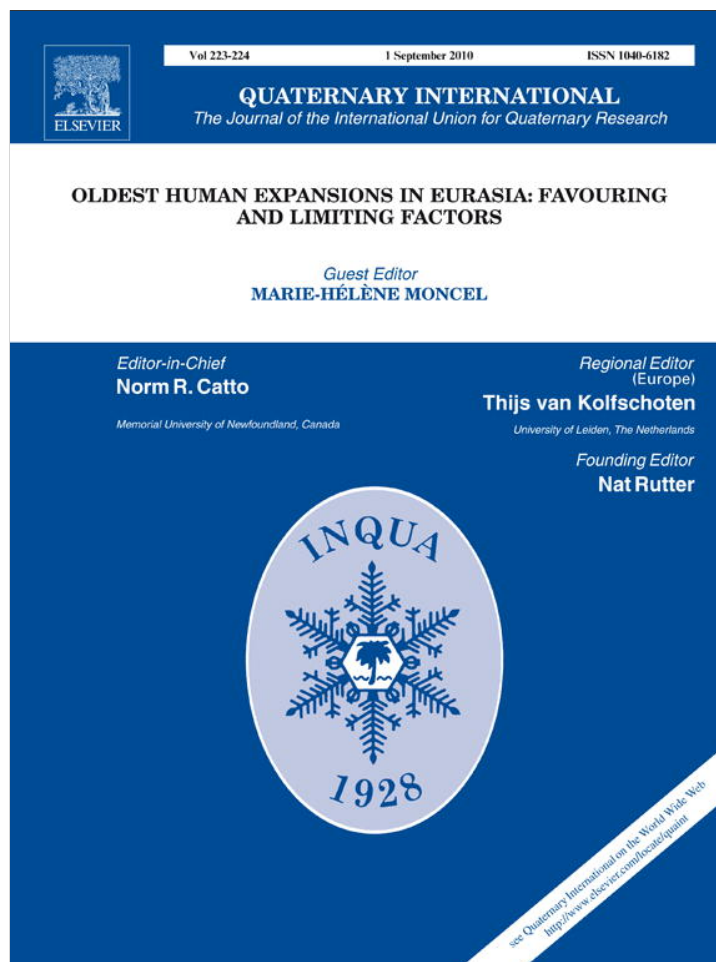


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Early Paleolithic of Korolevo site (Transcarpathia, Ukraine)

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ABSTRACT

The most ancient in situ Palaeolithic industries in Ukraine are known from the multi-layer Palaeolithic site of Korolevo in Transcarpathia, along the Tisza River. The Korolevo site was excavated from 1974 to the early 1990s. The Palaeolithic artefacts were related to a complex loess–palaeosol succession on top of a volcanic mount above the present-day alluvial plain. In the eastern sector (Beyvar), abundant lithic implements were collected in various excavation areas, but the loess–palaeosol succession was often limited or discontinuous.

In the northern sector (Gostry Verkh) the loess–palaeosol sequence reached a total thickness of 14 m, although the Palaeolithic assemblages were poorly documented. Huge Middle and Early Palaeolithic collections were mainly produced on local raw material (andesite). At Gostry Verkh, the reference stratigraphic sequence of Korolevo encompasses a complex succession of loamy units alternating with seven palaeosols. The Brunhes–Matuyama boundary was fixed at the base of palaeosol VII.

The 15 cultural–chronological complexes were further positioned within the pedosedimentary sequence, taking into account their inferred stratigraphic background as well as the degree of weathering of the lithics. The earliest assemblages were distributed respectively in the upper part of palaeosol VII (complex VI) and within the alluvial deposits prior to the Brunhes–Matuyama boundary (complexes VII and VIII).

A new section opened at Gostry Verkh has allowed a complementary reading of the sequence. In this way, the reproducibility of the main pedosedimentary units previously described could be tested, as well as the presence of reversed magnetisation. Palaeoclimatic analysis of the sequence has been improved by micromorphological analysis of the main pedological units. The new research also aimed at providing better control of the stratigraphic positioning of the cultural assemblages. Consequently, five Middle and Early Paleolithic assemblages were discarded, including complex VIII, as their situation regarding the local pedosedimentary context is poorly documented. At present in Korolevo, only levels VI and VII were determined to be Early Paleolithic.

