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The Final Early Paleolithic of Azerbaijan (Based on the Garaja Site)

We describe new findings relating to an Early Paleolithic site of Garaja on the Mingachevir Reservoir coast, Azerbaijan. Geological and geomorphological position of the area, structure of the Early–Middle Pleistocene deposits, faunal remains, and chronology are discussed. On the basis of geological characteristics and paleofauna (large mammals, mollusks) we tentatively date the site to the Bakunian age (0.8–0.4 Ma years ago). Artifacts, some 350 in number, found mainly on the surface, but reliably associated with lithological units, are described in detail. Primary reduction is dominated by parallel flaking, with occasional radial and "citron" cleavage. Most tools, made on pebbles and large flakes, are large (handaxes, choppers, and side-scrapers). While the Garaja industry is generally homogeneous, the stratigraphic situation of the site and certain elements of technocomplex, such as solitary Levallois cores, a Quina scraper, and advanced forms of bifaces, indicate the presence of two chronologically and technologically successive complexes within the general Late Acheulean industrial tradition. Garaja correlates with other cave and open-air industries of the East and South Caucasus and adjoining regions dating to the first half of the Middle Pleistocene.

Keywords: *Azerbaijan, Early Paleolithic, paleontology, Bakunian age, Middle Pleistocene, handaxes.*

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Introduction

The study of the Caucasian Early Paleolithic began in 1934, when S.N. Zamyatnin had discovered the first Acheulean sites on the Black Sea coast and on the northern slope of the Caucasus (Yashtukh, Ignatenkov Kutok, and others). In the late 1940s, Early Paleolithic sites were discovered in two other regions: in Armenia and South Ossetia (Satani-dar, Lashe-Balta, and others). In the 1950s–1980s, multilayered cave sites (Koudaro I, Azykh, Treugolnaya, and others) and numerous open-air localities represented mostly by surface artifact assemblages were studied (Lyubin, 1989, 1998). After the hominin remains dating to ~1.8 Ma ago were discovered with stone tools in Dmanisi, Georgia, the Caucasus has been viewed as a key route whereby the early *Homo* groups migrated after their first exit from Africa (Dmanisi I, 1998). Until recently, however, in terms of Paleolithic, the western coast of the Caspian Sea was one of the least studied areas in the Caucasus. The Azykh Cave (Guseinov, 2010) remained for a long time the only stratified Early Paleolithic site known there. The situation changed in the 21st century: during the first two decades, more than a dozen Early and Middle Pleistocene sites were discovered in the Northeastern Caucasus (Derevianko et al., 2012; Anoikin, 2021). As the findings suggest, the Caspian coast of the Caucasus was a place where hominin populations had been present since the early Quaternary. Virtually all these sites belong to the open-air category (previously, only cave sites were excavated in the Caucasus). In the southern part of the western Caspian region, research headed by M.M. Guseinov was conducted in the 1960s–1980s, but then Paleolithic studies were ceased there. In the second decade of the 21st century, intensive investigations were resumed by the joint Azerbaijan-Russian archaeological expedition. In the course of studies, a new, internationally important Early Paleolithic site of Garaja was discovered. The purpose of this article is to introduce results of the archaeological and natural science investigations conducted at the site during the last decade.

History of studies

In 2012, Gyanja-Gazakh Paleolithic team of the archaeological expedition under the auspices of the Institute of Archaeology and Ethnography, Azerbaijan National Academy of Sciences, conducted field surveys in western Azerbaijan. The team examined Pleistocene deposits in the western part of the Kura-Aras lowland, specifically in the regions where bone-bearing lenses with Pleistocene fauna remains had been previously found (Lebedeva, 1978: 91; Geologiya…, 1997: 529). One of the reconnaissance routes ran along the southern coast of the Mingachevir Reservoir. There, approximately 1 km south-east of the hydroelectric dam, at the foot of the Garaja Ridge (the eastern extension of the Bozdag Ridge), the locality with joint occurrence of paleontological and archaeological remains was found within deposits of the Middle Pleistocene Bakunian stage (Fig. 1). The site named Garaja was examined by the joint Azerbaijan-Russian expedition from 2012 to 2021 with few interruptions (Kulakov, Zeynalov, 2014).

Geological context and stratigraphy

The site of Garaja is located at the foot of the eponymic ridge (absolute altitude +90 m) representing an anticlinal fold up to 200 m high and up to 3 km wide. Its west to east extent measures ~10 km. The Garaja Ridge is a structural prolongation of larger Bozdag Ridge, extending farther west for more than 100 km. In environs of the reservoir, some other anticlinal ridges are situated: Duzdag, Palantekyan, Kodjashen, etc.

In the Early and Middle Pleistocene, neotectonic evolution of the region was characterized by a long-term dipping. This is confirmed by concordant bedding of Akchagylian, Apsheronian, and Bakunian deposits, whose thickness in some places reaches several hundred meters. The Garaja area and adjacent Bozdag and Duzdag ridges were repeatedly described in geological literature as a typical location of deposits representing these stages (Lebedeva, 1978: 77; Geologiya…, 1997: 527).

The main feature of the paleogeography of the region in the Early and Middle Pleistocene was that the coastline of the Kura Bay, spanning various ancient basins of the Caspian, shifted within dozens of kilometers, whereas the sea level fluctuated within hundreds of meters. Fluctuations of this sort were described in detail for the Late Pleistocene (Yanina, 2012: 197). It is assumed that in the Early and Middle Pleistocene, duration of some transgressions and regressions was much longer (Svitoch, 2014: 234). The number of such fluctuations of sea level over the last 2 million years could be large, as indicated by numerous strata of sea and continental sediments within the limits of the Kura paleo-bay.

