JOURNAL OF ANTHROPOLOGICAL RESEARCH

(Formerly Southwestern Journal of Anthropology)

VOLUME 51 • NUMBER 4 • WINTER • 1995

THE ANATOLIAN MIDDLE PALEOLITHIC: NEW RESEARCH AT KARAIN CAVE

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The aims of this report are threefold: (1) to provide new information concerning the Lower and Middle Paleolithic of southern Turkey, (2) to present the shifts in lithic techniques evident in the sequence of Karain Cave during these periods, and (3) to demonstrate the significance of the new information for interpreting long-distance relations between Western Asia and Europe. In fact, in spite of the crucial geographic situation of Anatolia between the Near East and Europe, it has rarely been the subject of intensive excavations and publications concerning the Paleolithic periods. Recently obtained data are therefore of significant interest.

SINCE 1989, a team including the authors of this paper has conducted new excavations at Karain Cave (the "black cave") in southwest Turkey (Yalcinkaya et al. 1993; Otte et al. n.d.). This cave is situated on the south-facing flanks of the Taurus range (Figure 1), which dominates a vast raised plain levelled by the Miocene sea. The cave is a large karstic system. Probably during the Lower Paleolithic, humans began to occupy ephemerally the main chamber. Manufacturing of stone tools took place in most periods outside the cave, and the common raw material was various types of radiolarites of different colors. Cobbles, pebbles, and chunks of these nodules are found in abundance in the colluvial and alluvial deposits that form the wadi terraces and cover the plain.

Karain E is the main chamber that contains Lower and Middle Paleolithic deposits. The sequence is ten meters thick and is composed of interfingering colluvia, travertines (including speleothems), layers of clayey-silts, and calcitic concretions often associated with the development of paleosols (studies in progress by M. Pawlikovski and P. Goldberg). The full sequence is visible in a major block of sediments in the central area of the chamber ("main block") and in the section near the eastern wall ("east profile"), both left by the previous excavator (K. Kökten). Four consolidated travertine layers have been identified (labelled "1" to "4" by black triangles on Figure 2) and are believed to

