ARTICLES

Paleolithic Archeology in Turkey

STEVEN L. KUHN

The Paleolithic prehistory of Turkey is potentially of enormous interest to paleoanthropologists. Anatolia is the most direct land route into Europe from the Levantine corridor and, more distally, from Africa. Repeated movements of human populations from Africa into Eurasia, and perhaps in the opposite direction as well, reconstructed on the basis of genetic evidence,[1–6] would surely have left traces in the archeological record of Anatolia. In principle, the spread of exogenous populations through the Anatolian peninsula in the past should be reflected in the appearance of new kinds of archeological complexes with evidence of links to population sources in the south (the Levant and Africa). Gene flow, occurring as a result of increased interaction between more established populations, would have a different archeological signature.

Turkey lies at the interface between distinctive archeological and biotic provinces.[7] For example, the Middle Pleistocene sequences of the Levant and the Caucasus include many Acheulean assemblages, whereas Acheulean handaxes and biface technology are seldom found in the contemprary Lower Paleolithic assemblages of the Balkans. Likewise, areas surrounding Turkey, including the Levant, the Zagros mountains of Iran, and the Balkan peninsula, yield distinctive Middle Paleolithic assemblages. The limits of these regional archeological complexes should lie somewhere within the boundaries of Turkey. Examining how these regional complexes interacted at their edges, and particularly whether they remained coherent or blended into one another, has the potential to cast light on population interactions and processes of technological divergence over the course of the Pleistocene.

The range of things one would like to know about the Turkish Paleolithic contrasts sharply with what is actually known about it. Although a general picture is beginning to emerge, we have comparatively little hard information about what might have been happening in much of the country during much of the Pleistocene. Some of these gaps in the knowledge base reflect a paucity of research. Turkey encompasses an area of almost 780,000 square kilometers and, despite the efforts of a small number of dedicated researchers, much of the land area simply has not been investigated in detail. In other cases, the absence of evidence is clearly due to gaps in the geological record. In some instances, the absence of evidence may even be evidence of human absence. Nonetheless, a series of projects carried out in Turkey over the past twenty years has produced substantive results on the Lower, Middle, and Upper Paleolithic periods in the region. Although there is a great deal more to be learned, it is instructive at this point to assess the state of knowledge about the Pleistocene prehistory of this vast area.

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GEOGRAPHY AND ENVIRONMENTAL HISTORY

Obviously, Turkey is a modern political entity and not a single geographic unit. Nonetheless, there is a certain geographic identity to the large part of the country that lies within the Anatolian peninsula. Anatolia is effectively a geographic interface between the Caucasus, Central Asia, the Levant, and eastern Europe, and is one likely route of overland movement among these regions. Turkey is conventionally divided into geographic units that include the Bosporous-Marmara area, the Aegean coast, the Mediterranean coast, the Tigris and Euphrates river basins in the southeast, the Pontic Mountains-Black Sea coast region, and the Central Anatolian Plateau (Fig. 1).

The geology of Turkey is complex. For obvious reasons, there has been a tremendous amount of research on Quaternary tectonics, but rather less work on paleoecology and topography. Except for that pertaining to the last 20,000 years or so, a good deal of information about paleoenvironments in Anatolia actually comes from studies in surrounding regions. Late Pliocene and early Pleistocene climates are thought to have been relatively warm and humid, with pronounced dry intervals, whereas later Pleistocene climates were markedly colder and drier.[8–10] Glaciers were present in the Taurus mountains dur-

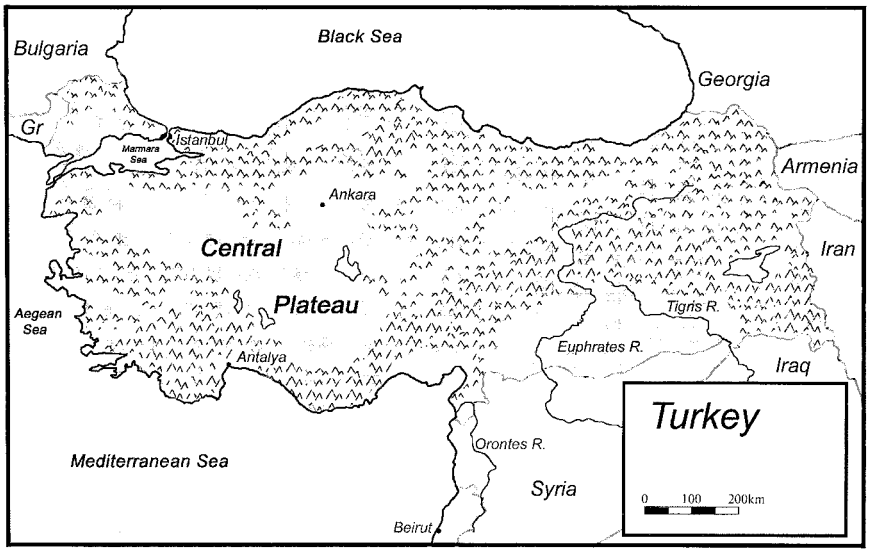

Figure 1. Map of Turkey showing major physiographic features and regions mentioned in the text.

ing the later Pleistocene: glacial terminations are recognized as low as 1,700 m, though most are above 1,900 m.[11] During the late Pliocene and Pleistocene, a series of large, shallow, sometimes saline lakes formed in the central Anatolian plateau.[12,13] The Salt Lake (Tuz Gölü) south of Ankara is the remnant of one such lake. The histories of these ephemeral bodies of water have been especially well studied in the Konya Basin.[14–16] It is not entirely clear whether the growth and shrinkage of the lakes was caused by changes in precipitation regimes or in evaporation rates.[9–12] Although the lakes were shallow, the deposits indicate impressively large storm waves whipped up by high winds blowing across the plateau.[14–16]

Because of the complex fault systems and recent tectonic activity, it is difficult to generalize about the nature of Pleistocene shorelines. Most of the southern Mediterranean coast is extremely steep with a narrow coastal shelf, so that the configuration of the shore would not have been much different during the Pleistocene than it is today, even during periods of lower sea level. The presence of a broad, shallow coastal shelf along the Aegean coast means that Pleistocene shorelines would have extended much farther east and south. Because of the neotectonic uplift, raised Pleistocene shorelines are common throughout the Mediterranean coast. The complex histories of the Marama and the Black Sea have been extensively studied. During much of the late Pleistocene, the Black Sea was an isolated lake. Marine conditions returned, perhaps catastrophically, sometime after 9,000 years ago.[17–19]

DISTRIBUTION OF PALEOLITHIC SITES

The presence of Paleolithic remains in Turkey has been recognized since the early twentieth century.[20] Research continued on a relatively small scale through the 1940s and 1950s, gradually accelerating over the past two decades. Professor K. Kökten, a pioneer of Paleolithic research in Turkey, excavated for many years at the important site of Karain cave, he also identified dozens of Paleolithic localities.[21–23] As of 1996, the TAY project,[24] an electronic gazetteer of archeological sites in Turkey, listed more than 200 Paleolithic sites (Fig. 2). However, fewer than twenty-five of these sites have been subject even to test excavation. Findings from only a handful of them have been reported in detail.

