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Gazma Cave—A Final Middle Paleolithic Site in Azerbaijan: Paleogeography, Chronology, Archaeology

This article describes the Middle Paleolithic industry of Gazma Cave in the Nakhchivan Autonomous Republic of Azerbaijan. We present data on the stratigraphy, paleontology, chronology, and archaeology of the site. Six lithological layers were identified, three of which (IV–VI) contain abundant archaeological material. The chronology of the site is based on a series of luminescence ages. The deposition of layers IV–VI formed ~55–40 ka BP. Paleontological, pollen, and grain size analysis offer the possibility of reconstructing Late Pleistocene environments around the cave. Faunal analysis indicates steppe, semi-steppe, and wooded mountains, with riparian forests and reeded areas in the floodlands. The analysis of 896 artifacts attests to the predominance of Levallois and parallel reduction. The share of Levallois blanks is high. The most common artifacts are Levallois and Mousterian points and side-scrapers; there are also limaces, knives, and a few indistinct Upper Paleolithic types such as end-scrapers and borers. Ventral basal trimming of points and ventral or dorsal thinning of side-scrapers were widely used. All the main indicators show the Gazma industry corresponds to the final Middle Paleolithic assemblages currently known in the Southeastern Caucasus.Gazma is an expressive MIS 3 example of the Taglar industry.

Keywords: *Azerbaijan, Middle Paleolithic, paleontology, palynology, OSL-dating, Levallois.*

Introduction

Currently, several hundred sites are known in the Caucasus, which preserve archaeological materials from the Middle Paleolithic. However, only a handful of these sites have artifacts found *in situ* that make it possible to provide more precise characteristics of the lithic industries, their chronology, and their progression (Lyubin, 1989; Dzhafarov, 1999; Golovanova, Doronichev, 2003; Lyubin, Belyaeva, 2006; Guseinov, 2010; Pinhasi et al., 2012; Stone Age…, 2014). Hence, all development schemes for the Middle Paleolithic of the Caucasus are based on collections from a small number of well-known sites, primarily located in the southern and northwestern regions and often associated with rock shelters. These sites have proven to be particularly informative in shaping our knowledge of this period in the Caucasus (Lyubin, 1989). In Azerbaijan, the most famous sites of this type are Azykh and Taglar caves (Dzhafarov, 1999; Guseinov, 2010). For a significant period of time, Paleolithic sites remained undiscovered in Nakhchivan. However, in 1983, the Gazma Cave site was finally unearthed there. Decades of research conducted within the cave have provided valuable insights into the cultural processes that took place during the final stages of the Middle Paleolithic in the region. The article is intended to present a comprehensive overview of the scientific knowledge pertaining to this subject of study.

Background

Gazma Cave is located in the Sharur District of the Nakhchivan Autonomous Republic (Azerbaijan), on the southwestern spurs of the Daralagez Ridge, 3 km southeast of the village of Tananam (Fig. 1). It is located on the left slope of a dry valley, in the basin of the Arpachay River, 30 m above the river level (1500 m above sea level) (Fig. 2, *1*).

The karst cavity is near a remnant of the Triassic limestone, and belongs to the caves of the corridor-grotto type, specifically of the branching subtype (Fig. 2, *2*). It extends along the NW-SE axis by 32 m, with a maximum width of up to 6 m. At 12 m from the drip line, it is divided into two narrow arms (Fig. 2, *3*). The total area of the cave is ca 60 m^2. The entrance faces the Gazma Gorge (northwest exposure) (Zeynalov, Veliev, Tagieva, 2010).

As an archaeological site, Gazma Cave was explored in 1987–1990 (under supervision of A.K. Dzhafarov and A.A. Zeynalov) and 2008–2011, 2013 (under supervision of A.A. Zeynalov). An area of ca 24 m^2 was unearthed at the site for the entire thickness of loose deposits (Fig. 2, *3*) (Zeynalov, 2013, 2016). In 2021, the Russian-Azerbaijani geoarchaeological expedition collected a sample core near the entrance of the cave for OSL-dating (Anoikin et al., 2021) (Fig. 3).

Fig. 1. Schematic map of the study area.

Stratigraphy

The sequence of deposits of the site, approximately 3 m thick, includes the following lithological units, listed from top to bottom (Zeynalov, 2016) (Fig. 3).

Layer I. Modern humus, dark gray, loose, pulverulent. Thickness 0.1–0.25 m. Contains single fragments of pottery, and bones.

Layer II. Light loam, light yellow, contains carbonaceous layers and lenses of greenish-gray sandy loam (up to 0.3 m). Thickness 0.2–0.6 m.

Layer III. Gray-yellow, dense sandy loam. Includes an insignificant amount of limestone fragments (crushed stone, rarely grus). Thickness 0.5–1.3 m. Contains abundant paleontological material.

Layer IV. Light loam, dark gray-yellow. Includes a large amount of small and medium crushed stone. Thickness 0.4–0.5 m. Contains abundant archaeological and paleontological material.

Layer V. Light, gray-brown, dense loam, with thin layers of greenish-gray silty material. Includes a large amount of small and medium crushed stone. Thickness 0.3–0.4 m. Contains abundant archaeological and paleontological material. Two fire pits were recorded in the layer (Ibid.: 77–78).