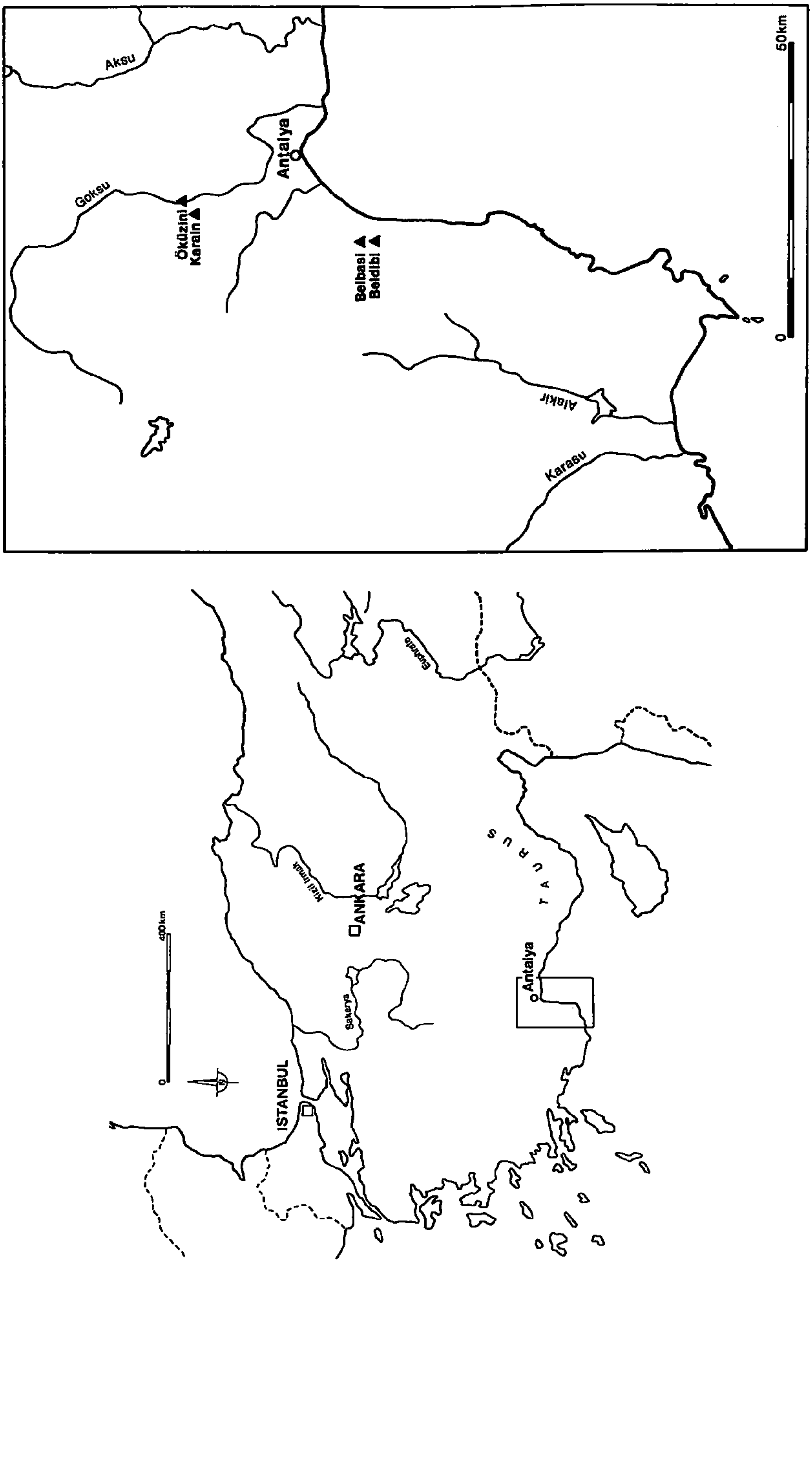

Figure 1. Location of Karain Cave

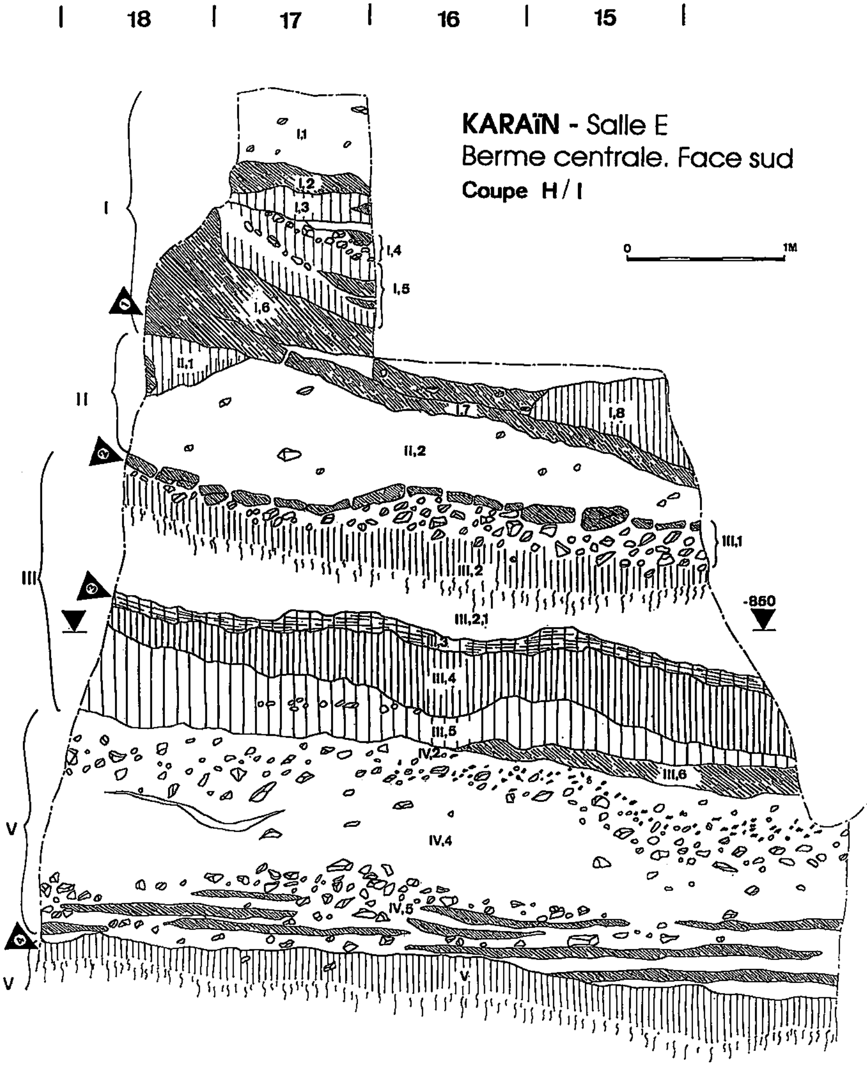

Figure 2. South Profile of the Main Excavation Block

The sequence shows an alternation of different sedimentary types:

(1) Fine, powdery, light-colored deposits (probably of aeolian origin) with varying amounts of limestone spall (*éboulis*) from the cave and fine silicious gravels of nonlocal origin (strata I.1, I.4, I.5, II.2, III.2.1, and IV.4).

(2) Alterations or weathering of earlier deposits, dark brown to black in color, corresponding to breaks in sedimentation and to soil formation episodes (strata I.3, I.8, III.2, III.4, and V).

(3) Breccia crusts that are more or less concreted, or speleothems (calcitic crusts, travertines) (strata I.2, I.6, I.7, III.1, III.3, and IV.5).

correspond to important paleoclimatic modifications that interrupted the more regular processes of sedimentation within the cave. ESR (electron spin resonance) readings from the uppermost layers provided an age range of 50–70 Ka for the layers above the first major consolidated layer (I.6/I.7), indicating an age within the Last Glacial (Çetin, Özer, and Weiser 1994). The consolidated upper horizon was TL (thermoluminescence) dated to more than 90 Ka. The deposits corresponding to layers I.6 and I.7 (a total thickness of one meter) were dated by ESR to around 110,000 to 130,000 years ago. This age range suggests a correlation with the Last Interglacial or Oxygen Isotope Stage 5 (Rink et al. 1994). These readings may indicate that the underlying consolidated travertine layers represent preceding interglacial phases.