There are several concentrations of Paleolithic sites and "findspots" in Turkey, as well as several conspicuous gaps in their distribution. Numerous sites have been reported from the areas around Istanbul and the Bosporous-Marmara region, the southern Mediterranean coast near the city of Antalya, the Hatay region along the coast near the border with Syria, and in the upper Euphrates and Tigris river basins in southeastern Anatolia. In large part, the greatest site densities coincide with the regions where archeological survey has been most thorough. Some large gaps in the distribution of sites, such as in extreme eastern and northeastern Anatolia, correspond to areas where there has been little systematic exploration.

The most glaring gap in the distribution of Paleolithic sites is in the central Anatolian plateau. Aside from a concentration of sites around Ankara known mainly due to convenience of access, few Pleistocene localities are known, and these are widely scattered. The scarcity of Pleistocene remains in central Anatolia cannot be entirely a consequence of lack of research. Instead, geological factors seem to be responsible.

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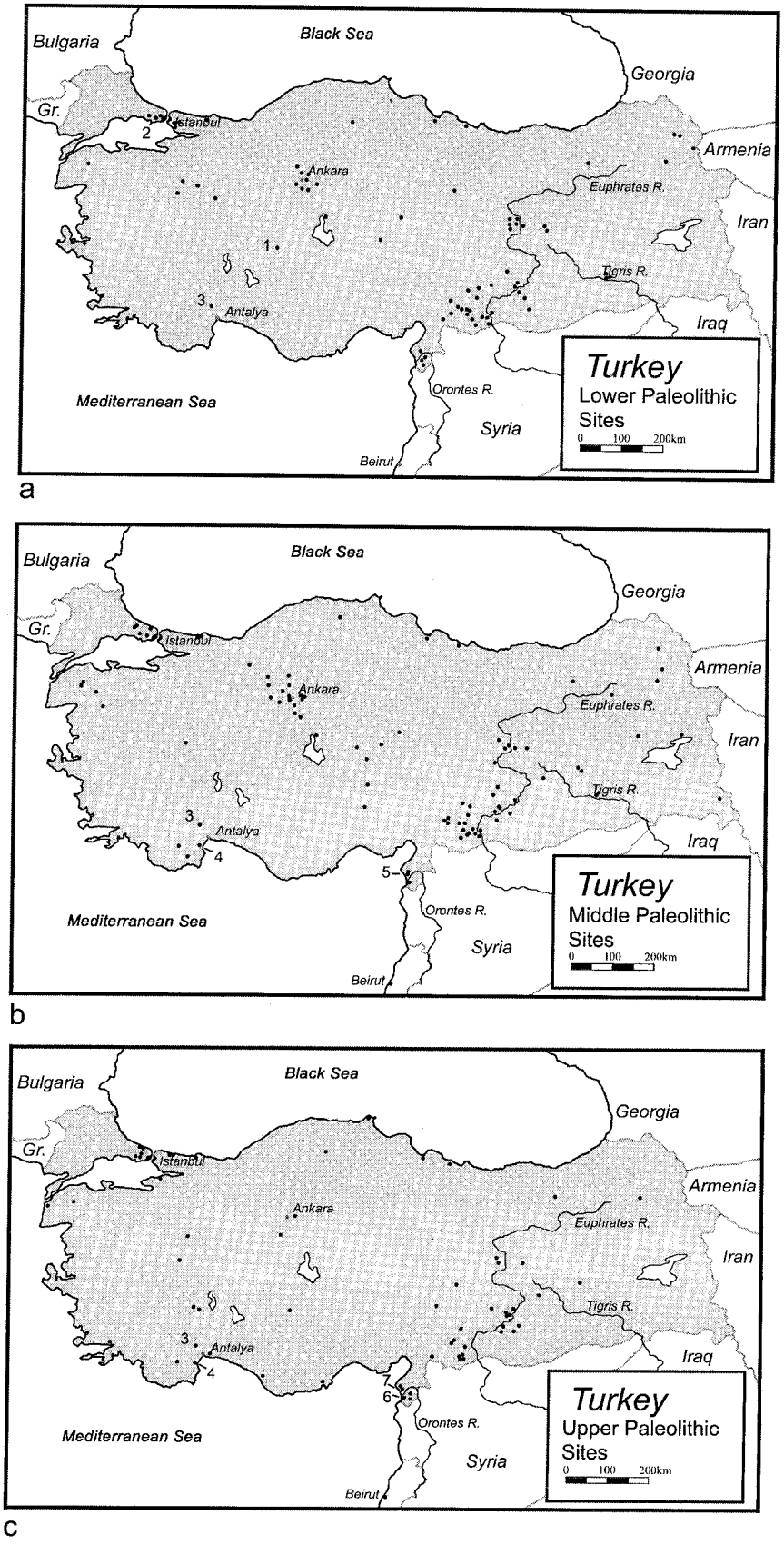

Figure 2. Distributions of Lower (a), Middle (b), and Upper Paleolithic (c) sites and findspots in Turkey as of 1996.[13] The sites described in the text are indicated by numbers: 1, Dursunlu; 2, Yarımburgaz Cave; 3, Karain Cave and Öküzini; 4, Beldibi-Kumbucağı, Belbaşı, and Kocapınar; 5, Merdivenli and Tıkalı Caves; 6, Üçağızlı Cave; 7, Kanal Cave.

factors seem to be responsible. The extensive Miocene record of central Anatolia has yielded important fossil hominoids.[25–27] Pleistocene strata are usually absent, of course, in areas where Miocene deposits are exposed at the surface. In other parts of the plateau, early deposits are covered with deep accumulations of late Pleistocene and Holocene sediments. For example, an intensive survey in the area of the important Neolithic site of Çatal Höyük, which included careful inspection of canal and river cuts,[28] identified only two late Epipaleolithic sites. The few near-surface Pleistocene sites known in central Anatolia seem to be associated with the margins of Pleistocene lakes or isolated outcrops of limestone or volcanic rocks.

Lower Paleolithic

Though surface finds of Lower Paleolithic artifacts are numerous and widespread, very few sites have been excavated and described in detail. None of the known Turkish localities seems to date to earlier that 1.0 my. However, the presence of much older deposits at Dmanisi in southwestern Georgia[29,30] suggests that Plio-Pleistocene remains should be present at least in the eastern part of the country.

