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## Early Palaeolithic evidence from the Euphrates River basin, Eastern Turkey

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### ABSTRACT

Early Palaeolithic finds older than Acheulean were unknown in Eastern Anatolia until recently. During exploratory works carried out by a joint Russian-Turkish expedition in the Euphrates River basin (2014 –2016), several stratified Early Palaeolithic localities were found. Lithic finds are represented by choppers, picks, retouched tools, and flakes. A similar stone tool industry has been found in the Caucasus (Armenia, Dagestan). In addition to the archaeological typological dating of lithic tools in eastern Turkey, geomorphological, stratigraphic, paleontological, and paleomagnetic records also confirm the Early Pleistocene age of the localities. Some of these sites are dated to before the Olduvai subchron, i.e., ~2 Ma. New Early Palaeolithic discoveries in Eastern Turkey are important for the study of the oldest human cultures of the Middle East and the Caucasus. Acheulean and Middle Palaeolithic stone tools were also found in the lower river terraces of tributaries of the Euphrates, south of the Taurus Mountains. These finds were used to date the terraces.

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### 1. Introduction

The Near East and the Caucasus are key regions for study of the earliest hominine cultures outside Africa. Discoveries in recent years show that hominines explored large territories of Eurasia from the Early Pleistocene on. One route of early hominine migration followed the Levantine corridor and the Euphrates valley to Eastern Anatolia and Caucasus. It is reasonable to suggest that this route is marked by related sites. Stratified Oldowan and Early Acheulean Palaeolithic localities have been found in Yemen (Amirkhanov, 2008), Israel (Bar-Yosef et al., 1993; Bar-Yosef, 1994; Ronen, 2006; Zaidner et al., 2010), Syria in the Orontes River valley (Liere, 1961, 1966; Hours, 1975; Besançon et al., 1978; Copeland and Hours, 1993), Middle Euphrates (Copeland, 2004) and the El-Kowm Oasis (Le Tensorer et al., 2015), Iran (Ariai and Thibault, 1975; Biglari and Shidrang, 2006), northern Armenia (Belyaeva, Lyubin, 2013; Egeland et al., 2014; Gasparyan et al., 2014), southern Georgia

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https://doi.org/10.1016/j.quaint.2018.02.035 1040-6182/© 2018 Elsevier Ltd and INQUA. All rights reserved. (Lordkipanidze et al., 2007;Lumley et al., 2005), and the northwestern (Shchelinsky et al., 2010, 2016) and eastern (Amirkhanov et al., 2014, 2016) terminations of the Greater Caucasus (Fig. 1A).

The finds in the Euphrates River valley in Syria are dated to ~2.0-1.5 Ma (Demir et al., 2007; Trifonov et al., 2012, 2014). The investigations in the El-Kowm Oasis date the Oldowan layer to ~1.8 Ma or, perhaps, to before the Olduvai subchron (Le Tensorer et al., 2015). The Georgian and Armenian finds are dated to the interval ~1.85–1.75 Ma, i.e., are correlated with the Olduvai subchron and the earliest Calabrian (Lumley et al., 2002; Presnyakov et al., 2012; Trifonov et al., 2016). Some of the cultural layers may also date to slightly earlier than the Olduvai subchron (Ferring et al., 2011). The Muhkai II locality in Dagestan (the eastern Greater Caucasus) occupies the uppermost Gelasian and Calabrian, and the lowest layers with Oldowan artefacts are situated below the Olduvai subchron layers and are dated to ~2.0 Ma, according to paleontological and paleomagnetic data (Amirkhanov et al., 2014, 2016). Thus, the earliest archaeological artefacts are dated to ~2.0-1.8 Ma. All known Early Palaeolithic localities that are older than 1.0 Ma were found in the Levant, Syria or the Caucasus region.





The most ancient evidence of human presence in modern-day Turkey is the find of a fragment of *Homo erectus* skull, ~1.1 million years old, from Kocabaş in Western Anatolia (Kappelman et al., 2008; Lebatard et al., 2014; Vialet et al., 2012). The most ancient Palaeolithic site with stone tools is Dursunlu, 0.9–0.78 million years old (Güleç et al., 1999, 2009), located in Central Anatolia. In south-eastern Turkey rare Early Palaeolithic finds are noted in the area of Birecik in the Euphrates valley (Sanlaville, 2004; Demir et al., 2008).

The Palaeolithic of the South-Eastern Taurus has not been studied to the same degree everywhere. Occasional surface finds of Palaeolithic artefacts are recorded from the northern slopes of the Taurus range in the provinces of Elazig and Malatya (Kökten, 1971, 1974, 1976). These materials are difficult to date, but the most ancient of them apparently relate to the Acheulean. To the south of the South Eastern Taurus Mountains a significant number of Palaeolithic localities are known in the province of Adıyaman. They are all represented by surface finds and lack stratigraphic context. They include such locations as Anep Ridge, Eğriçay, Çakalsuyu, Gri Memo, Hamışkan, Kırmızı-Acıdere Ridge, Memişhan, Miroglu, Salahan, Şambayat, Yenikoy, Pirin, Palanli, Pirun, Keciler Cave and others (Pittard, 1931,1939; Bostancı, 1973; Yalcınkaya, 1983;1984; Harmankaya and Tanındı, 1996). The collections from these locations often contain mixed material of different ages. The earliest Palaeolithic tools, with a significant number of handaxes, were discovered at Şehremuz. The collection is dated to the late Acheulean (Müller-Beck and Albrecht, 1988). Acheulean sites have been discovered in the Euphrates basin and to the south of the Atatürk Dam (Kansu, 1947: Senvürek and Bostanci, 1958: Bostanci, 1962: Özdoğan, 1977; Minzoni-Déroche and Sanlaville, 1988; Kuhn, 2002; Taşkıran, 2008; Dinçer, 2010; Güleç et al., 2012). The south-east of Turkey is the richest in finds of Acheulean handaxes, including handaxes in alluvial terraces as well as surface finds.