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1. Introduction

Korolevo is a key Middle and Early Palaeolithic site in the Transcarpathian Ukraine. It is located along the Tisza River, near the junction of the Hungarian and Romanian borders with Ukraine, at the outlet of the river through the Carpathian foothills into the Puszta Plain open to the Danube (Fig. 1A). At the site, the Palaeolithic implements were related to a complex loess–palaeosol succession capping a high terrace system of the Tisza on top of a volcanic mount, 80–100 m above the present-day alluvial plain.

The Korolevo site was excavated from 1974 until the early 1990s by V.N. Gladilin and the team of the Archaeological Museum, Institute of Archaeology (Kiev), in two sectors situated at the eastern and

northern edge of a large quarry developed in the central part of the volcanic mount (Fig. 1B). This has resulted in a huge collection of Middle and Early Palaeolithic implements, mainly produced using local raw material (andesite), and unequally distributed at the site. In the eastern sector of Gostry Verkh, abundant lithic implements were collected in various excavation areas (Fig. 2), but the loess–palaeosol succession was often limited or discontinuous. On the contrary, in the northern sector of Gostry Verkh, the loess–palaeosol sequence reached a total thickness of 14 m, although the Palaeolithic assemblages were poorly documented.

2. Stratigraphic and archaeological background

2.1. The 1989 record

At Gostry Verkh, the reference stratigraphic sequence of Korolevo was established by O.M. Adamenko in the vicinity of excavation areas

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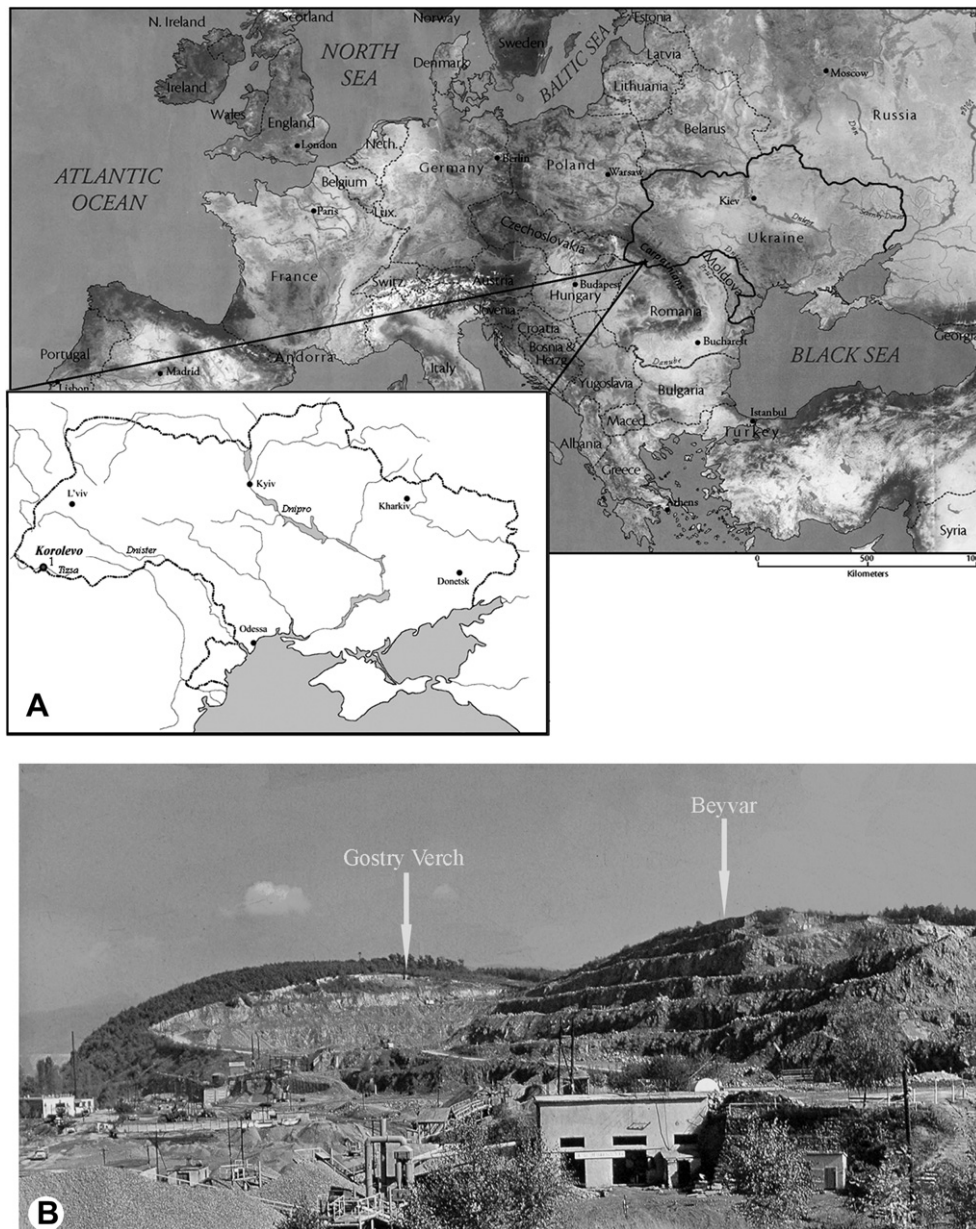