At the end of the Bakunian stage, a sharp inversion of the tectonic regime took place, and the folding process began (Milanovskiy, 1968) that determined the uplift of ridges and changes in sedimentation. The uplift of rocks was accompanied by severe erosion. After the filling of the Mingachevir Reservoir in the 1950s, the process was accelerated by intense coastal erosion of loose sediments in the surf zone and by

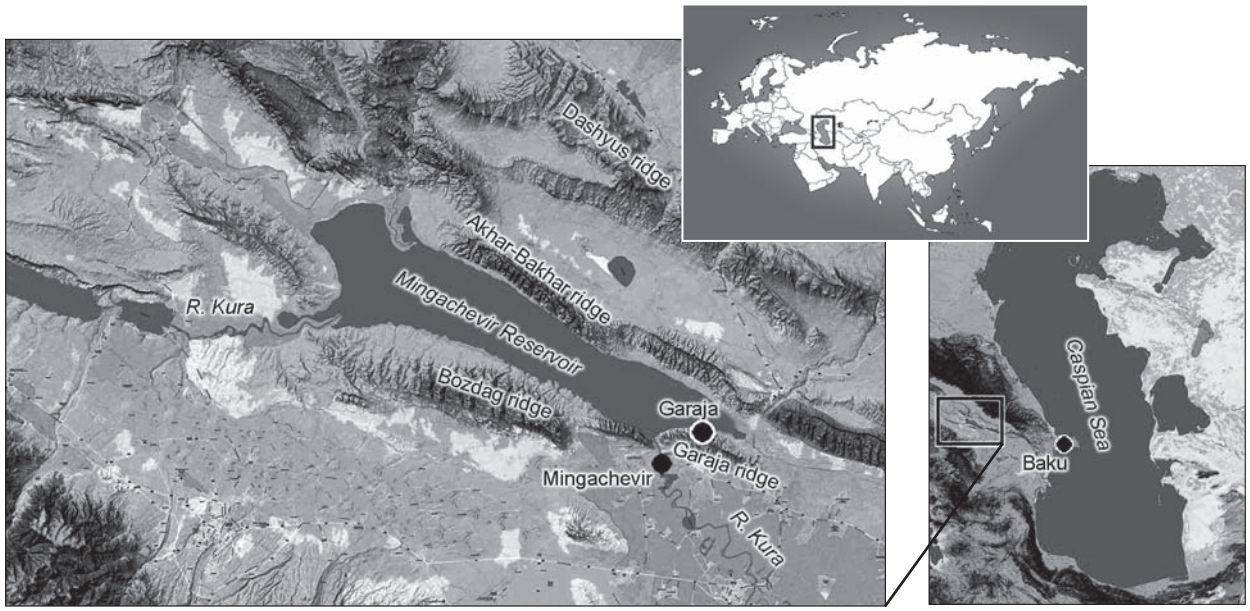

Fig. 1. Map of the study area.

exposition of Akchagylian and Apsheronian rocks near the Bozdag Ridge and of Apsheronian and Bakunian rocks near the Garaja Ridge. In the area where the latter rocks had been washed out, the site of Garaja was discovered (Fig. 2, *A*, *B*).

At the site, the sediments are represented by interbedding of various terrigenous rocks (pebbles, sands, silts, clays) with traces of numerous washouts. These beds form the northern limb of anticline. They extend from west to east and fall abruptly at a mean angle of ~60° in the north.

The lowest body of the section is formed by grayish-yellow silt more than 50 m thick (the lower marine series, Unit 1) (Fig. 2, *B*). It comprises a distinct layer of volcanic ash of a specific pink color. According to preliminary data, the ash got this color due to diagenetic changes in marine environment. The lower portion of the sediments contains mollusks of the Bakunian age (*Didacna parvula*, according to T.A. Yanina).

The beds with washout are followed by a complex series of gray sands ~30–35 m thick (the lower continental series, Unit 2). Massive gray sands at the base are overlain by cross-bedded sands with gravel lenses, and grayish-yellow clayey sand. The series comprises two thin (0.1–0.2 m) layers with Bakunian shells (Fig. 3, *4*) and a lens of grayish-yellow clay up 5 m thick, with paleontological remains (Fig. 3, *1*). The sands also contain well-preserved impressions of trunks and branches of large trees up to 0.7 m in diameter (Fig. 3, *3*). This series can be defined as continental. It is probably with this series that the lower archaeological level is associated (Fig. 4).

A series of stratified multicolored clays up to ~10 m thick overlays the described sediments. It extends over the whole section and serves as a marker. Its central portion comprises a 0.8 m thick layer with shells of Bakunian mollusks (*Didacna eulachia*, according to Yanina). The top of this unit shows traces of intensive washout. It is defined as the upper marine series (Unit 3).

A complex series up to 40 m thick lies above. It consists of interbedded sands, clays, and gravel. The sediments are mostly represented by cross-bedded gray sands with lenses of small and large pebbles. Some layers of sand are abundant in large impressions of tree trunks and paleontological remains (see Fig. 3, *2*). At some levels, massive stratified gray lacustrine clays with traces of washout are present. These sediments are identified as upper continental (Unit 4) and are associated with the middle (see Fig. 3, *5*) and upper archaeological levels.

Unit 4 with a washout is overlain by a series of yellow clays. The upper portion of the section is covered with water. In adjoining areas, similar sediments are overlain by sands with rare pebbles and paleofauna remains, which, in turn, underlay strata of grayish-yellow clays up to 100 m thick. According to N.A. Lebedeva (1978: 91), the upper portion in the section of the Garaja Ridge in its eastern part is composed of Khazarian alluvial gravel tens of meters thick.