So, with the exception of occasional finds without clear stratigraphic and cultural context, Oldowan archaeological sites older than 1 million years are not known in the territory of Anatolia. At the same time, Eastern Turkey and, in particular, the Euphrates valley are located on the route of expansion of ancient hominines (Lyubin, 1957; Bar-Yosef and Belfer-Cohen, 2001), whose traces have been discovered both to the south, in Syria and the Levant, and to the north and east, in the Caucasus. Therefore, the aim of our investigations is to search for Early Palaeolithic stratified sites in the Euphrates basin in the region of the South-Eastern Taurus.

### 2. Regional setting

The South-Eastern Taurus Mountains intersect the investigated region in a WSW–ENE direction. Their origin was due to global tectonic processes that took place during the Pliocene and Pleistocene. To the south of the investigated region, the Great African Rift System is continued to the north by the Red Sea Rift and Dead Sea Transform fault system. Their development was accompanied by a shift of the Arabian Plate to the north. The South Taurus (Bitlis) Thrust Zone formed in the collision area between the Arabian Plate and the Eurasian and Anatolian Plates. The thrusting caused uplift of the South-Eastern Taurus Mountains. Their length is about 600 km. The highest peaks reach 2600 m. The investigated region occupies the Euphrates River basin in the area, where the river crosses the ridge and enters the low plateaus of Northern Mesopotamia (Fig. 1B).

Two large areas of the Euphrates River basin were studied. The northern area is situated between the Armenian Highlands and the South-Eastern Taurus Mountains. This is made up of intermontane basins separated by low ridges. The average altitude is 900–1100 m above sea level (a.s.l.). The Euphrates River forms a loop near the town of Keban, rounding the Hasan and Bulutlu spurs of the Taurus Mountains from the west. Rivers flow along intermontane valleys. The Murat and Tohma rivers are the largest Euphrates tributaries, and the Keban and Karakaya Reservoirs extend along the river valleys. The Hazar Lake is situated in the East Anatolian Fault Zone. The investigated area is found in the Elazığ and Malatya administrative provinces.



Fig. 1. A - The earliest Palaeolithic localities (Oldowan and Early Acheulean) in Western Asia and Northern Caucasus: 1- Kashafrud; 2- Muhkay I-II, Aynikab 1; 3- Kermek, Sinya Balka, Bogatiry; 4-Karakhach, Muradovo; 5- Haghtanak 3; 6-Areni-1; 7- Dmanisi; 8- Borj Qinnarit, Cordon Littoral; 9- Khattab; 10- Maadan, Kasra; 11- Aïn al Fil; 12- Birecik; 13- Yiron; 14- Ubeidiya; 15- Bizat Ruhama; 16- Al Guza; **B** - The newly-discovered Palaeolithic localities in the South-Eastern Taurus region. Early Palaeolithic: 1. Kovancilar (N38.41952°; E38.51695°); 2. Eskimalatya (N38.24711°; E38.24141°); 3. Tahtalı (N38.37959°; E38.0916°); 4. Şambayat (N37.67928°; E38.06823°); 5. Bostancık (N37.60675°; E38.08144°); 7. Kalburcu (N37.75501°; E38.52990°). Middle Palaeolithic: 6. Eskiköydere (N37.60906°; E38.09511°).

The southern area occupies the southern foothills of the South-Eastern Taurus Mountains. The Euphrates turn to the WSW here, rounding the Karacadağ lava field and the Şanlıurfa Plateau. The river is dammed, forming the Atatürk Reservoir. The area is made up of a plain that is gently inclined to the south and is cut by numerous right tributaries of the Euphrates River. The largest tributaries are the Erikdere, Göksu Çayı, Eskiköydere, and Kalburcu rivers. Their sources are located in the South-Eastern Taurus Mountains. Their mouths and lower terraces are often flooded by the Atatürk Reservoir waters except for the Göksu Çayı, which falls into the Euphrates below the Atatürk Dam. The average altitude is 500–800 m a.s.l. The investigated area is the northern termination of Upper Mesopotamia and, along with northern Syria, represents a single geographical landscape zone. The area belongs to the Adıyaman administrative province.