Layer VI. Medium, gray-brown, dense loam. Includes a large amount of fine and medium clastic material, the concentration of which decreases towards the bottom of the layer. Thickness 0.4–0.95 m. Contains abundant archaeological and paleontological material. A hearth with a stone lining and a fire pit were recorded in the layer (Ibid.: 78–79).

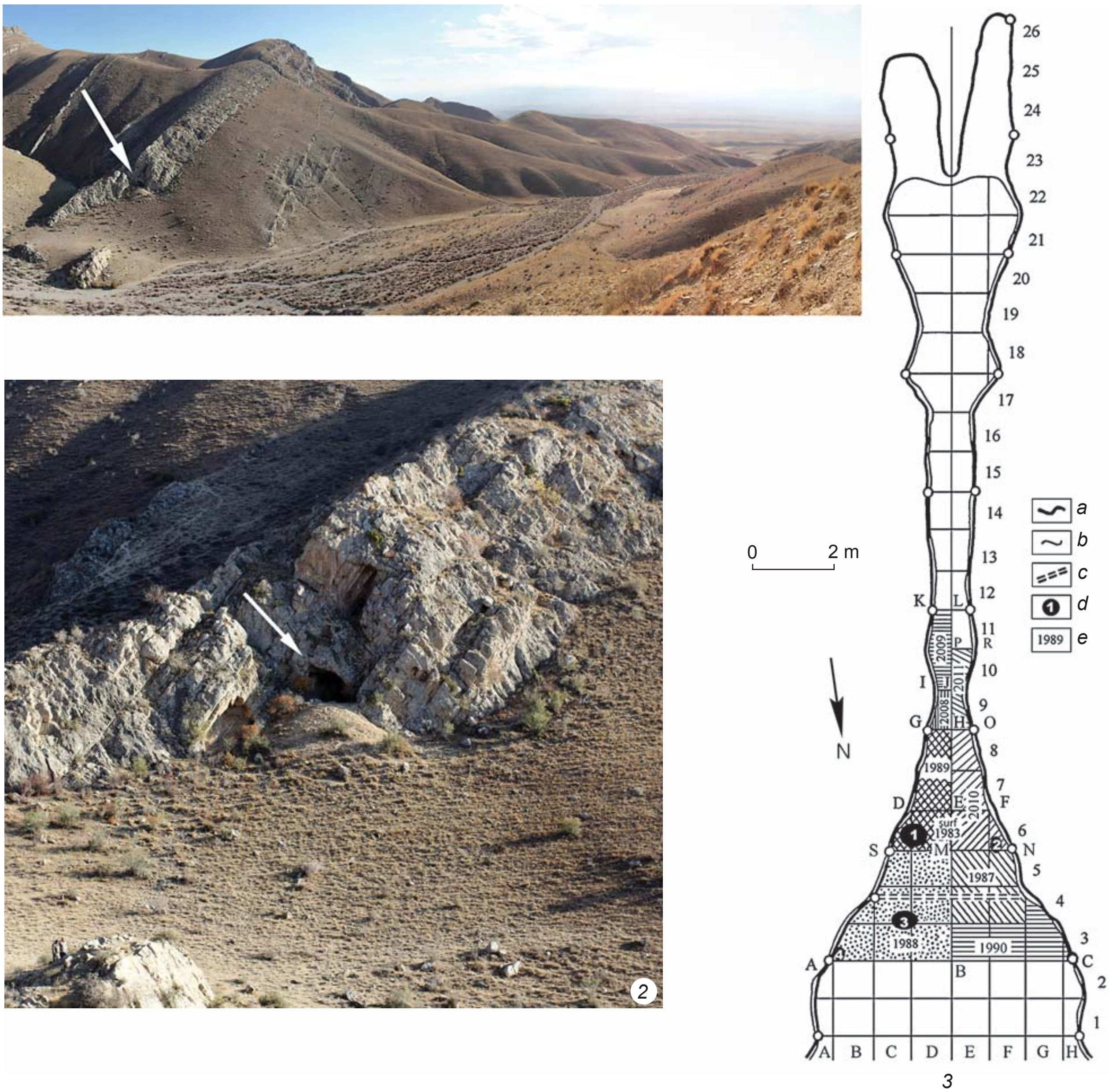

Fig. 2. Gazma Cave.
1 – Gazma Gorge and view of the Arpachay River valley from the north; *2* – view of Gazma Cave from the north; *3* – plan of Gazma Cave with indication of excavation areas.
a – boundary of the karst cavity; *b* – boundary of the karst cavity along the zero reference line; *c* – drip line; *d* – firepits and hearth; *e* – work areas by years.

Paleontological data

The faunal collection of the site includes about 22.5 thousand fragments of remains of mammals, birds, and amphibians (Zeynalov, Veliev, Tagieva, 2010; Zeynalov, 2016), with the vast majority (~90 %) occurring in layers IV–VI, containing abundant archaeological material.