Thus, the site of Garaja is associated with sediments of the Bakunian stage, which are represented by several series differing in structure and genesis (marine and continental). The feature of the area is that rocks are inclined at approximately 60°. Continental sediments, lying at two levels, are represented mainly by alluvial sands with lenses of pebbles and lacustrine clays. These lenses, stretching with gaps for tens of meters,

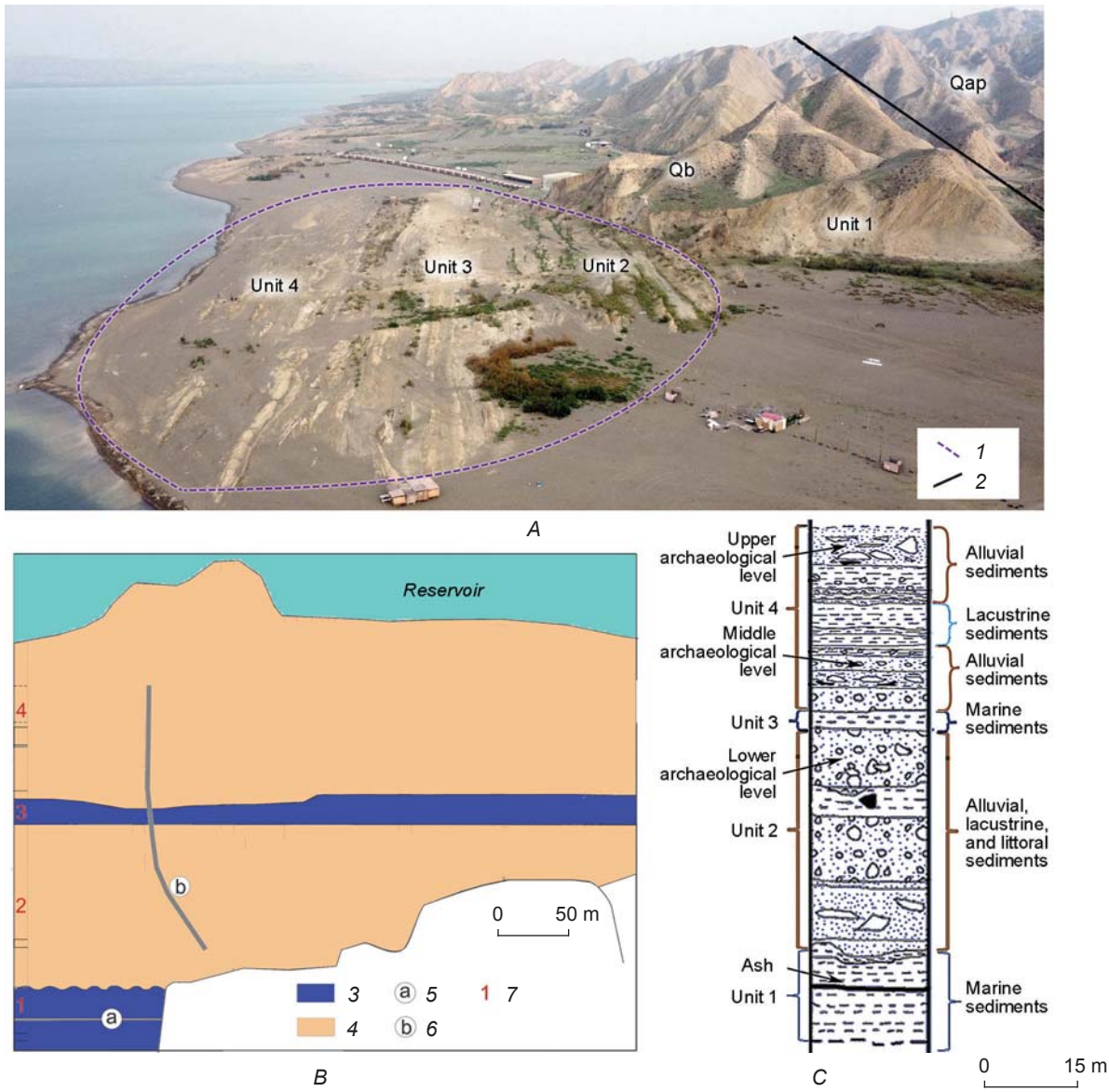

Fig. 2. Stratigraphic situation at Garaja.
A – upper view of the site; *B* – plan of the site area; *C* – combined stratigraphic column.
1 – limit of the main artifact concentration; *2* – limit of the Bakunian (Middle Pleistocene) and Apsheronian (Early Pleistocene) sediments; *3* – marine sediments; *4* – alluvial and littoral sediments; *5* – volcanic ash; *6* – trench; *7* – sedimentation unit.

contain the remains of trees and animals, as well as lithic artifacts. Marine sediments also form two series. They are composed of clays and auleritic sands containing malacofauna remains. All the series lie concordantly. Inside the continental sediments and in the zones where they contact marine series, numerous traces of washouts are present, some of them being large. The composition of the section is determined by complex dynamics of the sea level and by the changes of sedimentation regimes. According to natural science data (primarily the composition of malakofauna and large mammals), all sediments in this area correspond to a fairy long interval within the Bakunian stage in the Caspian Quaternary history, referring to the period between ~0.8 and 0.4 Ma years ago (Svitoch, 2014: 174–179).

Paleontological remains

In 2012–2021, a representative collection of Pleistocene fauna remains (196 spec.) was obtained at Garaja. Some remains were cemented into sand and gravel breccia forming thin interlayers within Unit 2, while most of them were collected from the surface, in washed areas of the continental series, within