### 3. Methods

A combination of methods was used to search for stratified Palaeolithic localities. They include the identification and geomorphological correlation of fluvial terraces and the description and correlation of their geological sections. Evidence of the geological age of the archaeological localities is presented in another paper (Trifonov et al. this issue). Dating of the localities is based on examination of the remanent magnetic polarity of the deposits, paleontological data and spore-pollen analysis. Archaeological study of lithic collections is based on typological and technological methods. Basic methodological concepts, developed for Early Palaeolithic materials from Africa, the Near East, Europe and the Caucasus, are used as a foundation (Bordes, 1961; Clark, 1961; Kleindienst, 1962; Biberson, 1967; Leakey, 1971; Toth, 1985; Bar-Yosef et al., 1993; Isaac et al., 1997; Clark and Kleindienst, 2001; Lumley, 2005; Torre and Mora, 2005). In characterising lithic collections, the understanding of "Oldowan" is used in the same sense as in the publications of Mary D. Leakey.

#### 4. Results

# 4.1. Early Palaeolithic localities to the north of the Taurus Mountains

Lower Pleistocene deposits are represented to the north of the South-Eastern Taurus Mountains by the Palu Formation in the Murat River valley and its analogues around Malatya City and in the Sultansuyu River valley. The Palu Formation mostly unconformably overlies the Çaybağı Formation. The latter corresponds to the Pliocene and probably part of the Gelasian (Trifonov et al., this issue). Early Palaeolithic artefacts were found during studies of the 200-m thick geological section in the right side of the Murat River valley near the town of Kovancılar (N38.41952°; E39.51695°; altitude a.s.l. H = 981 m; Fig. 1B). The lower part of the Kovancılar section (~85 m) belongs to the Çaybağı Formation, composed of loams, silts and sandstones. They are covered by the Palu Formation (~115 m), where the proportion of coarse deposits increases. The cited authors date the Palu Formation to the uppermost Gelasian and Calabrian. The Palu Formation is unconformably overlain by the 0.5-m to 2-m thick gravel layer that composes the surface of the upper terrace III. The thickness of this layer increases to the east to 4–6 m. The layer probably corresponds to the lowermost Middle Pleistocene.

Lithic artefacts with traces of working were found in the 5 m thick basal layer (Layer 17) of the Palu Formation, composed of grey sandstones with lenses of conglomerates (Fig. 2). The artefacts were found in the 1.5 m thick basal conglomerate with abundant stone matrix and in the talus directly nearby. The following artefacts were

Fig. 2. The Early Palaeolithic locality of Kovancilar. Arrows indicate locations of finds in Layers 1 and 17.

found: a pick (n = 1), pick-shaped tools (n = 2), choppers (n = 2), and a large fragment of subrectangular form with working on one lateral edge (Table 1). One chopper is unifacial and one is bifacial. The pick has a pear-shaped form and measures  $12.5 \times 10.1 \times 7.8$  cm. The frontal part is worked with centripetal flaking on both sides to form the medial edge. The end is sharpened with flat removals. A large worked "heel" can be seen on the artefact. The posterior part is flat (Fig. 3, 1). The two pick-shaped tools are close in form to the pick, but quite coarsely worked. The artefacts are rolled.

Stone artefacts were also found in the sub-soil layer covering the Palu Formation (Layer 1; Fig. 2). They are as follows: choppers (n = 4), a pick (n = 1), flakes (n = 3), and a fragment with removals (n = 1). The artefacts are made on pebbles of crystalline limestone heavily rolled and covered in a thick carbonate skin. It is probable that they were redeposited from lower horizons of the Palu Formation. There are two unifacial and two bifacial choppers. The pick is of particular interest. The tool is made on a flattened pebble, and has a shortened subtriangular form. A sharpened end was created by a few large removals on the frontal edge. The form of the "heel" was created by one longitudinal removal from the posterior end (Figs. 3, 2). The artefact faintly resembles a handaxe of the "Dauan" type identified in Southern Arabia (Amirkhanov 2006, p.153).

Another Early Palaeolithic locality was found on the right side of the Euphrates valley to the east of the village of Eskimalatya (N38.24711°; E38.24141°; H = 849 m; Fig. 1B). Here, a quarry cut into the upper part of the same terrace III. The section is correlated with the Palu Formation and is composed of conglomerates with lenses and interbeds of gravel, sandy loam and loam (~17 m). They are covered by sandy loam with carbonate inclusions (~2 m) with carbonate travertine (0.3 m) in the base. The intensively rounded Early Palaeolithic artefacts were found in the middle and lower parts of the exposed section. They are: three choppers (two unifacial and one bifacial), two picks (one short and one elongated), and a large primary flake (i.e., a flake without scars of previous removals on its dorsal surface) (Table 1; Fig. 3 and 3-4). The artefacts are made on dolomitized limestone.

The Tahtali section is situated 20 km to the NW of the Eskimalatya section in the right bank of the Kuru River, a tributary of the Euphrates ( $38.37959^\circ$  N;  $38.09166^\circ$  E; H:~875 m; height above water level (h): ~125 m; Fig. 1B). This ~105-m thick section is correlated with the Palu Formation and is subdivided into two parts. The lower part (25-35 m) consists of well-rounded conglomerates representing the alluvial channel facies. The upper part (75-80 m) is composed of sandstones and loam with thick interbeds of pebbles. In the top of the section, four rounded

Table 1Lithic finds from Lower Palaeolithic localities.