Bedrock has not yet been reached during the current excavations. However, our observations indicate that the upper part of the sequence (layers I through IV; see Figure 2) is the richest in residues of human occupations, while the lower part (layer V and below) provides only rare remains and numerous sterile layers. Table 1 gives the correlation between the major sedimentary phases and the archaeological levels utilized in the description of the archaeological assemblages.

TECHNICAL CHANGES WITHIN THE LITHIC SEQUENCE

The sequence was originally divided by Kökten (1964) into Middle and Lower Paleolithic. Although no additional bifaces beside the few reported by Kökten have been found, it seems that there are Lower Paleolithic remains below the rich Middle Paleolithic deposits. On the whole, the entire sequence is interpreted as representing a long accumulation, and thus it enables us to record the shifts in lithic techniques that took place during this period in southwest Anatolia. Most obvious are the changes within the flake-dominated assemblages that were unearthed in layers IV to I (Otte et al. n.d.). One observes the clear evolution of an industry made on flakes which progressively becomes more refined. The technical and typological changes reflect shifts in raw material, blank production, retouch, and types of tools. The generalized phases within the sequence are presented here in a simplified version, while the details are published elsewhere (Otte et al. n.d.).

Complex A (lithostratigraphic unit V: paleosol developed on clays)

This assemblage is numerically very reduced. It likely represents a Lower Paleolithic industry based on a rough centripetal method of reduction and denticulate tools (Figure 3).