Fig. 1. A – Map of Europe and Ukraine. 1 – Korolevo site; B – common view of Korolevo I site.

18 and 16 (Adamenko and Gladilin, 1989; Gladilin, 1989a,b). It encompasses a complex succession of loamy units alternating with seven palaeosols (Fig. 3), often duplicated (palaeosols III–IX in the regional system), ranging from brown boreal soil to leached forest soil, palaeosols IV and VI being the best developed. Regarding the palaeomagnetic data, the Brunhes–Matuyama boundary was fixed at the base of palaeosol VII, whereas pollen data analyzed by G.A. Pachkevitch and G.M. Levkovskaya (Adamenko et al., 1989) permitted a consistent chronostratigraphic distribution of the pedosedimentary units through the Late and Middle Pleistocene.

The entire set of lithic implements recovered at Korolevo has been ascribed to 15 cultural assemblages (Gladilin, 1989a,b). These assemblages were further positioned within the pedosedimentary sequence established at Gostry Verkh, taking into account their inferred stratigraphic background as well as the degree of weathering of the lithics (Gladilin and Sitlivy, 1990a). The main Middle Palaeolithic assemblages were distributed above and within the Riss/Würm palaeosol (assemblages II–IVa), as well as on top and

within the Riss 2/3 and Riss 2/1 palaeosols (assemblages V–Vb). The Early Palaeolithic assemblages were distributed respectively in the lower part of palaeosol VI (assemblage V, in the upper part of palaeosol VII (assemblage VI) and within the alluvial deposits below the Brunhes–Matuyama boundary (assemblages VII and VIII).

2.2. The 1997–1998 record

In the late 1990s, in the framework of an INTAS research programme in co-operation with Belgian and French teams, a new section was opened at Gostry Verkh, close to excavation area 18, allowing a complementary reading of the sequence (Haesaerts and Koulakovska, 2006). The reproducibility of the main pedosedimentary units described by Adamenko was tested, including the reversed magnetisation of the lower part of the section (base of unit 21 and top of unit 23). As well, the palaeoclimatic diagnosis of the Korolevo sequence was improved by micromorphological analysis