Category	Şambayat			Bostancik	Eskimalatya	Kovancilar		Tahtalı
	IV <sup>a</sup>	IV				L.17	L.1	
	_	L.9	L.2					
Prenucleus	1							
Unifacial choppers	2	1	1		2	1	2	
Bifacial choppers	3	2	1	1	1	1	2	
Pointed choppers	3							
Picks	1			1	2	1	1	
Pick-shaped tools	2		1			2		
Polyhedron with irregular flaking	1							
Artefacts with partial bifacial working				2				
Retouched tools	5							
Flakes, flake fragments	11	2		2	1		3	4
Fragments with removals	7		1			1	1	
Fragments		1						
	36	6	4					
Total	46	6	6	6	9	4		



Fig. 3. Lithic tools from Early Palaeolithic localities to the north of the South-Eastern Taurus: 1. Pick (Kovancilar, Layer 17); 2. Pick-shaped tools (Kovancilar, Layer 1); 3. Bifacial chopper (Eskimalatya); 4: Pick (Eskimalatya).

secondary flakes (i.e., flakes with scars of previous removals on their dorsal surfaces) produced from flint and red jasper were found (Table 1). Despite the poverty of the archaeological material, the location may be of interest for further investigations.

# *4.2.* Palaeolithic localities to the south of the south-eastern Taurus Mountains

### 4.2.1. Şambayat

The second major investigated area occupies the southern foothills of the South-Eastern Taurus Mountains, where the Euphrates River enters the plains of Southern Turkey, i.e., the northern Arabian Plate. Pliocene and Early Pleistocene deposits cover the upper fluvial terraces of valleys. The most significant results were obtained in the Göksu Cayı valley. Five terraces were identified here. The upper terrace V is attributed to the Pliocene. Terrace IV is correlated with the Olduvai subchron and adjacent parts of the Gelasian and Calabrian, terrace III with the uppermost Calabrian and lower Middle Pleistocene, terrace II with the Middle–Upper Pleistocene, and terrace I with the Late Pleistocene and Holocene (Trifonov et al., this issue). Palaeolithic artefacts were found in the terrace IV and IV<sup>a</sup> sections in the scarp near the road, 1.5 km to the east of the village of Sambayat (37.67928° N; 38.06823° E; H = 632 m; h = 150 m; Figs. 1B and 5). The terrace IV section is as follows (from the top downwards) (Fig. 4):

- 1. Silt; 1.7 m.
- 2. Conglomerate with sandstone interbed (0.2 m); 2 m. Early Palaeolithic artefacts.
- 3. Silt with conglomerate lens (up to 0.4 m) in the middle; 3.7 m. A proximal fragment of the metapodium of a midsized ungulate mammal. Normal magnetic polarity.
- 4. Conglomerate with very rough base; 1.5–2.5 m.
- 5. Silt with a paleo-soil horizon (0.3–0.4 m) in the middle; 3.9–4.3 m. The lower part of the layer has normal magnetic polarity.
- 6. Conglomerate with a thin paleo-soil lens; 1–1.5 m.
- 7. Clay with gravel lens up to 0.3 m at the base; 2.8 m. Normal magnetic polarity.

- 8. Silt with conglomerate lens, up to 1.5 m at the base. Reverse magnetic polarity.
- 9. Well rounded conglomerate; up to 3 m. Early Palaeolithic artefacts.
- 10. Brown loam; 1.5 m. The conglomerate thins out away from the river, and the thickness of the loam increases up to 4.5-5 m. Normal magnetic polarity.

The total thickness is about 26 m. Terrace  $IV^a$  (H = 590 m; h = 108 m) is a local formation and represents a partly eroded fragment of terrace IV that slid onto the surface of terrace III across a vertical distance of ~40 m. The section is ~15 m thick and corresponds to Layers 4–9 of the terrace IV section (Figs. 4 and 5). The Early Palaeolithic stone material was found in the 4–4.4-m thick Layer 6, of conglomerates with well-rounded pebbles of small and middle size and a lens-type interbed of loam paleo-soil. Layer 6 corresponds approximately to Layer 9 of the terrace IV section.

In total, 46 artefacts were found in the three layers at Şambayat (Layers 2 and 9 of terrace IV and Layer 6 of terrace IV<sup>a</sup>) (Table 1). The most representative collection was found in Layer 6 of terrace IV<sup>a</sup>. The density of natural flint material (nodules, fragments etc.) is higher here than in other layers at the site, but all the same remains insignificant. Here were found: a prenucleus (n = 1), unifacial choppers (n = 2), bifacial choppers (n = 3), pointed choppers (n = 3), a massive pick (n = 1), pick-shaped tools (n = 2), a polyhedron with irregular flaking (n = 1), massive sidescrapers (n = 3), a notched artefact on a flake fragment (n = 1), an endscraper on a flake (n = 1), fragments with removals (n = 7) and flake fragments (n = 11), a total of 36 artefacts.