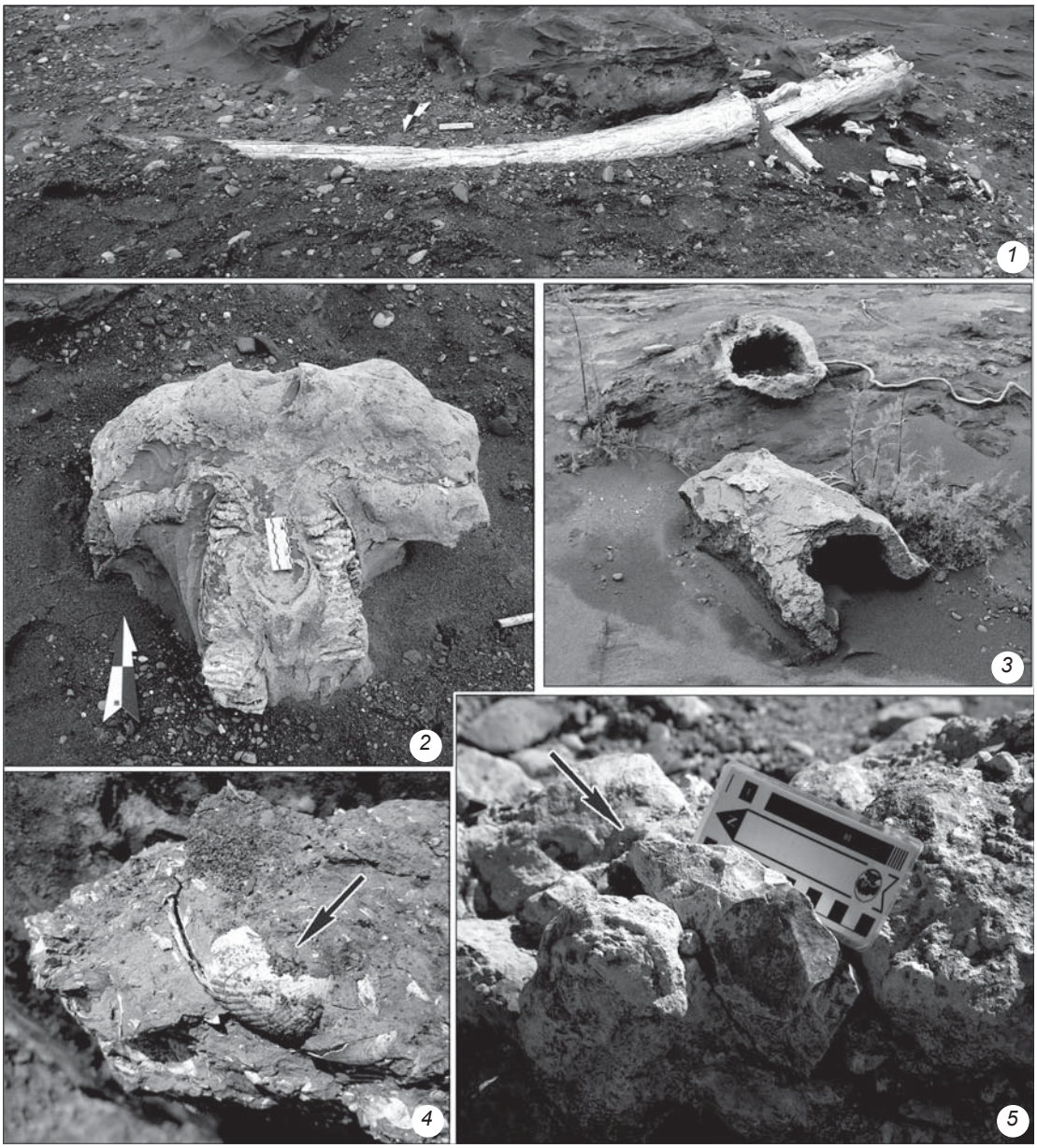

Fig. 3. Location of archaeological and paleontological materials at the level of the second continental series (Unit 3) at Garaja.
1 – tusk of a forest elephant (*Palaeoloxodon antiquus*); *2* – skull of a fossil elephant (*Archidiskodon* sp.); *3* – fragments of petrified tree trunks; *4* – shell of *Didacna eulachia*; *5* – handaxe, *in situ*.

the coastal strip. Identifiable finds (121 spec.) are dominated (~50 %) by the remains of fossil elephant (*Archidiskodon* sp.): a tusk, teeth, fragments of crania and postcranial skeleton (all paleontological identifications were made by T.M. Eybatov and V.V. Titov). Bones of southern (*Archidiskodon meridionalis*) and forest (*Palaeoloxodon antiquus*) elephants were also identified. The collection contains numerous bones of red deer (*Cervus sf. elaphus*) and extinct ox (*Bos* sp.). Remains of Merck's rhinoceros (*Stephanorhinus hundsheimensis/Stephanorhinus kirchbergensis*), extinct horse (*Equus caballus*), large-horned (*Praemegaceros verticornis*) and giant (*Megaloceros giganteus*) deer were found in small numbers. Coprolites (7 spec.) of ungulates (*Cervidae* sp.) and large unidentifiable animals are noteworthy.

Thus, the majority of species recorded at the site generally correspond to the Tiraspol fauna complex, which existed during the Bakunian stage of the Caspian Sea evolution (Middle Pleistocene).

Fig. 4. Location of archaeological materials at Garaja.
1 – scheme of conventional levels; *2* – distribution of artifacts at the levels in the main area of their concentration (collection of 2021).
a – artifacts of the lower level; *b* – artifacts of the middle level; *c* – artifacts of the upper level.

Archaeological remains

At Garaja, as mentioned above, archaeological materials were associated with sand and gravel layers in the continental sediments. They lay in washed out places, usually with a small horizontal displacement. According to the general geological situation, lithic artifacts were concentrated at three levels: the *lower level* associated with the earliest continental sediments; the *middle level* attributable to "continental series II" of Unit 4; and the *upper level*, where the finds originate from the top of the same unit, but can be registered only when the water level is lowest (see Fig. 4). During the excavations conducted in 2012–2021, several artifacts were found in the cemented sand at the *middle level*, i.e. they lay *in situ* (see Fig. 3, *5*). The total horizontal length of the lower continental series is ~40 m, that of the upper series is ~60.

All the artifacts were made from local pebbles (alluvium of the pra-Kura) abounding in sand and pebble lenses and in layers of the continental sediments. These normally are sedimentary rocks exhibiting various degrees of silicification; effusive rocks are less common; quartzites were used in isolated cases only. Almost all the artifacts display abraded surfaces. Well-rounded pieces with smoothed and hardly visible ridges, hampering the identification of artifacts, form a fairly high percentage. Thus, though the Garaja lithic

assemblage comprises over 350 artifacts, only 295 of them can be identified typologically.