Dursunlu (Fig. 2a, 1), located in south-central Anatolia, is currently the oldest documented Paleolithic locality in Turkey. The site is exposed in an abandoned lignite mine and, due to its peculiar situation, has not been investigated extensively. Dursunlu was first investigated in 1993–1994 by a joint team from Ankara University, the University of California, Berkeley, and the Turkish Geological Service.[31] Archeological and paleontological deposits are contained within lignite beds more than 10 m below the current ground surface, part of an extensive series of lacustrine and limnic sediments. The deposits are not directly accessible, but large intact blocks of lignite on the surface around the quarry pit were systematically "excavated." Paleomagnetic and paleontological evidence suggest an early Pleistocene age for the archeological deposits, though they probably postdate the Jaramillo subchron, roughly one million years ago.[31]

The quality of preservation in the lignite beds at the Dursunlu locality is remarkable. Microfaunal remains and plant macrofossils are abundant. A wide variety of vertebrate remains also are present, ranging from microfauna through probiscideans. The most common large-animal remains are attributable to a species of *Megalaceros*, the giant deer. The small collection of stone artifacts consists of very simple types, mainly quartz tools, flakes, chips, and chunks, along with a few flint artifacts and a limestone polyhedron.[31] No evidence of bifacial technology is present. The majority of quartz artifacts appear to have been produced by bipolar technique, and few show clear evidence of further modification. The absence of bifacial technology in the lithic assemblage provides tentative support for the notion of a relatively late emergence of the true Acheulean from Africa[32] although, given the small size of the sample, this suggestion must be provisional.

Yarımburgaz Cave (Fig. 2a, 2), a large, multi-chambered karstic site, is located in Thrace (European Turkey) just inland from the north coast of the Marmara, about 22 km west of Istanbul. The first formal investigations of the site, focusing primarily on the Chalcolithic and later remains,[33] also resulted in the discovery of intact Lower Paleolithic levels in the lower of the cave's two main chambers. This led to extensive excavations under the direction of G. Arsebük (Istanbul University) and F. C. Howell (University of California, Berkeley) from 1988 through 1990.[34,35] In all, nine sedimentary layers, divisible into three cycles of deposition, have been documented in the lower chamber of Yarımburgaz Cave. Paleolithic artifacts are found in the uppermost seven layers.[36,37] The dating of the Lower Paleolithic deposits at Yarımburgaz is problematic. Electron spin resonance dates on cave-bear teeth range from Oxygen Isotope Stage 6 through Stage 9.[38] Although the structure of bear teeth is not ideal for this form of dating, both electron spin resonance determinations and paleontological evidence indicate an age in the latter half of the Middle Pleistocene.[39]

The lithic assemblage from Yarımburgaz Cave consists of almost 1,700 specimens. Retouched flake tools, commonly with irregular denticulate edges, account for almost 35% of the artifacts (Fig. 3). Both bifacial and Levallois technologies are absent. Large tools are limited to heavy choppers and chopping tools. Techniques of blank production and core reduction are highly varied. As is often observed in Lower Paleolithic assemblages, different varieties of stone were worked in distinct ways. It is suspected that the consistency and the clast shape of different raw materials were important influences on divergent reduction techniques at Yarımburgaz Cave.[35,37]

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The Yarımburgaz archeofauna is dominated by an extinct bear (*Ursus deningeri*), which accounts for nearly 95% of the large vertebrate remains: At least 42 individuals are represented. The bear remains show no evidence of human intervention, although damage resulting from scavenging by large adult bears and other carnivores can be observed. Based on skeletal representation and age structure, it is hypothesized that the bear remains represent natural deaths during hibernation and are effectively unrelated to the occupation of the cave by hominids. The remaining 7% of the large mammal fauna consists of a surprisingly wide range of herbivore and carnivore species. At least some of the herbivores may well have been brought into the cave by hominids; a few show cutmarks and other traces of human damage, along with carnivore damage.[39–41] Artifacts and bear remains show no clear horizontal or vertical separation, raising interesting questions about how humans and bears might have interacted in the use of the cave over time.

Karain Cave, north of Antalya on the Mediterranean coast (Fig. 2a, 3), is by far the most extensively studied Paleolithic locality in Turkey. Excavations at this large multi-chambered cave began in the 1940s. Since 1985, Professor I. Yalçinkaya has been excavating at the site with various collaborators from Turkey and abroad.[42–48] The extensive cave system of Karain contains several deep stratigraphic sequences dating from Lower Paleolithic through Epipaleolithic, Neolithic, and into the Roman period. Chamber E contains a sequence of early deposits more than 10 m deep, which has been divided into 10 units. The first four units, A–E, are attributed to the Lower Paleolithic.

The lithic industry from Unit A is characterized by very simple, informal core reduction and small notched and denticulated flake tools, some with steep, invasive retouch. It has been termed Clactonian[42,44] and likened to the assemblages from Yarımburgaz Cave, among other places. These layers are estimated to be greater than 350,000 years in age. Units B–E contain a rather different kind of lithic assemblage, rich in extensively retouched scrapers on thick flakes. There seems to be a trend over time toward thinner blanks, more controlled retouch, and a wider range of tool forms. These assemblages, termed by the excavator proto-Charentian, appear similar to the Acheulo-Yabrudian of the central and southern Levant.[47] Acheulean biface technology is absent from the samples collected during the more recent excavations. Layers B–E are estimated to be in the range of 300,000 to 350,000 years old.[47] The fauna from the earliest layers at Karain has not been reported in detail, but in layers A–E re-