Complex B (unit IV.5: clayey deposits with numerous angular cobbles capped with one to three stalagmitic levels)

This is a "Proto-Charentian" industry dominated by denticulates produced on thick blanks, in particular those known as "Clactonian" flakes. In addition to denticulates and notches, there are some sidescrapers also made on thick flakes and shaped by abrupt retouch.

TABLE 1
Correlation between Geological Layers and Archaeological Units

Dates B.P. U/Th-ESR (averages)	Key Humic Horizons (soils and concretions)	Geological Layers	Depths in the Central Sector (cm below datum)	Spits (excavation units)	Archaeological Units	Stages	Technical Characteristics
		I.1	–500 to –550 cm	1 to 4	P.S.	Late Upper Paleolithic	bladelets; microliths
60,000 to 70,000		I.2–I.6	–550 to –650 cm	5 to 14	I	Mousterian of Zagros or Karain Type	= Levallois and discoidal; many scrapers; fine marginally retouched points and double scrapers
110,000 to 120,000	1	I.7	–650 to –700 cm	15 to 18	H		
		II.1, 2, 3	–700 to –750 cm	19 to 25	G		
130,000?	2	III.1	–750 to –770 cm	26			
		III.2	–770 to –850 cm	27 to 32	F		
	3	III.3, 4, 5	–850 to –880 cm	33 to 37	E	"Proto-Charentian"	thick flakes; hard percussion centripetal core preparation; heavily retuched notches and denticulates; steep scrapers; local raw material
		IV.1	–880 to –900 cm	38 to 39	D		
		IV.2, 3, 4	–900 to –1000 cm	40 to 51	C		
		IV.5	–1000 to –1050 cm	52 to 56	B		
	4	V	–1050 to –1100 cm	57 to 61	A	"Clactonian"	notches; no core preparation

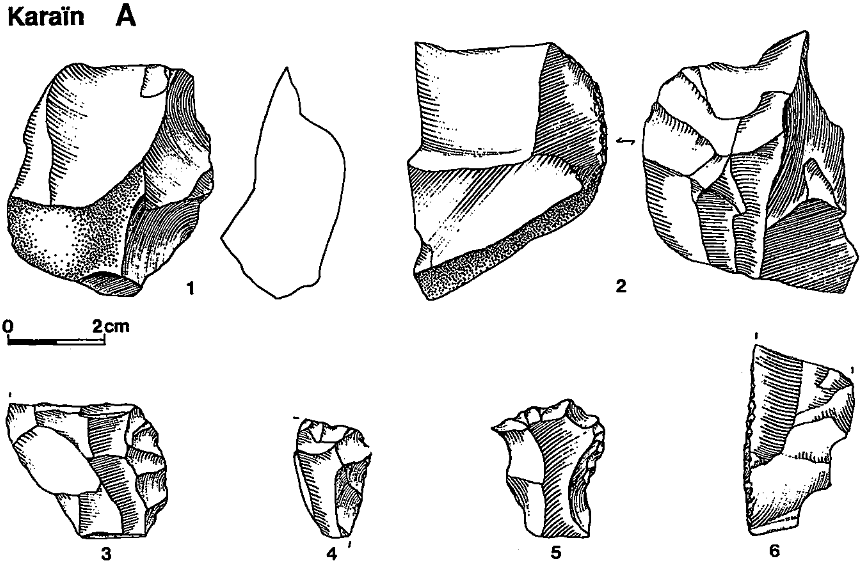

Figure 3. Karain E

Stratigraphic Complex A: 1–2, centripetal cores; 3–5, denticulates; 6, scraper.

Complex C (units IV.4 to IV.2: clayey-silty deposits mixed with small rocks)

This complex is composed of several occupations in which the industry exhibits a "Proto-Charentian" character, with denticulates and notches. The presence of a knife-canted sidescraper (*couteau-racloir déjeté*) with partially bifacial retouch suggests affinities with certain Acheulio-Yabrudian facies. Denticulates and notches always dominate, followed by sidescrapers and endscrapers (Figure 4:1–4).