The unifacial choppers are similar to one other and are simple in morphology. One of them is made from a subtriangular flint nodule  $(18.0 \times 12.3 \times 6.6 \text{ cm})$ . The unifacial working is located on one of the narrow ends of the nodule (Fig. 6, 1). In the collection more complicated chopper forms predominate: bifacial and pointed (there are 3 examples of each type). One of the bifacial choppers is made on a subrectangular nodule fragment  $(10.8 \times 8.4 \times 5.4 \text{ cm})$ . The working edge was again created on the narrow end of the blank with bifacial working.

The pointed choppers also bear bifacial working whose purpose was the creation of a sharpened end (Fig. 6, 3, 4). These artefacts are



Fig. 4. Stone Age finds in terrace sections of the Göksu Çayı valley. ▲ : Early Palaeolithic finds in gravel deposits; + : Finds from the end of the Upper Palaeolithic/Neolithic in covering loam; x401: Sampling location and sample number for paleomagnetic analysis.



Fig. 5. Şambayat locality. Locations of discoveries of lithic finds in the section of terraces IV and IVa: A: Early Palaeolithic finds in gravel deposits; + : Finds from the end of the Upper Palaeolithic/Neolithic in covering loam.



Fig. 6. Lithic tools from the Şambayat locality: 1. Unifacial chopper; 2. Pick-shaped tool; 3-4. Pointed choppers.



Fig. 7. Lithic tools from the Şambayat locality: 1. Bifacial chopper; 2. Pick-shaped tool.

subtriangular in form, with a cortical or worked "heel". They measure  $13.1\times10.0\times7.2$  cm,  $12.4\times11.5\times6.5$  cm and  $9.0\times9.1\times7.5$  cm.

Picks and pick-shaped tools are represented by 3 artefacts. The pick is of the heavy-duty variety ( $19 \times 17 \times 8.8$  cm) and is made on a large fragment of a nodule. Among the pick-shaped tools, a large artefact can be noted, which is made on a flat elongated nodule ( $28.5 \times 12.3 \times 5.5$  cm). There is meticulous convergent working from both sides forming a sharpened pick-shaped end, while the rest of the tool is practically unworked (Fig. 7, 2).

There are 3 heavy-duty scrapers  $(9.6 \times 10.1 \times 3.8 \text{ cm}; 8.5 \times 10.3 \times 4.5 \text{ cm}; 7.5 \times 10.5 \times 3.2 \text{ cm})$  made on flattened subrectangular nodules. The working edge is made on one of the long sides of the blank using large removals. The rest of the artefact surface, except for occasional removals, consists of cortex (Fig. 8, 1). It is important to note that tools of this type were discovered in quite a localised area of the layer exposure. No more artefacts of this type were found at the locality.

A notched tool was made on a flake fragment  $(5.1 \times 4.5 \times 2.7 \text{ cm})$ . The notch formed with one large and one small removal (Fig. 8, 5). The endscraper is made on a secondary flake. The working edge of the scraper is formed on one of the lateral sides of the tool. The artefact measures  $3.7 \times 4.6 \times 1.4$  cm, and the scraper edge is 3.3 cm wide (Fig. 8, 4), and has traces of natural impacts. The "fragments with removals" are fragments of flint nodules bearing negatives of several removals. Flake fragments are represented by some fairly large examples, measuring from 5 to 8.5 cm along one of their axes (n = 3). The other 5 examples

measure up to 4 cm along the longitudinal axis. They are distal fragments. Among the large flake fragments, two are primary and one is secondary. Of the flake fragments up to 4 cm in length, two artefacts are primary and three are secondary (Fig. 8, 2, 3). Practically all the flake fragments bear traces of rolling and shaping due to natural impacts.

Few finds were made in Layers 2 and 9 of terrace IV at Şambayat (Figs. 4 and 5; Table 1). In Layer 9, one unifacial chopper and two bifacial choppers were found. A large bifacial chopper ( $25.2 \times 14.7 \times 9.6$  cm) stands out, and has an arch-shaped working edge with thorough working from one edge and minimal correction from the other (Fig. 7, 1). Flake fragments (n = 2) and a fragment without visible traces of working were also found in the collection from the layer. The flake fragments are represented by a secondary medial ( $1.8 \times 2.6 \times 0.6$  cm) and a primary distal example ( $1.9 \times 1.8 \times 0.5$  cm). The artefacts are slightly rolled.

Among the finds from Layer 2, there are two choppers, a pickshaped tool and a fragment with removals. An unifacial chopper is made on a subtriangular nodule. A double-edged chopper is subrounded in form. The working edges are made on two opposing sides of the tool and are bifacially worked. The pick-shaped tool is made on a large flake ( $10.8 \times 7.7 \times 4.8$  cm). The rear face of the artefact is formed by the ventral surface of the flake. The front face is, correspondingly, the dorsal surface. The tool is triangular in section (Fig. 6, 2).