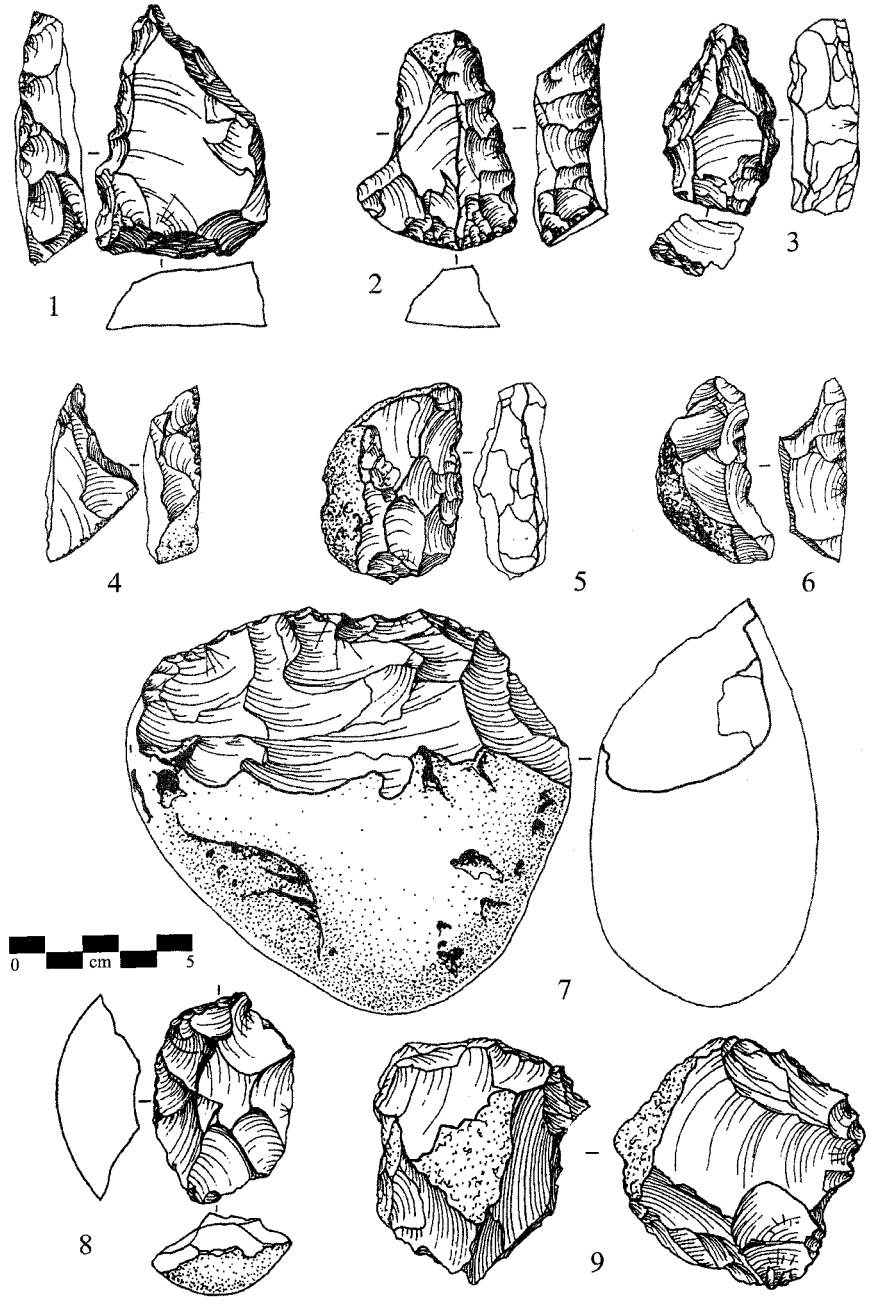

Figure 3. Artifacts from Yarımburgaz Cave: 1-6, flake tools; 7, chopper; 8, discoid core; 9, polyhedral core.

mains of wild sheep or goats predominate, with deer (*Cervus* and *Dama*) being much less common. A variety of carnivores, including bear, are also reported.[48]

Although Acheulean technology is not found in large stratified cave sites, it is well represented elsewhere in Turkey. Bifaces of apparent Lower Paleolithic age occur in surface collections from throughout Anatolia,[24,49,50] including the Marmara,[51,52] central Anatolia,[53,54] and the southeast.[49,55] Sites with bifacial tools and associated material are especially common in the Euphrates and Orontes river basins, where decades of survey have recorded numerous open-air occurrences on ancient river terraces.[49,56–61]

Middle Paleolithic

The most extensive and best-studied Middle Paleolithic sequence in Turkey is in Karain Cave[45,46,62] (Fig. 2b, 3). Mousterian assemblages are found in units F through I in the deep sequence of Karain chamber E. The site's excavators refer to the entire Middle Paleolithic sequence as Mousterian of Taurus-Zagros (or Karain) type[43,62] (FIG. 4). Assemblages are characterized by high frequencies of extensively retouched and heavily resharpened tools, especially sidescrapers, points, and convergent scrapers. In contrast to the Lower Paleolithic, nonlocal raw materials are plentiful in some the Mousterian layers. Levallois technology first appears in layer F, but the dominant mode of blank production is non-Levallois (discoid). Small, bifacially worked "leaf-shaped" points similar to ones found in the central European and Balkan Middle Paleolithic occur in the upper part of the sequence (units H and I). The closest analogs to the Karain Mousterian are found in either the Zagros Mousterian or the Middle Paleolithic of the Balkans and southeastern Europe.[45,47] The same seems to be true of Kocapınar, an open-air Mousterian site in the Antalya region.[63] Other Middle Paleolithic sites in the region, such as Beldibi-Kumbucağı[64,65] (Fig. 2b, 4), have not been well described.

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Karain Cave is also notable as the only site in Turkey to have yielded remains of archaic hominids. A modest collection of postcranial and cranial remains was excavated in 1996,

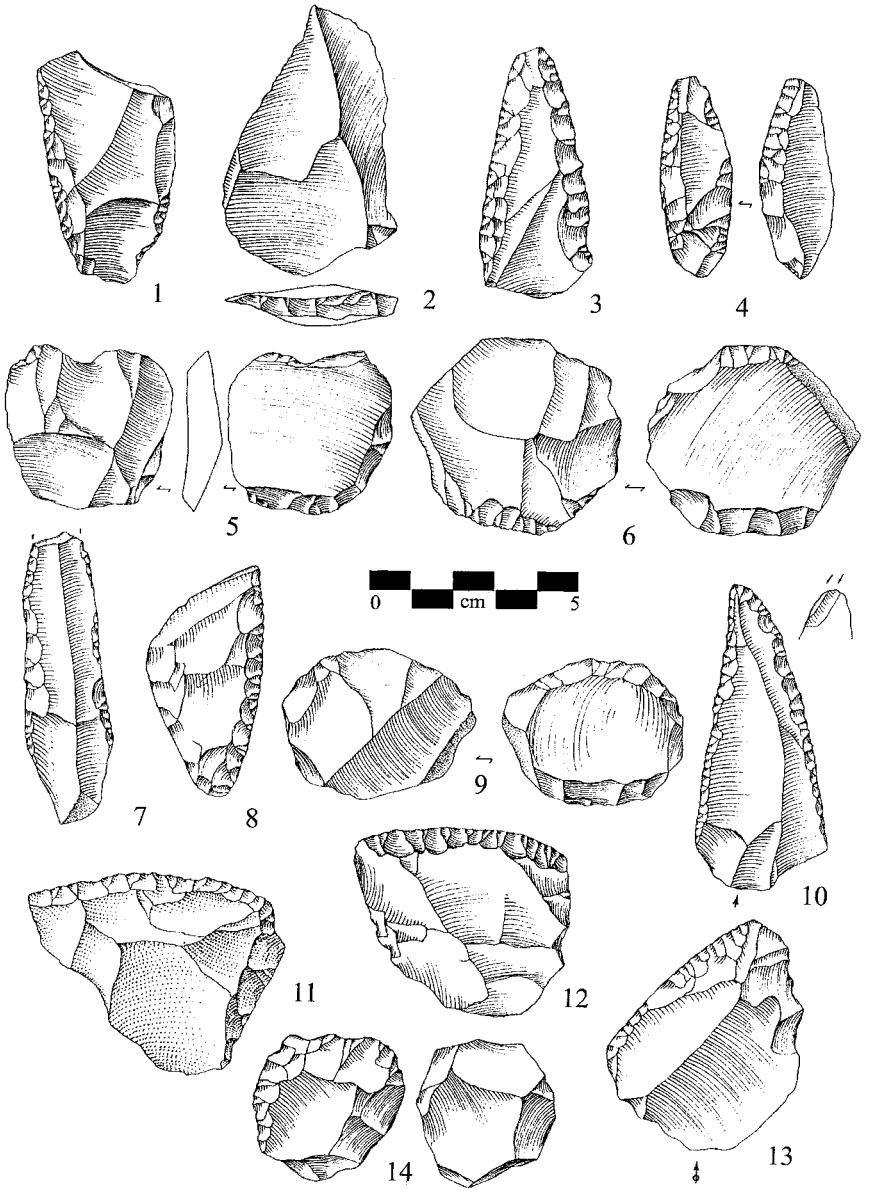

Figure 4. Artifacts from Karain E, Middle Paleolithic: 1-6, complex F; 7-10, complex G; 11-12, complex H; 13-14, complex I. (After Otte and coworkers).[42]

mainly from layer F (early Middle Paleolithic). Although descriptions of these materials have not yet been published, preliminary reports indicate that they are "Neandertaloid" in morphology.[45,48] A few very fragmentary and nondiagnostic hominid remains also have come from excavations in association with the "proto-Charentian."[45]