Complex D (unit IV.1: clayey deposit)

The lithic industry of this layer demonstrates the same techno-typological attributes as those observed in complexes B and C.

Complex E (units III.5 to III.3: clays interstratified with carbonated silts)

This complex corresponds to the last phase of the "Proto-Charentian" of the Karain sequence but displays some differences in relation to complexes D to B. Coarse centripetal reduction plays a less important role. It is replaced by unidirectional reduction from platforms formed by a single scar. Thick blanks are less often used for tool production. In accordance with this, abrupt retouch is replaced by simple marginal retouch. The tool fraction, however, is primarily composed of denticulates, followed by sidescrapers and retouched flakes (Figure 4:5–8).

Complex F (unit III.2.1: clay; and unit III.1: a major paleosol)

It is within this complex that important changes appear in the sequence—more from a technological point of view than typologically. This industry is

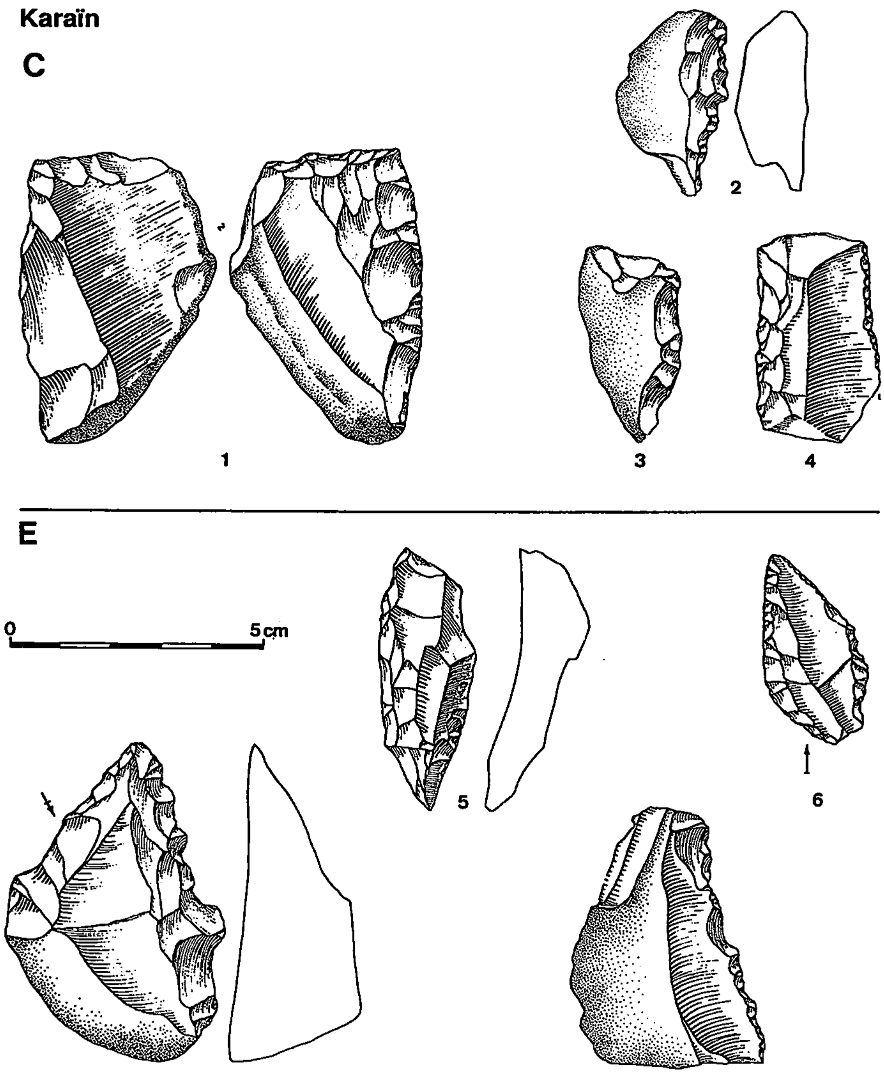

Figure 4. Karain E

Upper part. Stratigraphic Complex C: 1, sidescraper-knife with bifacial retouch; 2–4, scalariform retouched sidescrapers.