These layers yielded many bones of Pleistocene horse (*Equus caballus L.*), gazelle (*Gazella subgutturosa Guld.*), red deer (*Cervus elaphus L.*), Pleistocene donkey (*Equus hidruntinus Reg.*), and bezoar goat (*Capra sf. Aegagrus*). There are also remains of primeval bull (*Bos primigenius Boj.*), bison/auroch (*Bison* sp.), wild boar (*Sus scrofa L.*), and wild ram (mouflon?) (*Ovis* sp.). The composition of the commercial species commonly found at the site is generally representative of Paleolithic sites in Transcaucasia. For example, the remains of the Pleistocene donkey and caballoid horse were found in the caves of Taglar, Dashsalakhly (Azerbaijan) and Yerevanskaya (Armenia). Some of them contained bones

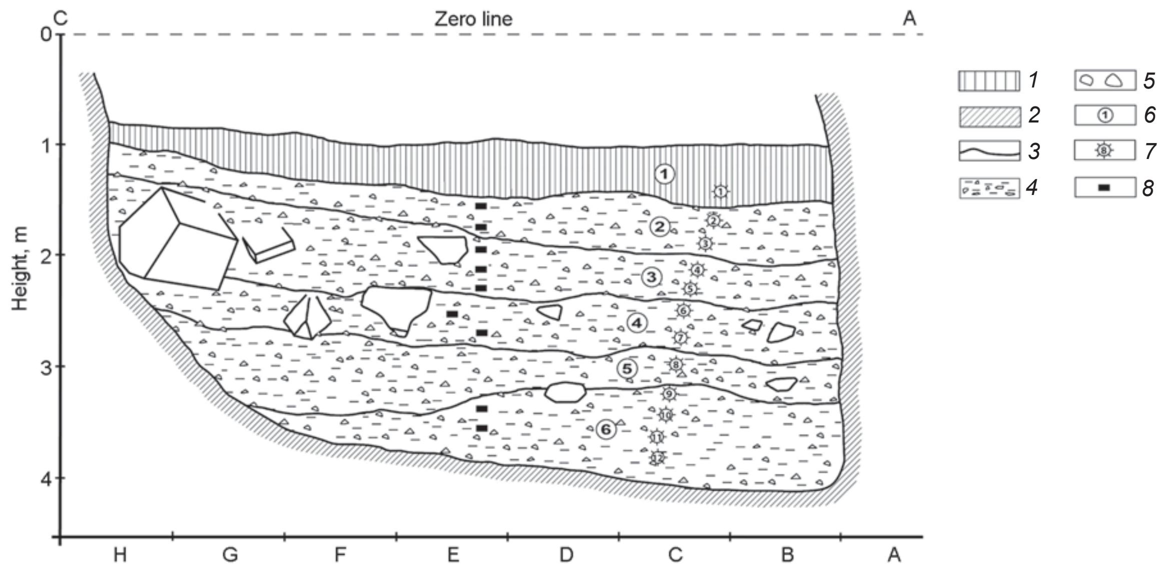

Fig. 3. Stratigraphic situation in Gazma Cave, northern wall of excavations of 1988 and 1990 (line A–C).
1 – layer of humus; *2* – cliff boundary; *3* – layer boundary; *4* – loam with crushed stone; *5* – large fragments of limestone; *6* – layer number; *7* – sampling site for pollen analysis; *8* – sampling site for OSL-dating.

of bezoar goats, mouflons, deer, and wild boars (Lyubin, 1989). Remains of predators, such as cave lion (*Felis spelaeus Goldf*.), steppe cat (*Felis libyca Schreber*), cave bear (*Spelaearctos spelaeus Ros.*), fox (*Vulpes vulpes L.*), and badger (*Meles meles L.*), are scarce in Gazma, and were recorded in some of the layers (Zeynalov, Veliev, Tagieva, 2010; Zeynalov, 2016). Certain bones exhibited gnawing marks, although the occurrence of such remains within the entire faunal collection is relatively low. The abundance of paleontological remains, especially those of medium and large ungulates, and the prevalence of tubular bone fragments and small fragments can be attributed to human hunting activities.

The species composition of the fauna indicates that in the Late Pleistocene, natural zones of steppes, semi-steppes, and wooded mountains coexisted in the cave area; and in the floodplains of the Arpachay and Araks rivers, there were riparian forests and reeded areas.

Pollen data

Detailed information on the Late Pleistocene paleogeographic settings in the area of the cave is provided by pollen analysis. The relevant material was taken from two sections: in the entrance zone of the cave (12 samples) (Fig. 3) and on the 40-meter terrace of the Arpachay River, a few kilometers away from the site (9 samples) (Zeynalov, Veliev, Tagieva, 2010). The samples yielded a limited amount of pollen, but oak (*Quercus*) and alder (*Alnus*) pollen were identified. Near the cave, the dominant pollen types among herbaceous plants were hazeweeds (*Chenopodiaceae*), grasses (*Poaceae*), and wormwoods (*Artemisia*). In the Arpachay valley, the spectra included Asteraceae (*Asteraceae*), heather (*Ericaceae*), grapes (*Vitis*), and juniper (*Juniperus*). Both forb and riverbank-water cenoses were present, with a higher prevalence of the latter and also of sedge species (Ibid.; Zeynalov, 2016).