Artifacts are nearly equally distributed among the levels described above. It is noteworthy that in the assemblage collected in 2012–2019, artifacts from the *upper level* amount to only ~10 %. This most likely can be explained by the high water level in the reservoir and, correspondingly, by the reduced area of excavations, as compared to 2021. Specifically, in 2021, during the lowest water level, when about 40 % of the artifacts were collected, their distribution by levels was nearly equal: 45, 47, and 44 specimens, respectively. The tentative analysis of the collection has shown that there were virtually no differences between the levels in terms of technology and typology of artifacts, with the share of tools and cores of specific types varying within 10–15 %. Given this fact and the relatively small number of artifacts, all the Garaja pieces can be considered as a whole, whereas probable differences with regard to levels can be mentioned separately.

In research, 136 artifacts discovered in 2021 and a sample of 250 typologically distinct implements from the combined collection of 2012–2019 were analyzed.

Core-like artifacts, including typologically distinct cores and core-shaped fragments, form ~20 % of the assemblage. The category of cores is dominated (~80 %) by simple single-faced cores with a parallel pattern of flaking, with or without minimal preparation (Fig. 5, *1*). Some of these cores are close to choppers and differ from them in the angle of convergence of edges (≥60°) not forming the working element. Almost all other nuclei represent in equal proportions the categories of radial cores (Fig. 5, *2*) and cores for "citrons". The assemblage contains two Levallois cores: one of them is a small, well-shaped piece for elongate convergent blanks; the other one is a typical tortoise nucleus for flakes. Both artifacts, with lightly abraded surfaces, were made of high-quality siliceous material and are quite distinct from the rest of the collection. The assemblage also comprises numerous (~10 %) split pebbles with traces of irregular flaking. They possibly represent the initial stage of raw material testing.

In the category of flakes (~20 %), large pieces prevail (Fig. 5, *2–4*). Small flakes are rare. Primary flakes or those resulting from shaping pebble tools constitute a large proportion (~40 %); more than half of their surface is covered with cortex (Fig. 5, *4*). Five pieces belong to the category of "citrons" (Fig. 5, *3*). Striking platforms are natural or flat; in single cases, they are dihedral.

Tools are most numerous, constituting ~50 % of the lithics. Such a high percentage is usual in surface collections, being mainly due to their easier visual identification.

The most common tools are pebble cutting forms—choppers (27 spec.) (Fig. 5, *1*; 6, *2*, *3*) and large bifacial implements (41 spec.) (Fig. 7, *1*, *3–9*). Partial bifaces and pieces with elements of bifacial treatment (10 spec.) also form a representative collection. All partial bifaces are semifinished products in the form of desired end tools, but with only one worked face. Handaxes are characterized by large variety of shapes. Almond-shaped (Fig. 7, *6*, *9*), cordate, (Fig. 7, *1*, *4*), oval bifaces, and limande (Fig. 7, *3*) are present in the assemblage. Approximately 50 % of implements have a pebble butt (Fig. 7, *1*, *7*, *9*). There are backed asymmetrical pieces (Fig. 7, *7*), including those resembling Keilmesser (Fig. 7, *5*, *8*). Biconvex bifacial tools predominate (Fig. 7, *1*, *3*, *4*, *6*, *7*, *9*).

Cleavers (see Fig. 6, *4*, *5*) are another category of tools regarded as cultural and chronological markers. In the Garaja collection, such implements total to 7 specimens: 2 finished products and 5 blanks.

Fig. 5. Tools and flakes from Garaja.
1 – chopper; *2*, *3* – "citrons"; *4* – primary flake.

These are made on very large (over 15 cm) elongate primary flakes. Tools of this kind are typical of certain Acheulean industries. They occur in Africa and South Eurasia from the Early Acheulean to the Early Middle Paleolithic.

Along with pebble chopping tools, the assemblage contains side-scrapers (11 spec.) fashioned on flakes or longitudinally split pebbles (see Fig. 6, *1*) and on pebble fragments. There are also a few denticulate and notched tools, irregularly retouched flakes, and a core-shaped endscraper—tool typical for the Early Paleolithic of the Caucasus (Lyubin, 1998: 172–173). Some implements are distinct from the rest of tools: a side-scraper made on a large flake and elaborately modified by various-sized, stepped retouch, similar to Quina retouch typical of the Middle Paleolithic (see Fig. 7, *2*), and two Levallois cores.

During investigations conducted on the southeastern coast of the Mingachevir Reservoir, in addition to the main area of artifact distribution, several other small locations of artifact concentrations were discovered 1 to 3 km east of Garaja. Some 50 implements were found there. Composition of the collection is similar to that of Garaja: split pebbles, single-faced cores for parallel flaking, large flakes, and tools including six choppers, six handaxes of various shapes, and three bifacial pieces (possibly, blanks).

The Garaja industry contains artifacts from two lithological units separated by marine deposits, possibly of vastly different age. However, the general variation within the industry does not exceed that within other final Early Paleolithic industries. This technocomplex fits well within the Caucasian context of Acheulean industries with bifaces, and corresponds to chronological