A small scarp is found 40 m to the east of the main outcrop (closer to the Göksu Çayı) in the terrace IV<sup>a</sup> surface. The subsided side of the scarp is filled by brown silt; 0.8 m. Several clusters of



Fig. 8. Lithic tools from the Sambayat locality: 1. Heavy-duty scraper; 2-3. Flake fragments; 4. Scraper; 5. Notched tool.

flint tools of other morphology were found at depths of 0.4–0.7 m in the silt (Figs. 4 and 5). The artefacts are completely unrolled, but are covered by a white patina. The collection contains 18 artefacts. They include two cores employing prismatic reduction. The cores are small  $(3.9 \times 5.8 \times 4.8 \text{ cm} \text{ and } 7.5 \times 6.5 \times 5.3 \text{ cm})$ , of subtriangular form, and single-platformed. Judging by their morphology, flakes and laminar flakes were removed from them (Fig. 9, 1-2). Apart from the cores, 15 flakes and one flake fragment were found (Fig. 9, 3-8). The flakes are 1.5–9 cm long and 1.6 to 6.5 cm wide. They include two primary flakes, seven secondary flakes, and six flakes with areas of cortex. Of the striking platforms, fourteen are plain, one is cortical, and one is linear. There are no

tools in the collection. In the section wall itself a fragment of small tubular bone was found. Apparently, the remains of a buried site were found here. The dating of this small collection is complicated, and the age of the silt in which the cultural layer is found cannot yet be determined. The site is preliminarily dated to the end of the Upper Palaeolithic to the Neolithic.

### 4.2.2. Bostancık

The Early Palaeolithic Bostancık locality is situated in the valley of the Eskiköydere (Eskiköy River), a right tributary of the Göksu Çayı (Fig. 1B). Three terraces were identified here. Terrace III corresponds to the Göksu Çayı terrace IV, while terraces II and I



Fig. 9. Şambayat locality. Lithic tools from the Upper Palaeolithic/Neolithic, discovered in the covering loam of terrace IVa: 1-2. Cores; 3-8. Flakes.

correlate to the same Göksu Çayı terraces. Stone artefacts were found in the basal layer of the terrace III cover section in the right bank of the river near the village of Bostancık (37.60675° N; 38.08144° E; H = 583 m; h = 130–140 m). This 7–10-m thick layer unconformably overlies the Miocene (?) deposits and is composed of well-rounded conglomerate with sandstone lenses. The magnetic polarity is normal and possibly reversed near the top.

Six artefacts were found in the basal laver of the Bostancık section (Table 1). They are: a bifacial chopper, a pick, two artefacts with partial bifacial working, an intensively rounded secondary flake, and a rounded distal cornelian flake fragment. The bifacial chopper  $(13.2 \times 7.3 \times 6.4 \text{ cm})$  is made on an elongated oval flint pebble (Fig. 10, 2). The wide, arch-shaped working edge, 5.2 cm long, was created on a narrow side of the pebble. The working edge displays large elongated negative flake scars (maximum 4.5 cm). The tool is intensively rounded and is partly covered by a carbonate crust. The working edge of the pick  $(7.5 \times 7.9 \times 4.5 \text{ cm})$  is made with large removals, one orthogonal from the edge and several transverse from the margin to the center (Fig.10, 1). The butt and underside are not trimmed. The pick point is triangular in crosssection. The tool resembles a variety of pointed chopper. The artefacts with partial bifacial working bear a few removals on both sides of the nodule. They are not bifaces. Rather, they resemble unfinished tools, because the partial bifacial working is focused on certain parts of the artefacts.

### 4.2.3. Eskiköydere

The Middle Palaeolithic Eskiköydere locality is situated in the left bank of the river, 1.5 km to the east of the Bostancık locality (Fig. 1B). The artefacts were found in the terrace II section (37.60906° N; 38.09511° E; H = 476 m; h = 23 m). Its altitude has been decreased by human activity. About 6.5 m of thick silt is exposed at the top of the section. Its upper and middle parts represent a cultural settlement layer (small tell), whose remains are present in the terrace surface and contain Neolithic or Chalcolithic ceramics and flint tools. The silt partly cuts the lower 5–5.5-m layer of bedded pebbles. It contains a 5 to 10 cm thick horizon with numerous flint artefacts (Fig. 11).

The finds from this layer include cores (n = 3), a Levallois flake (n = 1), blades (n = 4) and flakes (n = 15). The cores for the production of large laminar flakes are quite exhausted. Their debitage surface has been corrected using a technique similar to Levallois, with the aim of narrowing the flaking surface and modifying the striking platform. One of the cores the rear face has been deliberately flattened using large removals (Fig. 12, 1). Elongated irregular blades, laminar flakes and Levallois flakes were obtained from the cores (Fig. 12, 2-6). The blades from the locality correspond to the negatives found on the cores, i.e., the technological link between the cores and products is completely clear. The blades are also irregular and somewhat sinuous in shape, and are rather massive in section. They have a clearly expressed bulb of percussion and an obtuse angle between the striking platform and the ventral face. Three out of four blades have areas of nodular cortex. The blades are 7-12 cm in length. The flakes are short in outline, and are most likely linked to the preparation of the front and rear faces of the cores. In functional terms, they relate to production waste. Only one is a primary flake; the others bear negatives of previous removals. The finds date to the Middle Palaeolithic and have analogies among the Middle Palaeolithic sites of the Levant.

It must be mentioned that in various parts of the investigated region, lithic finds of various ages are found in significant quantities on the surface of terraces IV and III, including from the Middle Palaeolithic. They are often found in mixed contexts. Because these finds are most likely redeposited and have no stratigraphic context, their interpretation is extremely difficult.