The obtained data suggest the existence of sparse oak forests in the area of the cave in the Late Pleistocene, formed by frost- and drought-resistant oriental oak (*Quercus macranthera*). Light-colored oak forests with xerophilic herbs were combined with arid juniper open woodlands on rocky slopes. In addition, the general composition of the flora corresponds to more humid natural conditions than modern ones. The evidence of less arid environments is further supported by the results of a granulometric analysis of the composition of the Late Pleistocene cave deposits (Ibid.).

Chronology of the site

Initially, the chronology of the site was based on the correlation between the position of the cave and the level of river terraces in the Lesser Caucasus, within the framework of the Khvalynian transgression of the Caspian Sea (MIS 3–2). However, the Middle Paleolithic appearance of the lithic industry allows for the time frame of the site to be the Early Khvalynian stage (not earlier than the period corresponding to MIS 3). The radiocarbon date of 26,867 ± 143 BP (29,090 ± 165 cal BP (95.4 %, IntCal 20)), obtained from the combined collection of bones from layers IV–VI, did not go beyond the period corresponding to MIS 3 (Zeynalov, 2016); however, in the context of archaeological materials, it looked unreasonably young.

A series of samples were taken from the cave for OSL-dating in 2021. At present, three determinations have been obtained at the Nordic Laboratory for Luminescence Dating Riso (Denmark). Comparisons of dates for quartz and potassium feldspars showed their high correlation ($IKSL_{290}$/OSL ratio: 1.03 ± 0.04), which indicates the reliability of the final age determinations for quartz (Kurbanov et al., 2021). The time of layer VI formation at the initial stages of MIS 3 is determined by two dates: 53.6 ± 4.7 ka BP (No. 218208) and 51.7 ± 3.2 ka BP (No. 218209). Using a sample from the layer IV roof, a date of 41.9 ± 2.4 ka BP was obtained (No. 218205).Taking into account dating results, as well as data on the chronology of other Middle Paleolithic sites of the South Caucasus (Pinhasi et al., 2012; Stone Age…, 2014), it can be proposed that the rock shelter was actively used by prehistoric humans in the range of ca 55–40 ka BP.

Archaeological materials

The collection of artifacts from layers VI–IV includes 896 specimens: 385 spec. from layer VI, 362 spec. from layer V, and 139 spec. from layer IV. Ten items were found during the slide of the walls, without an exact binding to the layer. Finds from all the layers show similar use of mineral resources. The main raw material was obsidian (~89 %). Flint and chert were significantly more rare. The nearest modern sources of obsidian in bedrock outcrops are located in the upper reaches of the Arpachay River, on the Kelbajar volcanic highlands. The prehistoric inhabitants of the cave were probably finding it in the alluvium of the river, about 15 km from the rock shelter. Flint was sourced in the Devonian-Carboniferous deposits, with its outcrops available in the area of the cave (Zeynalov, 2016).

The stratified distribution of archaeological materials, categorized by primary reduction techniques and types of tools, indicates that all the artifacts belong to a single industry and can be regarded as components of the same complex (Tables 1, 2).

Primary reduction is characterized mainly by the parameters of flakes, since there are only 3 cores found, and they appear to be very exhausted. The industry exhibits several notable characteristics, such as an exceptionally low proportion of cores (0.3 %) and their extensive reduction, the absence of primary spalls, and the scarcity of items retaining pebble cortex. These distinctive features allow the following conclusions to be made:

1) the cores were shaped and used mainly outside the cave, possibly directly at the places of collection of raw materials;

2) most likely, ready-made tools or flake-blanks were brought to the site; the production process focused mainly on tools shaping and rejuvenation;

3) the cores brought to the site were used until the complete exhaustion, which was probably due to the remoteness of the sources of raw materials; in addition, they could have served as chisel-like tools.

An analysis of the flake industry shows that its main parameters change little over the layers. One of the most widespread and distinctive categories within the assemblage is that of Levallois flakes, consisting of a significant proportion of triangular-elongated specimens. These flakes are either completed target blanks or unsuccessful removals. In terms of morphology, numerous triangular flakes are close to them, having no signs of convergent dorsal scar pattern or fine rejuvenation of the striking surface. It can be assumed that the main purpose of the primary reduction was the manufacture of pointed spalls using the Levallois technology. Additionally, the utilization of the parallel flaking technique to acquire numerous elongated blanks has been observed. The dominance of Levallois reduction is indicated by the corresponding indices: average IL for all the layers is 29, and taking into account some of the technical spalls, possibly removed by the recurrent

Table 1. **Composition of the Gazma Cave lithic industry**

Layer	Cores		Blades		Flakes		Triangular flakes		Levallois flakes		Shatters, chunks, chips		Total		
													Spec.	incl. tools	
	Spec.	%	Spec.	%	Spec.	%	Spec.	%	Spec.	%	Spec.	%		Spec.	%
IV	–	–	20	14.4	39	28.1	12	8.6	24	17.3	44	31.7	139	41	29.5
V	2	0.6	44	12.2	57	15.7	32	8.8	62	17.1	165	45.6	362	100	27.6
VI	1	0.3	30	7.8	83	21.6	24	6.2	52	13.5	195	50.6	385	91	23.6
Total	3	0.3	94	10.6	179	20.2	68	7.7	138	15.6	404	45.6	886	232	26.2