Lower part. Stratigraphic Complex E: 5, scalariform retouched sidescraper; 6, double scraper; 7, convergent denticulate; 8, denticulate on cortical flake.

Mousterian, differing from the earlier assemblages by the clear appearance of the Levallois technique, the disappearance of abrupt retouch, the appearance of Mousterian points, and the relative importance of sidescrapers in relation to denticulates and notched pieces. The lithic material was intensively worked in the cave. Cores, even if not numerous, are better prepared and exploited more intensively than before. Many small flakes and splinters provide evidence of retouching activity and resharpening of tools. The Charentian characteristics are much less pronounced in the morphology of the sidescrapers. Levallois debitage dominates, followed by bipolar reduction and then discoidal cores. Sidescrapers are most common, followed by denticulates and notches, then by retouched flakes and Mousterian points (Figure 5:1–4).

Complex G (units II.3 to II.1: clays, paleosols, and stalagmitic crusts)

This complex can be attributed to a Mousterian rich in sidescrapers and characterized by the presence of Levallois technique. Typologically, it is similar to the Zagros Mousterian (Baumler and Speth 1993; Dibble and Holdaway 1990), continuing the affinities already observed in complex F. The general structure of the industry is comparable to that of F, but notches and denticulates clearly decrease in importance.

Complex H (basal part of unit I: clayey deposits capped by stalagmitic crust I.7)

This complex represents a continuation of the same techno-morphological tradition found in complexes F and G, but it presents an industry that is probably more laminar. The tool ensemble is composed essentially of sidescrapers, of which many had been produced on laminar flakes.

Complex I (clayey-silty deposits between stalagmitic crusts I.6 and I.3)

The complex appears to be the same as the local Mousterian of Karain as described above, but the Levallois character is less pronounced. In contrast, the industry is much smaller in size. It is always dominated by sidescrapers, the morphology of which resembles that of complexes F and G. Among the debris produced during reduction, the discoidal shape formed in the final stage is significant (Figure 5:5–8).

The hiatus between the Middle Paleolithic and the Upper Paleolithic is placed within lithostratigraphic unit I.1 (see Figure 2). Archaeological unit 4 corresponds to this limit and contains a mixture of artifacts of the two periods. The end of the sequence (archaeological units 3 to 1) contains mixed material of late Upper Paleolithic types with a few derived Mousterian pieces.

SYNTHESIS OF EVOLUTION

The long occupation of Karain Cave permits us to trace the evolution of technical modifications during a time span estimated to stretch from ca. 300,000 B.P. to ca. 40,000 B.P. (In the absence of radiometric dates establishing the end of the Mousterian at the base of unit I.1, we use the general estimated age for the transition from the Middle to the Upper Paleolithic.) The rhythm of transformations within the sequence of the lithic industries in Karain adds to the debate over the factors responsible for the observed variability (Rolland and