Another concentration of Middle Paleolithic material is found in series of small caves, Kanal, Merdivenli, and Tıkalı (Fig. 2b, 5), near the Mediterranean coast in the Hatay region of south-central Turkey.[67–68] These caves yielded rich Mousterian assemblages manufactured using flint pebbles from local marine beaches. The assemblages are characterized by a frequent use of Levallois techniques (Fig. 5). Retouched tools are less abundant and less intensively modified than they are at Karain. Not surprisingly, given their geographic location, the Hatay Middle Paleolithic assemblages bear a closer resemblance to the Levantine Middle Paleolithic than to Karain or the eastern European Mousterian.

As in the case of the Lower Paleolithic, surface occurrences of Mousterian artifacts have been documented over a large part of the country, from the Marmara and western Black Sea coast to central Anatolia to the Tigris and Euphrates river terraces of the southeast[24,69–71] and extending to the far northeast of the country.[23] Middle Paleolithic artifacts have even been found at elevations up to 2,000 m in the central Taurus Mountains. For the most part, these Mousterian surface assemblages resemble assemblages from the regions closest to them.

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Open-air sites in the Hatay and Orontes valley contain numerous Levallois flakes, points, and cores but relatively few retouched pieces,[70–71] a pattern similar to that typically found to the south in Syria and Lebanon. In the Marmara region, Mousterian assemblages have been described as resembling the "Balkan" Middle Paleolithic from Bulgaria and Greece.[52]

Surveys near the confluence of the Tigris and Batman rivers in southeastern Turkey have brought to light an interesting set of Middle Paleolithic

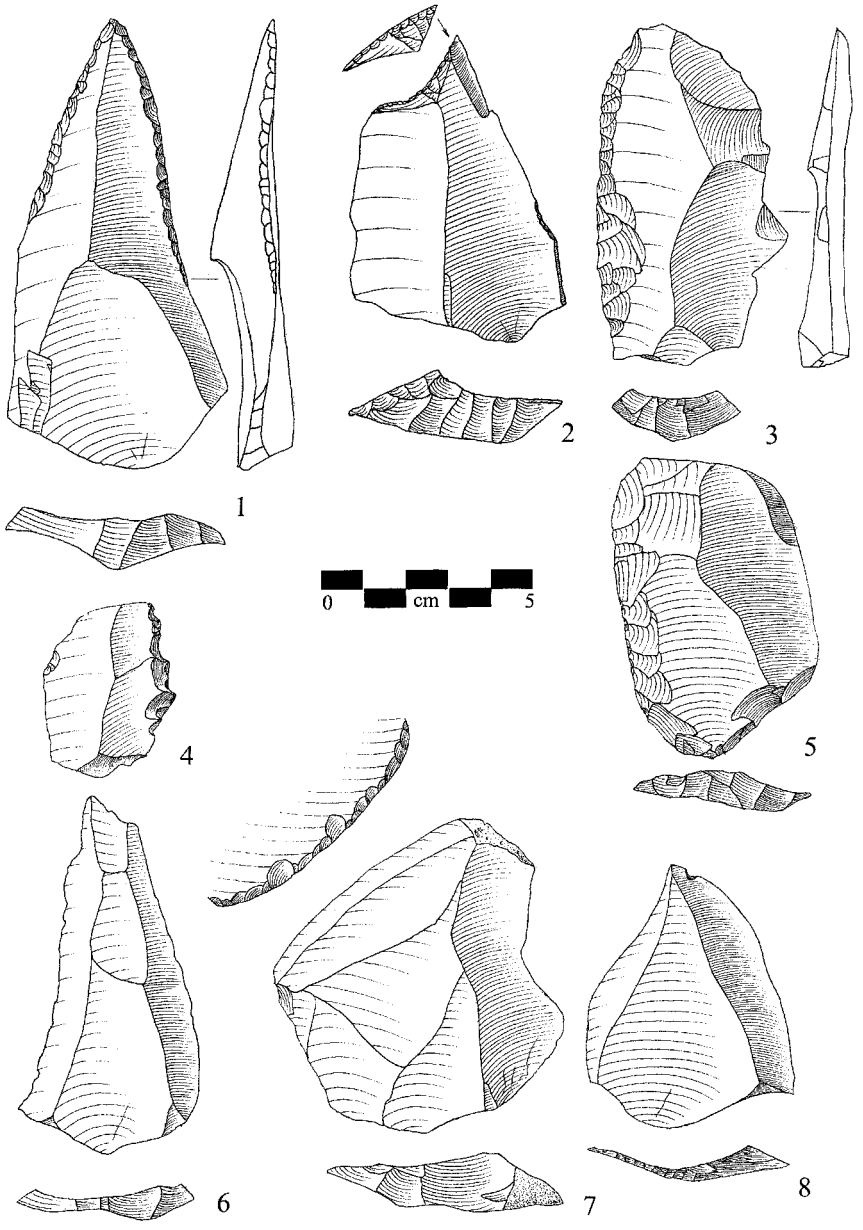

Figure 5. Artifacts from Middle Paleolithic sites in the Hatay region: 1-2, Kanal; 3-5, Tıkalı Cave; 6-8, Merdivenli Cave.

open-air localities.[57] Assemblages from lowland river terraces contain numerous Levallois flakes and large, rather crudely retouched tools, as well as small ovate bifaces. The investigators suggest that they represent an early form of Levantine Levalloiso-Mousterian. Middle Paleolithic assemblages from other sites at somewhat higher elevations contain numerous heavily modified scrapers and points, features more typical of the Zagros Mousterian. These contrasts among Middle Paleolithic assemblages could be a result of the abundance and quality of raw materials at different elevations or may reflect differences in the nature of occupations in the two zones. A third possibility is that the region has an interfingering of typical Zagros Mousterian and Levantine Mousterian technological patterns.