Table 2. **Tool forms of the Gazma Cave lithic industry**

Tool type	Layer IV	Layer V	Layer VI	Total	
	Spec.	Spec.	Spec.	Spec.	%
Points:	12	26	31	69	29.7
Levallois	4	2	3	9	3.9
Levallois, with retouch	1	3	7	11	4.7
Mousterian	7	20	19	46	19.8
with retouch	–	10	2	13	5.2
Limaces	–	7	–	7	3.0
Side-scrapers:	8	17	12	37	15.9
longitudinal	2	8	8	18	7.8
double longitudinal	1	–	1	2	0.9
transverse	–	3	–	3	1.3
convergent	3	3	1	7	3.0
angular	2	3	2	7	3.0
End-scrapers	3	–	2	5	2.2
Borers	1	6	1	8	3.4
Knives	2	4	6	12	5.2
Chisel-like	1	3	3	7	3.0
Retouched flakes	9	13	16	38	16.4
Tool fragments	5	15	20	40	17.2
Total	41	100	91	232	100

method to obtain convergent blanks, is 38. IFlarge of striking surfaces of flakes (148 spec.) is 82, IFstrict is 68. Along with the faceted (including *chapeau de gendarme*) and dihedral striking surfaces, there are also the plain ones (17.6 %). Dorsal pattern of the flakes is radial, convergent, or subparallel; all presented in equal proportions. There are approximately 22 % of artifacts resembling blades in terms of proportions (Fig. 4, *12*). Length of about 95 % of flakes is less than 5 cm. The small size of most artifacts can also be explained by the remoteness of the sources of raw materials and/or the small size of raw pieces, by the production of flakes outside the rock shelter, and by intensive use of blanks (possibly with their repeated trimming/rejuvenation) *in situ*. In addition to retouch, which is nearly always dorsal, ventral thinning of blanks is widely used in the industry, mainly in the proximal part. The ventral thinning is observed in about 20 % of Mousterian points and side-scrapers (Fig. 4, *9*; 5, *4*). Sporadic employment of transverse truncation through fine flaking can also be identified.

The composition of the toolkit almost does not vary throughout the layers (Table 2). Its main categories are points (Levallois and Mousterian) and side-scrapers; they make up 75 % of the typologically expressed tools (see Fig. 4, *4*, *6*, *10*, *11*; 5, *1*, *5*, *9–11*; 6, *1–3*, *5*, *6*). Among side-scrapers, 2/5 of the items are convergent, including angular ones (see Fig. 4, *13*; 5, *2*; 6, *7*). Longitudinal varieties were in most cases made on elongated subrectangular blanks (see Fig. 4, *8*, *14*; 5, *3*, *6*, *8*). As noted above, these categories of tools are characterized by both ventral and dorsal thinning (see Fig. 6, *8*). Retouched knives and a few items of the Upper Paleolithic type, such as chisel-like tools, borers, and end-scrapers, were found in all the layers (see Fig. 4, *5*, *7*; 6, *4*). Chisel-like tools are of small size, single- and double-edged, with opposite blades (see Fig. 5, *7*). The borers have distinct shoulders, often symmetrical, and an elongated, carefully retouched point. End-scrapers are of different sizes, larger ones are lateral, small ones are with the signs of processing along the perimeter. An impressive type of tools, occurring in layer V only, are limaces; these are small, narrow, strongly elongated items, two-pointed, with intense modifying retouch along the perimeter (see Fig. 4, *1–3*).