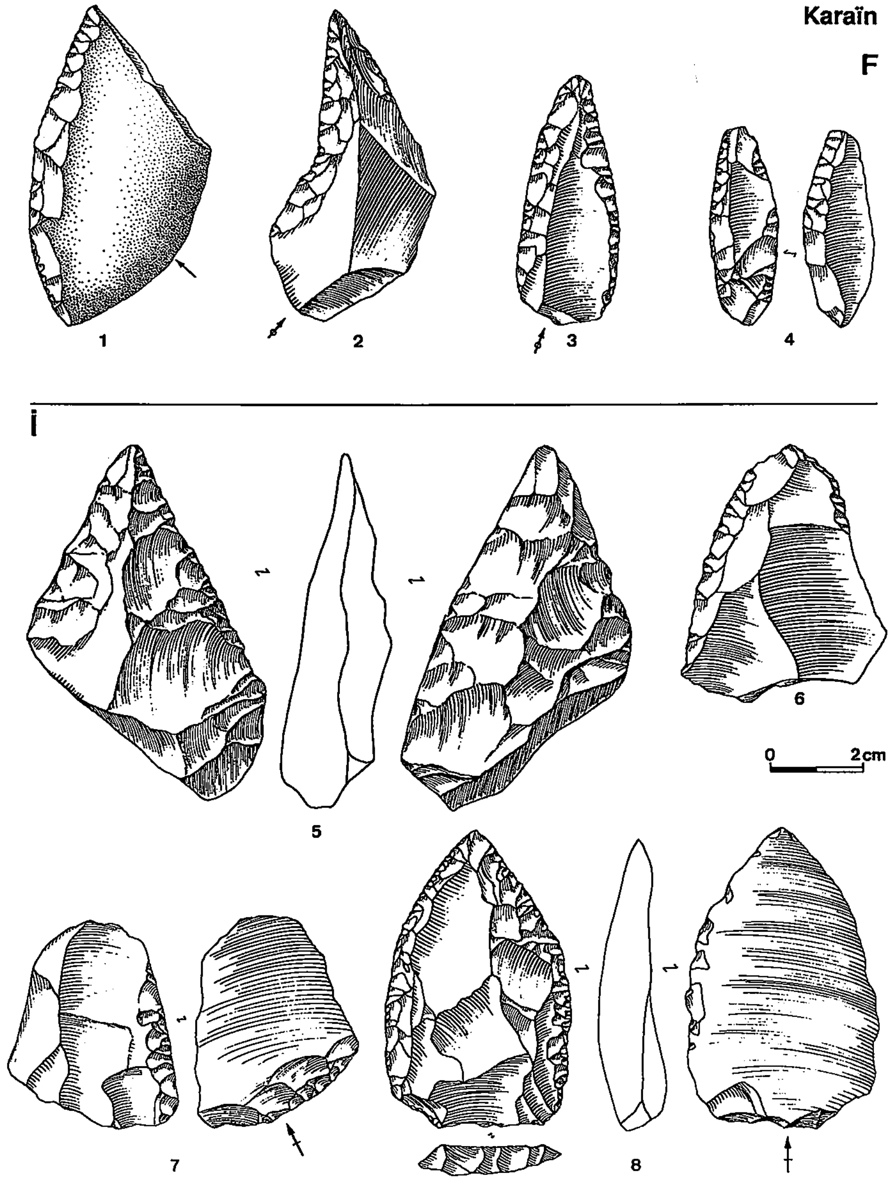

Figure 5. Karain E

Upper part. Stratigraphic Complex F: 1, convex lateral scraper; 2, notched lateral scraper or thick beak; 3–4, Mousterian points.

Lower part. Stratigraphic Complex I: 5, bifacial piece of Balkanic type; 6, convex lateral scraper; 7, scraper with base thinned by "Nahr Ibrahim" technique; 8, double scraper with inverse retouch on butt.

Dibble 1990; Rolland 1981; Otte 1992). The diachronic factor in explaining Middle Paleolithic variability (as discussed by Mellars 1969) is clearly expressed here.

The base of the sequence includes the presence of reduction technique by hard percussion that obtained large and thick flakes, sometimes shaped into tools by scaled retouch. By their mode of debitage and the form of the flake tools, these assemblages resemble the Clactonian and the Tayacian. Certain bifaces found by Kökten were perhaps associated with these assemblages. The technical changes continued by the reduction of flakes from large blocks.

The assemblage of retouched pieces is dominated by sidescrapers produced on thick blanks, giving them a "Charentian" aspect. Local material still dominates, but larger flakes are produced on exogenous rocks, attesting to the variety of raw material procurement modes during this stage.

