration wave from the Levant reached not only the Altai, but also certain areas of East and Southeast Asia. Admixture between migrants and the *Homo erectus* populations in these areas resulted in a small percentage of Denisovan and Neanderthal alleles in the modern gene-pool.

6. In the Levant, during the Middle Paleolithic, a lithic industry different from African and European industries emerged. It was associated with anatomically modern humans and the Palestinian Neanderthals, whose cultures cannot be clearly distinguished.

7. No new species of *Homo* emerged in the Levant during the Middle and Late Pleistocene. The evolution of early anatomically modern humans and the Palestinian Neanderthals on the basis of *H. heidelbergensis* did not result in speciation. We agree with Bräuer (2008, 2010; and others) that speciation (*H. heidelbergensis*) took place in Africa and Eurasia during the Middle Pleistocene, rather than with Rightmire (2001, 2009) who recognized two evolutionary lineages, *H. heidelbergensis* and *H. sapiens*, in the Middle and Late Pleistocene. In our view, the evolution of *H. sapiens*—or rather its subspecies—resulted from adaptation and gene-flow in four regions: Africa (*H. sapiens africanensis*), Europe (*H. sapiens neanderthalensis*), North and Central Asia (*H. sapiens altaiensis*), and East and Southeast Asia (*H. sapiens orientalensis*) (Derevianko, 2011).

8. Modern humans, whose remains were found in Manot Cave, appear to have emerged as a result of hybridization of the autochthonous Levantine population and modern humans associated with the Late Nubian Levallois industry.

We realize that these hypotheses need to be tested by new archaeological, anthropological, and genetic studies. DNA sequencing of Zuttiyeh, Qesem, Tabun, Skhul, Amud, Kebara, Manot, etc. might clarify a number of issues raised in this publication. Indeed, it is open to discussion, and our hypotheses may be eventually rejected. The available evidence is incomplete, and future findings may lead to substantial revision.

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