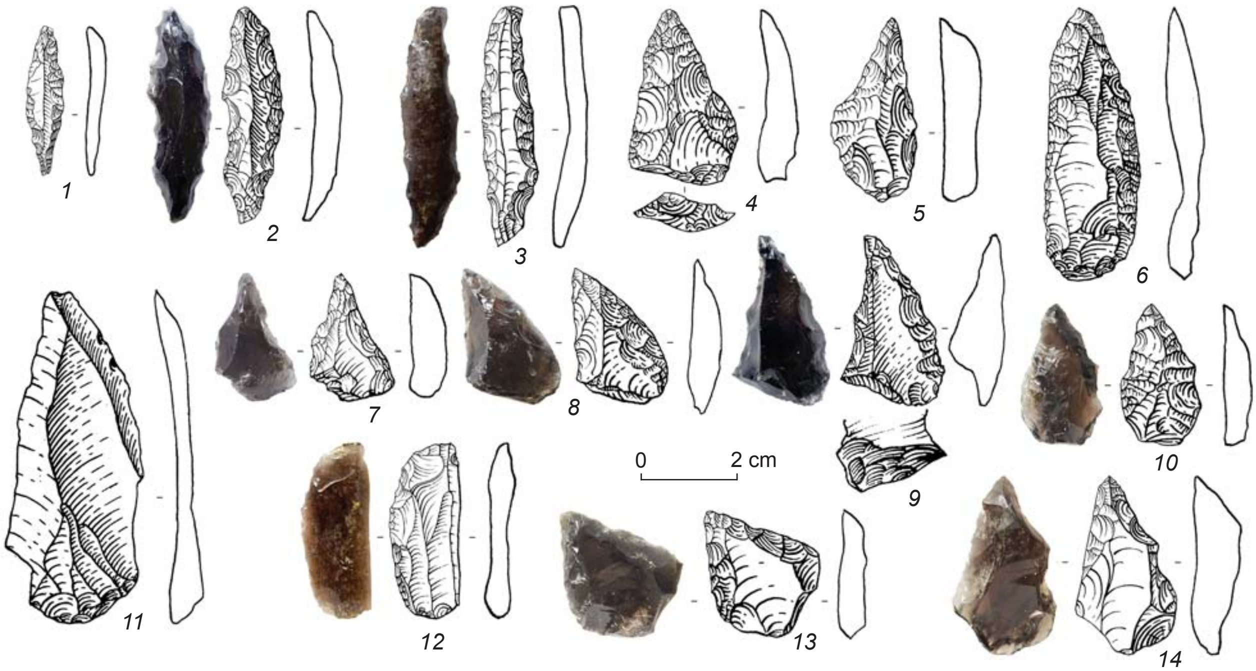

Fig. 4. Tools from Gazma Cave, layer V.
1–3 – limaces; *4*, *6*, *10* – Mousterian points; *5*, *7* – borers; *8*, *14* – longitudinal side-scrapers; *9* – Mousterian point with traces of basal trimming; *11* – Levallois point; *12* – retouched blade; *13* – angular side-scraper.

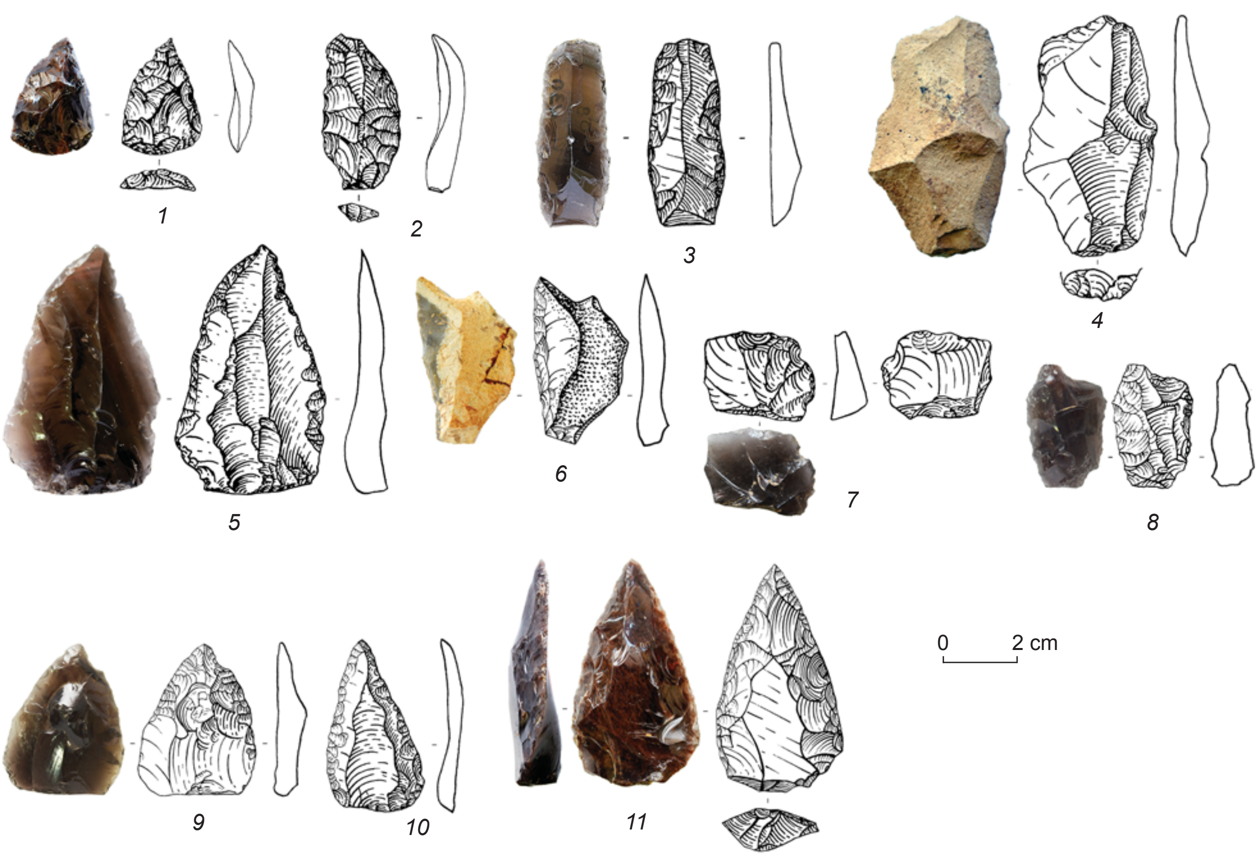

Fig. 5. Tools from Gazma Cave layers V (*6–11*) and VI (*1–5*).
1, *9*, *11* – Mousterian points; *2* – convergent side-scraper; *3* – double longitudinal side-scraper; *4* – flake with traces of trimming; *5*, *10* – retouched Levallois points; *6*, *8* – longitudinal side-scrapers; *7* – chisel-like tool.