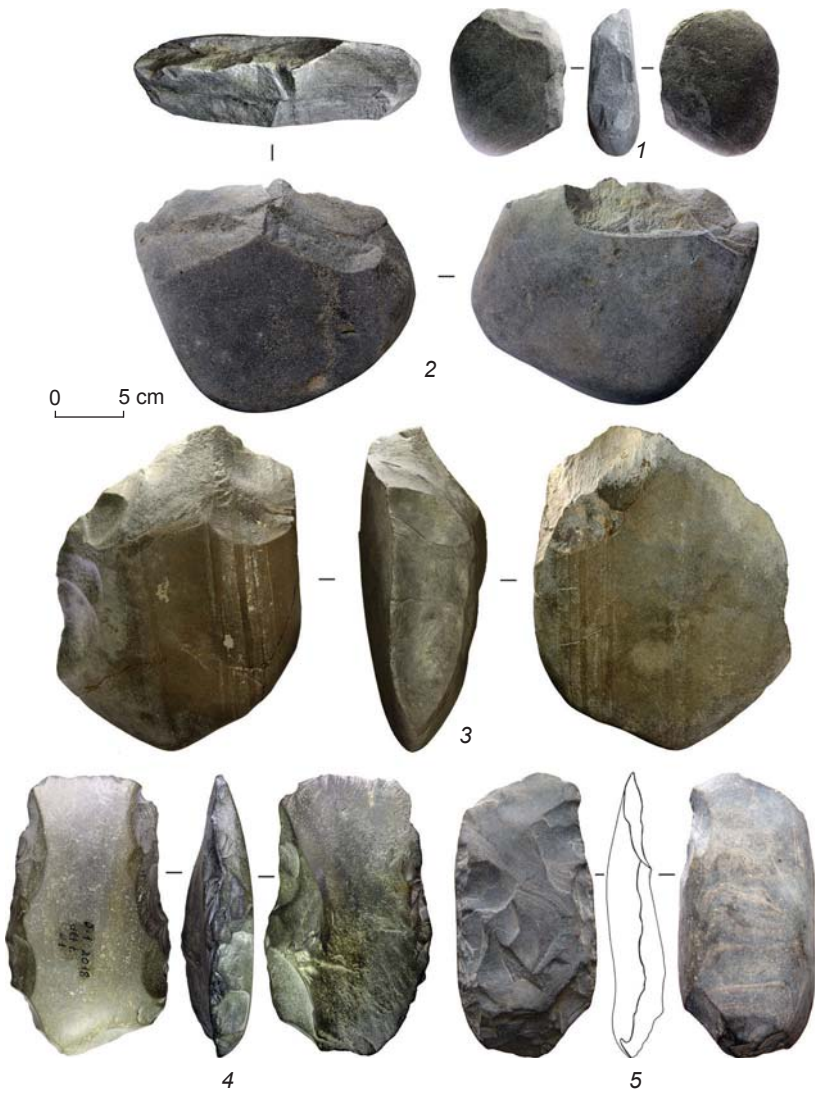

Fig. 6. Tools from Garaja.
1 – side-scraper on pebble; *2*, *3* – choppers; *4*, *5* – cleavers.

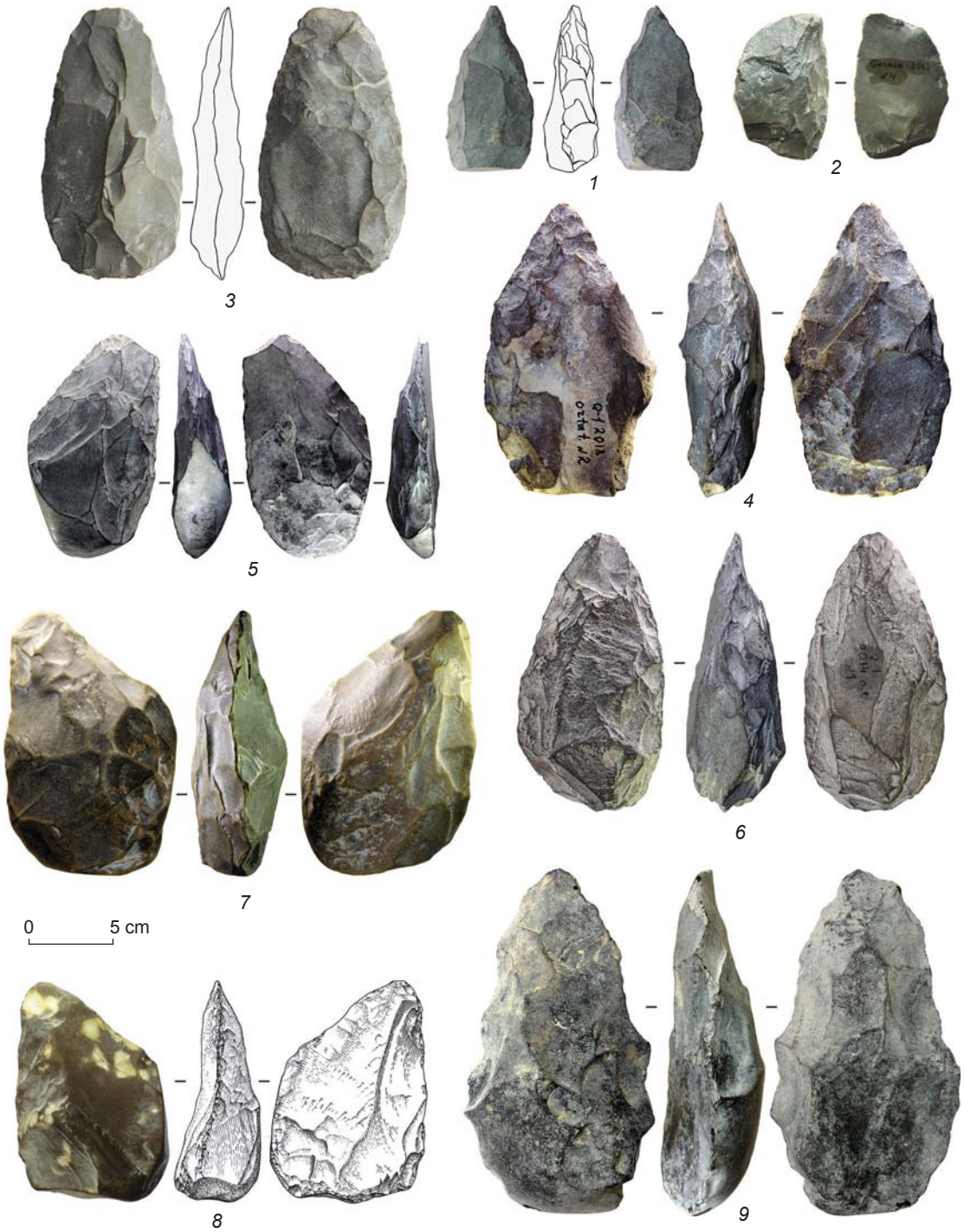

Fig. 7. Bifacial tools from Garaja.
1, *2*, *5–9* – handaxes (bifaces); *3* – limande; *4* – handaxe found *in situ*.