Fig. 10. Lithic tools from the Bostancık locality. 1. Pick; 2. Bifacial chopper.

### 4.2.4. Kalburcu

Not all surface finds are mixed. A compact cluster of Acheulean tools was found at the Kalburcu locality. It is situated in the Kalburcu River basin, 20 km eastwards of Adıyaman City. The artefacts were found at the surface of terrace III (37.75501° N; 38.52990° E; H = 610 m; h = 54 m; Fig. 1B) that probably corresponds to terrace III of the Göksu Çayı valley (Fig. 13). The terrace is composed of the 0.5-m thick layer of pebbles covering the Upper Miocene–Pliocene sandstones. The finds come from an area of  $120 \times 30 \text{ m}$ . Four entire and one broken handaxes and five flakes were found (Fig. 14, 1-4).

The unbroken axes have the following forms: 1 Micoquian, 2 amigdaloidal and 1 ovoid. The artefacts are not rolled and are covered in light polish and patina. A well-made example stands out, of a finished handaxe of Micoquian type, with an elongated thin end and a thick "heel" (dimensions:  $15.2 \times 8.3 \times 6$  cm). The sharpened end is 7 cm long and its thickness in the middle part is less than 2 cm (Fig. 14, 2). The flakes are large and thick, with large striking platforms, and are also slightly patinated. The flakes and bifaces constitute a single industry. No finds of a later age have been discovered at this locality. The locality appears to be a site with a destroyed cultural layer. Movement of artefacts, if any, has been insignificant. The artefacts may have a wide chronological range within the Middle (Clark, 1965) to Late Acheulean. The presence of a Micoquian handaxe most likely indicates that the collection is Late Acheulean, close to the industry from Tabun E (Garrod and Bate, 1937; Jelinek et al., 1973).

Geographically, the closest finds of handaxes were made in the Euphrates valley at the localities of Keban, Sehremuz, Karkamış, Dızmırtaşı (Taşkıran, 2008; Müller-Beck and Albrecht, 1988). These localities are open air sites and are dated to the Late Acheulean. The handaxes from Calburcu are generally similar to the handaxes from these localities. Therefore, we assume that Kalburchu locality is dated to the Late Acheulean.

### 5. Discussion

### 5.1. Stratigraphic position of Early Palaeolithic stone industries

The Early Palaeolithic artefacts of south-eastern Turkey were found in conglomerate-pebble layers. They all had been moved by some distance and the majority was more or less rounded. However, their stratigraphic position generally corresponds to the deposits containing them. They are Early Pleistocene deposits forming the upper terraces of river valleys. The Oldowan artefacts of the Kovancılar locality were collected from the basal layer of the Palu Formation. It covers the Çaybağı Formation, which is dated to the Pliocene and perhaps the early Gelasian. The basal layer belongs to a part of the section that is characterized by reverse magnetic polarity and underlies the layers with normal polarity corresponding to the Olduvai subchron. Therefore, the finds from the basal layer are earlier than 1.95 Ma. The upper layer of the same section overlying the Palu Formation formed in the early Middle Pleistocene or, at least, the final Calabrian. The Early Palaeolithic stone finds that were collected from this layer were intensively rounded and probably redeposited from lower eroded layers of the Palu Formation. The collection from this layer belongs probably to the Acheulean.

The finds from the Eskimalatya locality derive from a section, stratified with analogues of the Palu Formation, and belong to the same terrace III as the finds from Kovancılar. The layers have reverse magnetic polarity (Matuyama chron) and possibly correspond to the Calabrian. Based on the morphology of the artefacts, they most probably relate to the Oldowan.

A fuller chrono-stratigraphy has been constructed for localities to the south of the Taurus Mountains. Five terraces have been identified in the Göksu Çayı and Erikdere valleys. The largest portion of the terrace IV section of the Göksu Çayı valley (Layers 3 to 7) has normal magnetic polarity. Their position among the other terraces provides a possibility to correlate these layers with the Olduvai subchron. Layer 8 has reverse polarity. This means that Layer 8 and the lower part of the section including Layer 9 with the Oldowan artefacts are earlier than the Olduvai subchron, i.e., they belong to the uppermost Gelasian. Layer 6 of terrace IV<sup>a</sup>, where the largest collection of artefacts of the same type was obtained, is correlated with Layer 9 of terrace IV and, therefore, is of the same age. In contrast, Layer 2 of the terrace IV section, where Oldowan artefacts were also found, is correlated with the Olduvai subchron or the lower Calabrian. The Bostancık locality, in the lower layer of



Fig. 11. Middle Palaeolithic locality of Eskiköydere. Dotted line indicates distribution of cultural layer.



Fig. 12. Lithic finds from the Eskiköydere locality (Middle Palaeolithic). 1. Core; 2. Levallois flake; 3-6. Blades.

the terrace III section of the Eskiköydere valley, has the same stratigraphic position.

Therefore, all localities of Oldowan type to the south of the South-Eastern Taurus Mountains are situated in layers that are lower than the Olduvai subchron (1.95-1.77 Ma) – Layer 6 of terrace IV<sup>a</sup> and Layer 9 of terrace IV at Göksu Çayı – or are correlated with this subchron or the lowermost Calabrian – Layer 2 of terrace IV of Göksu Çayı and Bostancık locality.