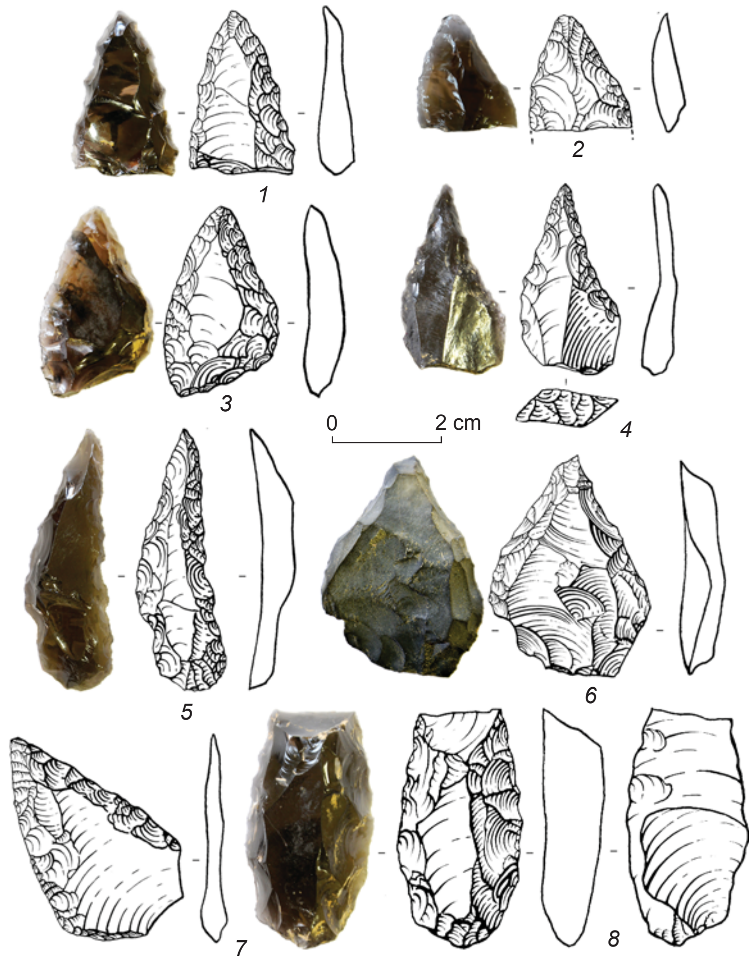

Fig. 6. Tools from Gazma Cave layer IV.
1–3, *5*, *6* – Mousterian points; *4* – borer; *7* – angular side-scraper; *8* – longitudinal side-scraper.

Discussion and findings

In the South Caucasus, the industries of the cave sites located in the eastern part of the Lesser Caucasus (Taglar, Dashsalakhly, Buzeir) are chronologically and spatially closest to the Gazma materials (Lyubin, 1989; Dzhafarov, 1999; Guseinov, 2010).

In Taglar, six layers with Middle Paleolithic industries have been identified, whose chronology, according to the set of biostratigraphic data, is determined by a range of about 70–35 ka BP (Late Khazarian to Early Khvalynian transgression). Flint, silicified schist, and less commonly obsidian were used as raw materials. Archaeological materials (5863 spec.) belong to the same industry. Cores are few, and they are mostly radial and parallel single-platform and single-faced. Layers 2 and 3 contain isolated subprismatic cores. IL is ~48, IFlarge is ~66, IFstrict is ~35. At the Taglar site, just as at Gazma, the primary reduction, aimed at obtaining pointed blanks, was based on the Levallois strategy, while that for the production of elongated subrectangular spalls, on parallel flaking (Dzhafarov, 1983, 1999).

Most tools are Levallois and Mousterian points, as well as side-scrapers (~90 % of the total number of tools). There are also end-scrapers, knives, denticulate-notched tools, and limaces. Burins and borers are single. The ventral thinning of points and side-scrapers was often used. The latter were sometimes thinned along the entire ventral face (“Taglar-type” side-scrapers) (Ibid.).

The materials from Dashsalakhly Cave (326 spec.) are also close to the described industries. Flint, silicified schist, and, more rarely, obsidian served as raw materials for the inhabitants of the site. The cores are mostly radial, but there are many Levallois flakes. IL is ~45, IFlarge is ~85, IFstrict is ~40. The tools are dominated by side-scrapers, Levallois and Mousterian points, including those with ventral thinning. There are also knives and denticulate-notched forms (Dzhafarov, 1999; Guseinov, 2010).

Sixty-one lithic artifacts have been recorded in the Pleistocene layers of Buzeir Cave. The raw materials are flint, chert, and obsidian. The cores are few; all of them are radial or severely exhausted. The tools are Levallois points and single-edged side-scrapers, including those with ventral thinning. One burin is also recorded (Dzhafarov, 1999).