A major change occurs between complexes E and F (see Table 1), with the first evidence for the use of Levallois technique. This phenomenon is expressed in both the mastering of the radial Levallois method and the shift in the procurement strategies that incorporated materials from distant sources. Carefully prepared cores dominate; local material was used for centripetal reduction and exogenous material for Levallois flake production. Variability in the modes of procurement seems to determine in part the techniques used for core reduction, which were apparently chosen from a larger range of known operational sequences (*chaînes opératoires*).

COMPARISONS

The way in which the Levallois technique was employed by the occupants of Karain is more reminiscent of that of the Zagros cave sites (e.g., Dibble 1984; Dibble and Holdaway 1990; Baumler and Speth 1993) than that of the Levantine Mousterian, except for a noticeable increase in its use in a few Levantine cave sites during the late Mousterian (see, e.g., Meignen and Bar-Yosef 1991; Bar-Yosef and Meignen 1992). A similar picture emerges from typological studies. The frequencies in the Karain assemblages of retouched pieces and tool types, such as the sidescrapers and the thick blades that were retouched on both edges, are similar to those of the Zagros Mousterian and differ considerably from those of the Levant. Even those "technical attributes" that are often referred to as "stylistic" seem to differentiate the Karain Mousterian from the Levantine industries described at Kebara, Amud, Ain Aqev, Tabun, etc. (see Meignen and Bar-Yosef 1989 and references therein). The high frequencies in Karain of retouched pieces that express the "Frison effect" or the results of reduction as described by Dibble (1984, 1988) are perhaps explained by the distance of the cave from raw material sources and the size of available nodules of the local radiolarite.

Among the secondary attributes of the Karain assemblages, we note the presence of the "Nahr Ibrahim" technique (Figure 5:7) that could have been a special preparation for hafting and therefore cannot be considered as a regional stylistic characteristic. On the other hand, the presence of pieces with bifacial retouch on flakes and blades, forming a few points and knives, is interpreted as

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evidence for contacts with the Balkans (Kozłowski in Yalcinkaya et al. 1993). Otte (n.d.) interprets this particular attribute as "stylistic," that is, related to a certain region and not the result of technical convergence.

DISCUSSION

As indicated above, K. Kökten, the original excavator, reported a couple of bifaces from the lower layers at Karain Cave. It should be noted that surface bifaces have been found in the Ankara area and the region of southeast Turkey (Özdogan 1977). But it seems that the discoveries of bifaces decrease in number in the west of the country, perhaps due to a lesser intensity of archaeological prospection. This region is a portion of a larger zone that stretches from the Levant and the Arabian peninsula into the Caucasus, Iran, and western India, where Acheulian bifaces are found (for a general survey, see Bar-Yosef 1994). This distribution is interpreted to be the result of diffusion from Africa. From central Anatolia through eastern and central Europe, no Acheulian assemblages are known. We believe that the nonbiface industries represent earlier, Lower-and-Middle-Pleistocene-age migrations into Eurasia.

The archaic industry at Karain, with a "Clactonian/Tayacian" character, seems to indicate the presence of a non-Acheulian industry perhaps some 300,000 years ago. The adoption of the Levallois technique by the Karain occupants took place at a later stage, earlier than 130,000 years ago and perhaps even some 200,000 years ago. Both stylistic aspects (the bifacial pieces) and technical aspects (the abundance of thin sidescrapers) may indicate European affinities. The separation of the Karain "Clactonian/Tayacian" industry from the late Acheulian of eastern Anatolia perhaps demarcates the boundary zone between traditions of African and central Asian origins.

The early establishment of hominid occupation in Europe makes it possible to postulate eastward migrations during late Middle and Upper Pleistocene times. Resemblances among Mousterian industries, such as those of the Balkans, the Taurus, and the Zagros, with rare Neanderthal remains, suggest the expansion of human populations in an eastward direction, namely, into the Near East. This movement was probably caused by the onset of glacial conditions across Europe (see, e.g., Bar-Yosef 1988).

Finally, the geographic crossroads position occupied by Turkey today should be a focus for the study of long-distance contacts at the time of the origin of Old World Paleolithic traditions north of the tropics.

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