Upper and Epipaleolithic

One of most distinctive features of the sparse Paleolithic record of Turkey is the scarcity of Upper Paleolithic sites. The TAY gazetteer lists more than 75 sites with possible Upper Paleolithic or Epipaleolithic components[24] (Fig. 2c). A recent review[72] counts more than twenty published reports of Upper Paleolithic sites, but few of these sites have been investigated since their original discovery. The overall scarcity of Early Upper Paleolithic sites in Turkey probably is not entirely an artifact of geology or biases in past investigations. In western Europe, cave sites above 500-m elevation were seldom if ever occupied during the Upper Paleolithic,[73] and most of the central Anatolian plateau lies more than 1000 m above sea level. The central plateau may therefore have supported very low population densities. Milder Mediterranean habitats would have been magnets for human populations during the coldest and driest intervals of the late Pleistocene (OIS 3 and 2), as they were for populations of other animals and plants.[7] Most of these same coastal sites must currently be submerged except where tectonic uplift has been greatest.

The most extensive Early Upper Paleolithic deposits in Turkey are found in two sites, Kanal and Üçağızlı Cave,[74–77] situated on the Mediterranean coast of the Hatay region. Although the Hatay lies within the borders of the modern nation of Turkey, physiographically and ecologically it resembles the Mediterranean Levant much more closely than it does Anatolia. The Upper Paleolithic archeology also seems to show strong links to areas to the south in Syria, Israel, and especially Lebanon.

Üçağızlı Cave (Fig. 2c, 6) is situated on the steep rocky coast south of the mouth of the Orontes river. This partially collapsed cave was discovered and first excavated in the late 1980s.[77] After a hiatus of several years, a second program of excavations was begun, a joint effort of Ankara University and the University of Arizona.[75] A 3-m-deep sequence of intact early Upper Paleolithic and possibly Middle Paleolithic deposits is preserved at Üçağızlı Cave. The archeological assemblages here can be assigned to three major Upper and Epipaleolithic complexes.

The oldest Upper Paleolithic at Üça-

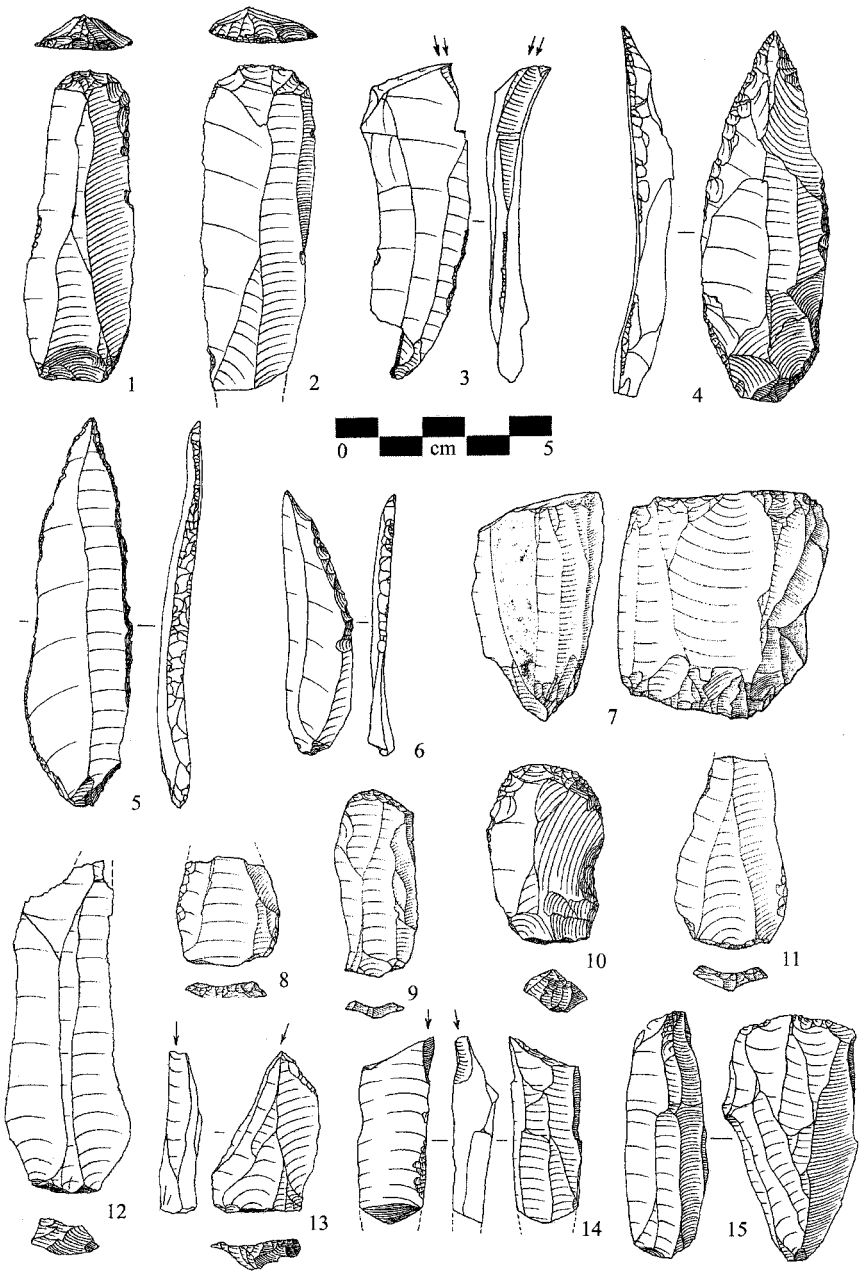

Figure 6. Early Upper Paleolithic artifacts from Üçağızlı Cave: 1-7, Ahmarian; 8-15, Initial Upper Paleolithic.

ğızlı Cave is typical of the so-called Initial Upper Paleolithic in the eastern Mediterranean, such as has been documented at the famous site of Ksar 'Akil in Lebanon.[78] Retouched tools are mostly typical Upper Paleolithic forms such as endscrapers, burins, and retouched blades (Fig. 6, 8–15). However, the lithic technology exhibits a combination of Upper and Middle Paleolithic attributes, and many pieces would be classified as Levallois flakes, blades, and points. This combination of typical Middle and Upper Paleolithic has led some investigators to dub such assemblages "transitional."[78,79] In my opinion, this term presumes too much about cultural phylogeny. The more neutral term "Initial Upper Paleolithic" is preferable. Accelerator mass spectroscopy (AMS) radiocarbon determinations for layers G and H at the bottom of the Üçağızlı sequence suggest an age of between 39,000 and 41,400 radiocarbon years BP (uncalibrated).[76] Due to the likelihood of contamination and changes in atmospheric levels of ^{14}C, these should be considered minimum estimates: true (calendar) ages are probably between 2,000 and 6,000 years older.[80,81] The rich, well-preserved fauna consists primarily of large and medium-sized terrestrial herbivores, including wild goat, fallow deer, and roe deer.[82]

Along with the stone tools, the lowest layers at Üçağızlı Cave have yielded a number of bone tools, including at least one square-sectioned point, quite unusual for the Levantine early Upper Paleolithic. Ornaments are also extremely abundant. To date, more than 500 shell beads and pendants, mostly made of the marine gastropod *Nassarius gibbosula* (Fig. 7) have been recovered from the Initial Upper Paleolithic layers.[76] Along with shell ornaments of similar or greater age from Ksar 'Akil in Lebanon[76] and Kebara Cave in Israel, these finds demonstrate the appearance of a regional tradition of personal ornamentation in the Levant before 40,000 years ago.