The terrace III sections of the Göksu Çayı and Erikdere valleys correspond to the uppermost Calabrian and lower Middle Pleistocene. No archaeological material was found there. However, the findspot with the Acheulean hand-axes was located in the surface of the same terrace in the Kalburcu River valley. The dating of this collection is difficult. It may be broadly dated to within the Middle to Late Acheulean. A Late Acheulean date is preferred.

The terrace II sections of the valleys to the south of the South-Eastern Taurus Mountains correspond to the uppermost Middle Pleistocene and lower Upper Pleistocene. The archaeological finds from the terrace II section in the Eskiköydere valley belong to the Middle Palaeolithic. The thickness of the cultural layer (5 cm) in the gravel indicates that the horizon of finds formed in a single stage. Locally, in the covering IV<sup>a</sup> deposits at Şambayat and terrace II at Eskiköydere, stratified sites dating to the end of the Pleistocene/Holocene have been found.

Hence, all the archaeological finds in the studied region support or clarify the geological data. 5.2. The typological characteristics of the earliest palaeolithic of the investigated region

Various types of raw material were used for creating lithic tools at the Early Palaeolithic sites found to the south and to the north of the South-Eastern Taurus Mountains. The stone raw materials used to make tools in all the newly discovered localities is of local origin. This feature is characteristic of the Oldowan industry, in contrast to the Early Acheulean industry, on which distant stone raw materials often used. The lithic finds to the north of the mountains were made on sandstones and crystalline limestone. All of the artefacts in the lithic industries found to the south of the mountains were made on grey and brown flint. In total, there are 77 artefacts in the collections. The collections are generally small, and archaeological excavations have not yet taken place, but all the finds have a clear stratigraphic context. Be that as it may, the material allows for preliminary conclusions concerning its cultural affiliation.

When comparing the finds from these localities, some general typological features stand out. Unifacial and bifacial choppers, picks and pick-shaped tools occupy a principal place in the collections from all the Early Palaeolithic sites (with the exception of Tahtali). Handaxes and proto-handaxes are absent. Characteristics such as the prevalence of choppers and the absence of handaxes support the collections attribution to Mode 1. Apart from choppers, picks and similar pick-shaped tools also stand out in the industry of these



Fig. 13. View of the Acheulean locality of Kalburcu.

sites. These finds are quite individual in nature. For example, one massive pick is made on a large nodule, another pick made on a short nodule is similar to the pointed type of choppers, while a third tool (a pick-shaped tool) is made on a large flake. At the Olduvai Gorge sites, picks are mainly noted in the middle and upper parts of Bed II (sites BK, EF-HR — the developed Oldowan B and Early Acheulean) (Leakey, 1971, pp. 132-135, 209-210). Some artefacts deriving from the upper part of Bed I (FLK North, typical Oldowan) and interpreted by Mary Leakey as protobifaces (Leakey, 1971, pp.78-79) resemble pick-shaped tools. Thus, the picks and

similar pick-shaped tools cannot constitute a sufficient basis for the archaeological dating of this industry. Another significant characteristic of the assemblages (specifically as found at Şambayat) is the presence of rather large flake fragments (including of secondary flakes) and retouched tools on flakes and small nodules (heavy-duty scrapers, an endscraper, a notched tool). The typological variability of the retouched tools is characteristic both for the Oldowan (Eastern and Northern Africa, the Caucasus) (Lumley, 2009) and for Early Acheulean sites (Africa, the Near East). Based on the above, the described Early Palaeolithic finds from eastern



Fig. 14. Handaxes from the Kalburcu locality: 1. Amygdaloidal; 2. Micoquian; 3. Ovoid; 4. Broken handaxes.

Turkey probably relate to the Oldowan culture (Mode 1), but with elements and features (large flakes, the pick-shaped tool on a large flake, blanks for bifacial tools) which are characteristic of the Early Acheulean. The possibility is not ruled out that the industry found at these sites represents a transitional stage between the Oldowan and the Early Acheulean. Their cultural attributions may be clarified in the course of further work.

### 6. Conclusions

In the course of field investigations in the Euphrates Valley to the north and to the south of the South-Eastern Taurus, the Lower Palaeolithic sites of Kovancılar, Eskimalatya, Tahtali, Şambayat, and Bostancık were discovered. All the finds have a clear stratigraphic context. The initial data on geological dating and cultural attributions correlate fully. The lithic industries from these sites are generally similar to each other, and belong to a single cultural phenomenon. But the possibility remains that the age and archaeological attribution of the finds will be clarified in the course of future excavations. Based on comprehensive data it is established that the territory of Anatolia was already settled in the early stages of the Early Pleistocene (the end of the Gelasian). The initial settlement of Anatolia took place from the south, from the Levantine corridor and the proto-Euphrates valley. We already see the furthest traces of the expansion of ancient humans in the Greater and Lesser Caucasus. Human history in Anatolia, having begun in the early Pleistocene, continued later in time. The various stages of the Stone Age are evidenced by finds deriving from variously aged terraces of the tributaries of the Euphrates.

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