In Armenia, the most representative complex of the Final Middle Paleolithic is the industry of the Yerevanskaya I Cave site (layers 1–4) (Yeritsyan, 1970; Stone Age…, 2014). For layers 3 and 4, a series of uncalibrated AMS-dates was obtained in the range of >49–32 ka BP (Stone Age…, 2014). The cores are Levallois (for points and flakes) and those with a parallel flaking pattern. There are Levallois flakes, including elongated ones, while there are only a few laminar blanks. IFlarge is ~35, IFstrict is ~20 (Yeritsyan, 1970). The tools are dominated by side-scrapers. There are many Levallois and Mousterian points, some knives and notches. Materials of the Upper Paleolithic types are scarce: chisel-like tools, end-scrapers, and burins (Yeritsyan, 1970; Stone Age…, 2014). Bifacially processed tools and limaces were identified. Specific types include points with rejuvenated bases (“Yerevan-type” points), truncated-faceted items, and side-scrapers with thinned body, i.e. artifacts with direct parallels in the contemporaneous industries of Azerbaijan (Yeritsyan, 1981; Lyubin, 1989; Dzhafarov, 1999; Liagre et al., 2006).

Materials from the main cultural layers of Lusakert I Cave (B, CI, CII, and D), according to a series of AMSand OSL-dates, have the age of ca 40–30 cal ka BP (Adler et al., 2012; Stone Age…, 2014). The collection, showing the predominance of Levallois flaking, contains many elongated Levallois spalls; IFlarge is ~50. Points (mostly Levallois) and side-scrapers dominate the toolkits; there are many denticulate-notched pieces and natural-backed knives. Artifacts of the Upper Paleolithic types are rare (chisel-like tools, inexpressive end-scrapers, burins). The widespread use of ventral thinning is recorded; there are points with basal trimming. Some finds can be considered truncated-faceted items (Yeritsyan, 1975; Liagre et al., 2006; Adler et al., 2012; Stone Age…, 2014).

The researchers also attribute lithic artifacts from layers 7 and 6 of the Kalavan-2 site to the Late Middle Paleolithic. For layer 7, a radiocarbon date of 37.7 ± ± 0.9 cal ka BP was obtained (Ghukasyan et al., 2010; Stone Age…, 2014). The primary reduction was dominated by the Levallois strategy, which produced both points and blades. Within layer 6, in addition to these artifacts, radial cores were also found. Among the tools, Levallois points, Mousterian points, and side-scrapers are the most abundant. Upper Paleolithic tools, on the other hand, are infrequent and inexpressive, comprising end-scrapers, chisel-like tools, and burins. While truncation techniques were employed, there are no artifacts displaying ventral thinning (Ghukasyan et al., 2010).

The Gazma collection is fully consistent with the industries of these sites in terms of primary reduction, toolkit composition, specific shaping of some types of products, as well as raw material preferences. For these complexes, a number of researchers proposed the designation "Taglar-type industry", which refers to the name of the most representative and well-studied site of the Final Middle Paleolithic of the region (Golovanova, Doronichev, 2003). Importantly, the experts, while analyzing the archaeological materials of this time from the territory of Azerbaijan and Armenia as a whole, note their proximity to the Zagros Mousterian complexes, which testify to the combination of Levallois and parallel reduction strategies and include radial/disk-shaped cores (Varvasi, Kunji caves, etc.) (Dzhafarov, 1983; Lyubin, 1989; The Paleolithic Prehistory…, 1993; Doronicheva et al., 2023). The toolkits of Iranian sites are also dominated by side-scrapers and points (Levallois and Mousterian; angular side-scrapers, etc.), often elongated; truncation of blanks is widely represented; the number of truncated-faceted pieces and tools with basal trimming is noticeable (The Paleolithic Prehistory…, 1993; Dibble, McPherron, 2007; Tsanova, 2013; Heydari-Guran et al., 2021; Doronicheva et al., 2023).

Conclusions

In Azerbaijan, the Middle Paleolithic industries appeared during the Late Khazarian period. The most ancient artifacts have been documented in the upper layers of Azykh Cave, their age corresponds to MIS 6 and 5 (Guseinov, 2010; Azokh Cave…, 2016). The subsequent stages of the Middle Paleolithic, particularly the final ones, are well represented by the materials from several stratified sites, also associated with rock grottoes (Taglar, Dashsalakhly, etc.), and have been studied in more detail. The lithic industry of Gazma, dating back to the first half of MIS 3, is a good example of a "Taglar-type" technocomplex (Golovanova, Doronichev, 2003). Determining the precise chronology of these materials remains one of the most challenging aspects of their study. Recently, a large series of ages have been obtained for the sites in Georgia and Armenia. However, for the Azerbaijan sites, there is only a small series of ESR ages (for the deposits of Azykh Cave) (Azokh Cave…, 2016). With this in mind, the new OSL ages for Gazma Cave should be considered key for the region, since they mark the upper boundary of the Middle Paleolithic in the eastern part of the South Caucasus.

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