The upper layers at Üçağızlı Cave yield a rather different kind of early Upper Paleolithic assemblage, one that is similar to the early Ahmarian from sites such as Ksar 'Akil and Antelias shelter near Beirut.[78,83] The lithic assemblages are characterized by well-developed bipolar prismatic blade technology (Fig. 6, 1–7). Bone tools are fairly common, and the assemblage of modified shell ornaments is extremely rich, comprising more than 1,200 specimens. In both range and proportions, the ornamental shell species differ significantly from those at the lower levels, indicating changes in the "grammar" of ornament use, or the local marine ecology,[76] or both. The fauna is again dominated by terrestrial herbivores such as roe deer, but small game such as birds, tortoises, and marine resources such as shellfish and bony fish, were also exploited.[82] A series of AMS dates on charcoal and marine mollusks places this more recent Upper Paleolithic component between 28,000 and 33,000 radiocarbon years BP.[76]

The sequence at Üçağızlı Cave seems to document a gradual technological and typological transition be-

tween the Initial Upper Paleolithic and the later Ahmarian in a manner similar to that observed at Ksar 'Akil.[78,84] If there is a break in the cultural evolutionary sequence in this region, it would be between the late Mousterian and the Initial Upper Paleolithic. At Ksar 'Akil,[85] there is a depositional hiatus between the uppermost Middle Paleolithic levels and the beginning of the Upper Paleolithic, so it is impossible to examine the transition directly at that site. Marks describes a gradual in situ technological transition between terminal Mousterian and initial Upper Paleolithic at Boker Tachtit in the southern Levant,[86,87] although this interpretation has been challenged recently.[88]

About 40 km north of Üçağızlı, on the opposite side of the Orontes River delta, is the site of Kanal (Fig. 2c, 7). Part of a complex of small caves near the town of Çevlik, this site was heavily damaged by the construction of a massive drainage channel during the Roman period (hence its name).[74,75] The cultural sequence at Kanal originally spanned the Middle Paleolithic and Upper Paleolithic, with an early Upper Paleolithic sequence similar to that from Üçağızlı Cave.[75] Unfortunately, only a small area of intact deposits remains at the site today.

One of the most pressing questions concerning the Early Upper Paleolithic of Turkey is the possible presence and dates of the Aurignacian.[89] Many researchers now feel that, strictly speaking, the Aurignacian originated in Europe and later spread into the Levant and Zagros. If this is so, then the culture complex should have spread through Anatolia. This seems especially likely now that it appears that the early Aurignacian is not present at all in the southern Caucasus.[90] Unfortunately, the sequences at Üçağızlı and Kanal end earlier than the Aurignacian might be expected to occur in the area.[91] "Aurignacian" artifacts have been reported from several other sites in Turkey[24,72] but, for the most part, this reflects the now-abandoned use of the term to refer to all of the early Upper Paleolithic. The best candidate for the true Aurignacian in Turkey comes from the site of Karain, where a thin layer containing many carenated scrapers or cores has recently been found to be stratified between Mousterian and Epipaleolithic layers. Preliminary radiocarbon determinations seem consistent with this attribution,[92] but more study is needed.

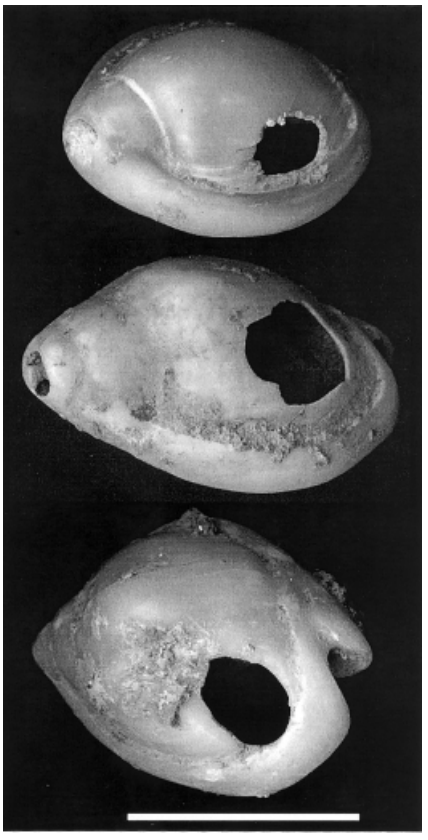

Figure 7. Beads manufactured of marine gastropod shells (*Nassarius gibbosula*) from layers F and H at Üçağızlı Cave. White bar is approximately 1 cm long.

Epipaleolithic or late Upper Paleolithic assemblages with numerous backed microlithic pieces have been reported throughout Turkey. The greatest density of Epipaleolithic cave sites is found in the Antalya area on the Mediterranean coast: important localities include Karain B,[93] Beldibi, Belbaşı[64,65] (Fig. 2b, 3), Kızlın,[94] and especially Öküzini (Fig. 2c, 3). Öküzini, a small cave located just a few hundred meters from Karain Cave,[95–98] preserves a complex stratigraphic sequence nearly 2 m deep, which serves as a kind of reference sequence. The sediments and pollen also provide an excellent climatic record of the late Pleistocene. An extensive series of radiocarbon determinations shows that the deposits at Öküzini span a period from about 17,800 BC to 6,500 BC (calibrated).[96–98]

Much like stratigraphic sequences in the Levant and Europe, the Öküzini Epipaleolithic sequence documents a gradual trend toward microlithization at the end of the Pleistocene. The excavators have divided the Epipaleolithic at Öküzini into several phases.[96]

Many researchers now feel that, strictly speaking, the Aurignacian originated in Europe and later spread into the Levant and Zagros. If this is so, then the culture complex should have spread through Anatolia. This seems especially likely now that it appears that the early Aurignacian is not present at all in the southern Caucasus. Unfortunately, the sequences at Üçağızlı and Kanal end earlier than the Aurignacian might be expected to occur in the area.