period determined by geological and paleontological data—to the Bakunian stage. The technocomplex has the following features. Primary reduction products are dominated by simple cores with parallel pattern of flaking; radial and "citron" flaking techniques were episodically implemented. Most tools were fashioned on pebbles or large primary flakes detached from them. Secondary treatment was accomplished by removing small or medium-sized flakes rather than by retouching. Large implements (handaxes, choppers, cleavers, and side-scrapers) prevail in the toolkit. Tools on flakes are scarce; they exhibit no traces of intense trimming. Large pieces predominate. It should be taken into account that 99 % of the artifacts were found lying exposed on the sand and

gravel beach, where large and robust tools have a much greater chance of being preserved and found. Solitary Levallois artifacts and a Quina scraper do not contradict the Early Paleolithic attribution of this assemblage either, since several Early Paleolithic sites with both large bifacial tools and those manufactured using the Levallois technique have been recently found in the East and South Caucasus (Darvagchay-Zaliv-4, Nor-Geghi-1) (Rybalko, Kandyba, 2021; Adler et al., 2014).

Discussion

First industries with bifaces (handaxes), which appeared in Africa approximately 1.8–1.5 Ma years ago, inaugurated the beginning of a long (over 1 Ma years) Acheulean period. Later on, the Acheulean spread to the Near East (~1.4–0.9 Ma years ago) and further to Eurasia (Derevianko, 2014: 173–177; Axe Age…, 2006; Semaw, Rogers, Stout, 2009). Some researchers distinguish Acheulean complexes proper and archaic assemblages with bifacial tools. According to this view, expansion of the Acheulean from the Near East to the east of Eurasia occurred not later than ~0.5 Ma years ago, and to the western part of the continent, including the Caucasus, ca 0.7–0.6 Ma years ago (Derevianko, 2014: 43–67). Supposedly, bifacial technique in those regions could appear much earlier. For instance, in the Caucasus it could exist ~1.4 Ma years ago, in India ~1.2 Ma years ago, in China ~1.6 Ma years ago, and on the Java ~1.2 Ma years ago (Shchelinskiy, 2021: 53–57; Larick et al., 2001; Paddayya et al., 2002; Zhou et al., 2004).

The analysis of lithic industries that existed in the South and East Caucasus during the Bakunian age reveals several sites that can be regarded as standard for reconstructing the evolution of final Early Paleolithic technologies in the region.

One of the best-known sites in the Caucasus, whose location is closest to Garaja (~150 km), is Azykh Cave in Azerbaijan. The cave contains strata with artifacts of the Acheulean type (layers VI and V), which, judging by paleontological and pollen data, can be attributed to the Middle Pleistocene (Guseinov, 2010: 185–188). ESR-date of 293 ± 23 ka years ago was obtained for the base of layer V. Culturally sterile sediments separate layers VI and V from layer III, containing younger archaeological materials (Azokh Cave…, 2016: 27–54).

In assemblage from layer VI (1890 artifacts), primary reduction is represented by several discoid (radial) and parallel single-faced cores. About a half of striking platforms are dihedral and facetted. Side-scrapers of various modifications, including convergent and angular forms, prevail in the toolkit. Denticulate-notched implements and atypical end-scrapers are numerous. Large tools on pebbles (choppers, cleavers, and bifaces) form 10 %. The assemblage also comprises several limaces and small points resembling Tayacian pieces (Guseinov, 2010: 189–196).

Lithic industry of layer V, which is thicker (~3 m) than the previous one, is less abundant (289 spec.). Primary reduction is represented by a few cores of the types similar to those found in layer VI; however, evidence of Levallois technique appears. Category of flakes includes target Levallois blanks; share of faceted striking platforms increases. Secondary treatment becomes more sophisticated; some blanks demonstrate basal thinning. Side-scrapers (mostly double-edged), choppers, and bifaces prevail in toolkit. Denticulate-notched implements are rare. Mousterian points, which are absent in other layers, occur along with singular point-like tools with trimmed bases (Ibid.: 197–202).

Owing to the Levallois technique employed, more sophisticated secondary treatment, and presence of specific Middle Paleolithic implements (Mousterian points, complex side-scrapers, etc.), the industry of layer V seems to be too advanced for the Early Paleolithic. Given the scarcity of artifacts and the stratigraphic position of the industry (the finds are scattered across the 3-meter-thick deposits), the material probably attests to multiple short-term occupation episodes by groups associated with various industries (Lyubin, 1998: 33–43).

In Armenia, assemblages from Dashtadem-3 and Nor-Geghi-1 are most informative among stratified Middle Pleistocene complexes. In Dashtadem-3 assemblage (~2500 spec.), single- and double-platform cores with parallel flaking prevail; radial and Levallois cores for points are also present. Bifaces (hadaxes), large beaked implements, and knives preponderate in toolkit. Side-scrapers, atypical end-scrapers, and notched pieces are inconsiderable in number. Levallois points are available. On the basis of geological and archaeological data, this assemblage can be attributed to the Late Acheulean, most probably, within the limits of the final Middle Pleistocene (Kolpakov, 2009).

According to a series of Ar/Ar-dates, the age of Nor-Geghi-1 artifacts is ~350–300 ka years ago. They are characterized by combination of parallel and Levallois flaking techniques. Levallois technique was applied in order to receive both flakes and elongate (including pointed) blanks. Flakes with facetted platforms form a fairly high percentage. Various side-scrapers, including déjeté and Quina, prevail in toolkit; bifaces varying in size and shape are also numerous (Adler et al., 2014).