Phases 1–3 contain large numbers of points, mainly backed and truncated bladelets. Phase 4 contains a more diverse lithic assemblage that incorporates a variety of irregular microlithic forms. These early phases have yielded grinding stones, possibly indicating that intensive exploitation of plant foods was already a component of subsistence. Eighty percent of the faunal elements are caprovines, with

smaller numbers of fallow deer and hare. Many beads of marine shell and worked stone have been recovered from the layers that make up the first phases of occupation at Öküzini.[96–98]

Phase 5 at Öküzini, dated to between roughly 13,000 and 10,500 BC, represents something of a departure from the earlier layers. Tool blanks are predominantly small flakes, or bladelets rather than narrow bladelets. Cores are rather irregular, even polyhedral, and most artifacts are made on local radiolarite materials. Geometric microliths—lunates, trapezoids and triangles—are abundant, as is evidence of micro-burin technique. The nonlithic component of the material culture is quite rich. Bone artifacts such as awls, spatulae, and needles are common. In addition, various kinds of personal ornaments, as well as incised pebbles, have been collected from these more recent Epipaleolithic horizons. The fauna from the uppermost levels includes larger quantities of forest-dwelling species such as wild boar and red deer than are present in the lower levels.[96]

Interestingly, the Hatay region, home to the richest early Upper Paleolithic deposits in Turkey, has a very sparse Epipaleolithic record. Üçağızlı Cave contains only remnant Epipaleolithic levels, though much more extensive deposits must have been present before the cave collapsed. The Üçağızlı assemblage resembles some examples of the early Kebaran from the northern Levant,[99] as well Phase I at Öküzini, an assessment that is consistent with a single AMS ^{14}C date of about 17,000 BP. The fauna includes a wide range of small terrestrial game, along with medium-sized herbivores, shellfish, and fish, reflecting a trend toward increasing diet breadth that is seen throughout much of the Mediterranean basin during the Upper and Epipaleolithic.[100,101]

Open-air Upper and Epipaleolithic sites have been reported in many parts of Turkey, from western Thrace to the extreme southeast. A series of localities in and around the Marmara and Bosporous[52,102] have yielded assemblages rich in geometric microliths thought to date to the terminal Pleistocene. Aside from this, however, few if any of the reported Upper Paleolithic and Epipaleolithic surface sites has been investigated or described in detail.[103]

DISCUSSION

Although Turkey could eventually provide archeological and paleoanthropological data relevant to many important questions in human evolution, the corpus of well-investigated sites is simply too small at present to provide definitive answers to questions about human migrations or gene flow. The few sites that have been excavated have yielded important data and insights on their own, but they hardly constitute sufficient geographic coverage to address the kinds of questions posed at the beginning of this paper. Nonetheless, the available data do at least permit the development of a number of hypotheses that could be tested as the database is filled in.

Phase 5 at Öküzini, dated to between roughly 13,000 and 10,500 BC, represents something of a departure from the earlier layers. Tool blanks are predominantly small flakes, or bladelets rather than narrow bladelets. Cores are rather irregular, even polyhedral, and most artifacts are made on local radiolarite materials.

The two best-known stratified Lower Paleolithic sites in Turkey, Yarımburgaz and Karain E (units A–E) have yielded nonbiface industries, as has the new site of Dursunlu. This could give the impression that true Acheulean was absent from central and western Turkey, and that these areas represented an extension of the "handaxe-free zone" of central Europe and the Balkans.[104] However, the large numbers of handaxes from open-air occurrences suggest a different story. The frequency of biface assemblages does seem to decline from east to west, but small numbers of Acheulean handaxes have been found even at the western edge of Anatolia. As limited as they are, the data may suggest considerable geographic overlap and perhaps even coexistence of the two technological facies (Mode 1 and Mode 2), as in the Early and Middle Pleistocene of Africa.[105]

The fact that handaxes come largely from open-air sites, while the best-known Mode 1 industries come from caves, may also indicate a functional distinction between the two types of assemblage. Obviously, functional analyses of artifacts from the various types of assemblage would go a long way toward answering this question. It would also be of great interest to understand whether or not the nonbiface component of the Acheulean resembles the Mode 1 assemblages. If the same procedures of flake manufacture were used in both kinds of assemblage, this would strengthen the case that they are functional variants.[106] Alternatively, there may be a chronological separation between Acheulean and non-Acheulean Lower Paleolithic assemblages in Turkey. Only additional investigation of well-stratified deposits with good preservation will resolve this question.

Because the number of well-excavated and well-described sites is so limited, even less can be said of the Middle Paleolithic. It seems at present that a technological pattern typical of both the Balkan[107, 108] and the Zagros Mousterian,[109,110] characterized by low to moderate frequencies of Levallois, and frequent and heavy retouch on stone tools, extends across at least southern Turkey from the highlands around the Tigris and Euphrates rivers to Antalya on the central coast and to the Marmara area. The explanation for such a widespread complex of traits remains elusive. It could be related to a general reliance on small-

sized raw materials across this area or it might be a chance convergence. If the sequence at Karain cave is relatively complete and continuous, it does not appear that the Levantine Levalloiso-Mousterian technological pattern ever extended that far west,[47] as might be expected in the context of an expansion or invasion of hominids originating in the Levant or areas farther south during the late Pleistocene. However, the number of sequences with reasonable chronological control is simply too small to be definitive. As a first step toward addressing this question, it seems that the number of open-air occurrences is sufficient to achieve a more complete mapping of the geographic distribution of typological and technological variants of the Mousterian within Anatolia.

The number of Upper Paleolithic sites is also too small to permit definitive statements about the geography and chronology of different cultural complexes. Based on what little is now known of the early Upper Paleolithic, it seems that Levantine connections were strong in southeastern Turkey (Üçağızlı Cave, Kanal). In contrast, the single Aurignacian layer farther west at Karain suggests stronger affiliations with Europe, although similar industries are also known from the Levant and the Zagros mountains.[111] There is currently no evidence of a massive movement of populations or cultural attributes across Anatolia from either the south or the west during the early Upper Paleolithic, but the number of published sequences is small. It is significant that even the earliest layers at Üçağızlı Cave have yielded bone tools and ornaments, two important components of the complex of traits thought to characterize behaviorally modern humans.[112,113] Apparently these behavioral innovations occurred before and independently from the appearance of the Aurignacian in the region. In fact, distinctive traditions of personal-ornament manufacture appeared in several places, including central Europe[114] and East Africa,[115] at about the same time. These facts suggest that the appearance of these artifacts does not track the spread of a single population of behaviorally modern humans. Instead, the proliferation of personal ornaments probably occurred as a result of interaction between pre-existing cognitive capacities and environmental or demographic conditions that made it advantageous to broadcast personal information to a large number of individuals.

What we would like to know about the Paleolithic of Turkey far outstrips what we do know at present. The potential of Turkey's Pleistocene archeological and paleontological records will not be fully realized for years to come. Paleolithic research in the region has a long history, but the database has been slow to develop despite the best efforts of a small group of dedicated scholars. Since the mid-1980s, there has been an expansion of interest in the Turkish Paleolithic, manifested in collaborations between Turkish research teams and foreign scholars.[31,46,52,75,98] We can only hope that this trend continues, and that there will be a great deal more to report a decade from now.

It seems at present that a technological pattern typical of both the Balkan and the Zagros Mousterian, characterized by low to moderate frequencies of Levallois and frequent and heavy retouch on stone tools, extends across at least southern Turkey from the highlands around the Tigris and Euphrates rivers to Antalya on the central coast and to the Marmara area. The explanation for such a widespread complex of traits remains elusive.

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