In the Northeastern Caucasus, three stratified sites with representative industries of the Acheulean type are known. At Darvagchay-Zaliv-4 (South Dagestan), assemblages with bifaces were recorded in layers 5 and 3,

whose OSL-age is 370–330 and 250–220 ka years ago, respectively (Kurbanov, Rybalko, Yanina, 2021). These chronological assessments correlate well with geological and paleontological data. In the lithic industry of layer 5 (~300 spec.), primary reduction is characterized by the prevalent parallel flaking and episodic utilization of radial and "citron" techniques. Among tools, spur-like and notched implements are most numerous. There are many large pebble tools (picks, choppers, and handaxes). The assemblage also comprises simple side-scrapers, including a pebble variety, and atypical end-scrapers. Many tools are small in size, measuring 2–4 cm (Derevianko et al., 2012: 241–245; Rybalko, Kandyba, 2021).

In the industry of layer 3 (~1000 spec.), primary reduction is represented by parallel cores with one flaking surface. Radial cores are rare. The assemblage contains elements of Levallois technique (isolated cores for flakes and elongate blanks; Levallois flakes). Among tools, spur-like and notched implements predominate. If compared with the assemblage from layer 5, side-scrapers and atypical end-scrapers are more numerous, while large tools on pebbles are less common. The category of large tools on pebbles represented by the same types also includes core-like end-scrapers and numerous bifacial forms. Points occur. Some tools are small-sized (2–4 cm) (Derevianko et al., 2012: 238–241).

At Darvagchay-Zaliv-1 located nearby, artifacts of the Acheulean type (~600 spec.) were found in association with gravel and pebble sediments. Almost all cores are parallel with one flaking surface. Kombewa cores and Levallois nuclei for elongate blanks are represented by solitary specimens. Pieces of Levallois morphology occur. The composition of toolkit is similar to that discovered in layer 3 of Darvagchay-Zaliv-4 (Derevianko et al., 2012: 217–220; Derevianko, Rybalko, Kandyba, 2016).

A significant portion of Acheulean materials was found without a stratigraphic sequence in the East and South Caucasus: Satani-dar, Djraber, Chikiani, Lori Plateau, Lashe-Balta, and others (Lyubin, 1998: 136–155; Gasparyan et al., 2014). Large cutting tools of various kinds (bifaces, cleavers, picks, etc.) constitute the most typical and common element of these assemblages and serve as the main chronological marker.

Thus, the discussed Acheulean industries of that part of the Caucasus are characterized by great diversity of local variants. This opinion is shared by all experts on the Paleolithic of the region despite disagreement concerning the principles underlying the definition of those variants, their chronology, distribution areas, etc. (Lyubin, 1998: 168–175; Doronichev et al., 2007: 200–250; Derevianko, 2014: 43–67; Amirkhanov, 2016: 177–187).

Comparison of Garadja assemblage with materials from the mentioned sites revealed the following. Owing to the presence of implements such as handaxes, cleavers, and choppers, the predominance of pebble tools, absence of Levallois elements, and a rather archaic reduction technique ("citron" and simplest parallel cores, which are virtually unprepared), the Garaja industry appears to be earlier than those of other known final Bakunian sites in the Caucasus (0.4–0.3 Ma years ago). The complex is distinguished by the absolute dominance of large bifacial implements. Bifaces and similar pieces (51 spec.) form approximately 1/3 of the toolkit. This is the highest figure for the Early Paleolithic sites known in the Caucasus. In addition, Garaja bifacial tools demonstrate great variability in terms of shape, proportions, character of treatment, location of working edge, etc. Most probably, this was associated with several stages in occupation of the site by different groups and/or with specialization of bifacial implements (the shape and character of treatment were stipulated by their utilization function). It is noteworthy that similar variability of bifacial implements is observed in assemblages of the Darvagchay cluster of sites, where a wide spectrum of bifacial tools varying in age and location is present (Kharevich, Kolobova, Rybalko, 2022).

The Garaja assemblage, while generally falling within the variation limits of the Late Acheulean, reveals certain peculiarities caused by the fact that there were several occupation episodes during the final Bakunian. For instance, a great variety of bifacial implements is noted. These are represented both by large robust cutting tools with a pebble butt, and elaborate and thin pieces like Keilmesser and limande. Garaja assemblage contains at least two successive technocomplexes. The younger one comprises advanced forms of bifaces, together with implements made by Levallois technique and intensely retouched side-scrapers. Nearly contemporaneous collection from Darvagchay-Zaliv-4, demonstrating the evolution of handaxe technology (sophistication of techniques and standardization of shape), evidences the same processes (Ibid.). In contrast from Dagestan assemblages, Garaja industry does not abound in small notched and spur-like pieces. Given that small artifacts could get lost due to environmental or anthropogenic factors, these differences are not critical. The final resolution of this issue hinges on further studies at the site and a more accurate chronology.

Conclusions

After the discovery of Azykh Cave in 1960, there came a long hiatus in studies of the Early Paleolithic in Azerbaijan. For a long time, Azykh Cave reminded the only location in the Southeast Caucasus associated with the early

human occupation of this territory. Discovered in 2012, the site of Garaja provided an opportunity in studying the earliest history of the region at a new level. Despite the fact that archaeological materials were partially lost due to destruction of culture-bearing sediments, study of the site yielded important information about the Early Paleolithic and natural history of the region. Taking into account scarcity of open-air sites of this period in the Caucasus, representativeness of the archaeological assemblage, availability of paleontological materials, as well as the possibility to reliably correlate artifacts with lithological strata and to use absolute dating methods, it can be stated that Garaja, along with Azykh Cave, is the key site for understanding initial stages of peopling of both the South Caucasus and the western Caspian region as a whole. Evidence of primitive techniques of primary reduction and secondary treatment, a representative set of large tools, including the most numerous collection of handaxes in the region, testify to full conformity of Garaja assemblage to the industries of the first half of the Middle Pleistocene known in the Caucasus and adjoining regions. At the same time, certain elements of technocomplex, such as solitary Levallois cores, a Quina scraper, and advanced forms of bifaces, indicate the presence of two chronologically and technologically successive complexes within the general Late Acheulean industrial tradition.

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