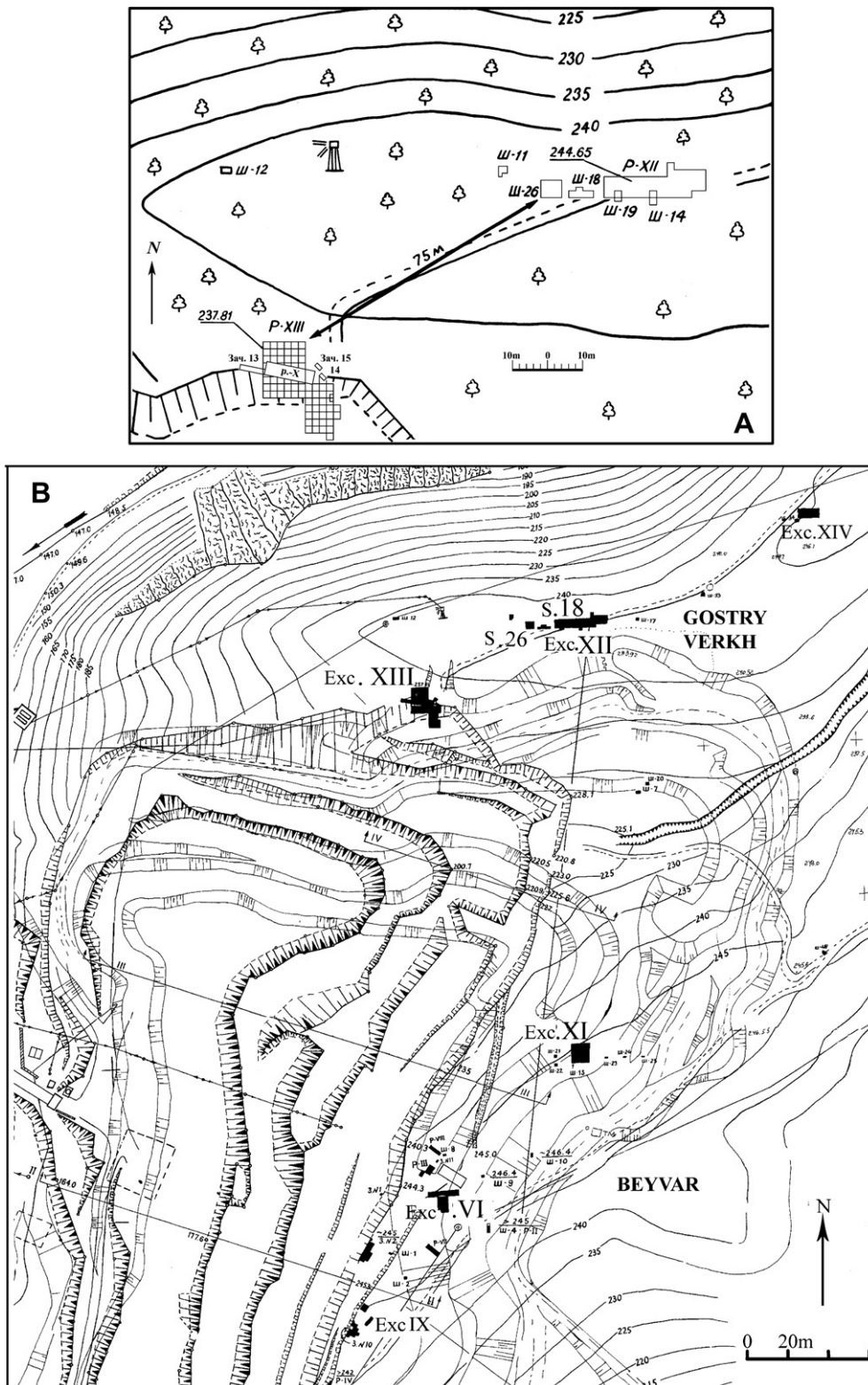


Fig. 2. A – Plan of Gostry Verkh location; B – common plan of Korolevo I site.

of the main pedological units, allowing establishment of a correlation scheme on the scale of Central Europe (Fig. 3, right).

The new investigation of the Gostry Verkh section also aimed at a better control of the stratigraphic positioning of the cultural assemblages established by Gladiline, mainly concerning the lithic concentrations of the Beyvar sector. From the detailed stratigraphies

recorded from 1974 to 1990 for all excavation areas of this sector, five cultural assemblages were discarded, as their situations in the local pedosedimentary context were poorly documented. Middle Palaeolithic assemblages IV, IVa and Vb, as well as Early Palaeolithic assemblages Vc and VIII (Haesaerts and Koulakovska, 2006, p. 28), therefore, are not considered here.

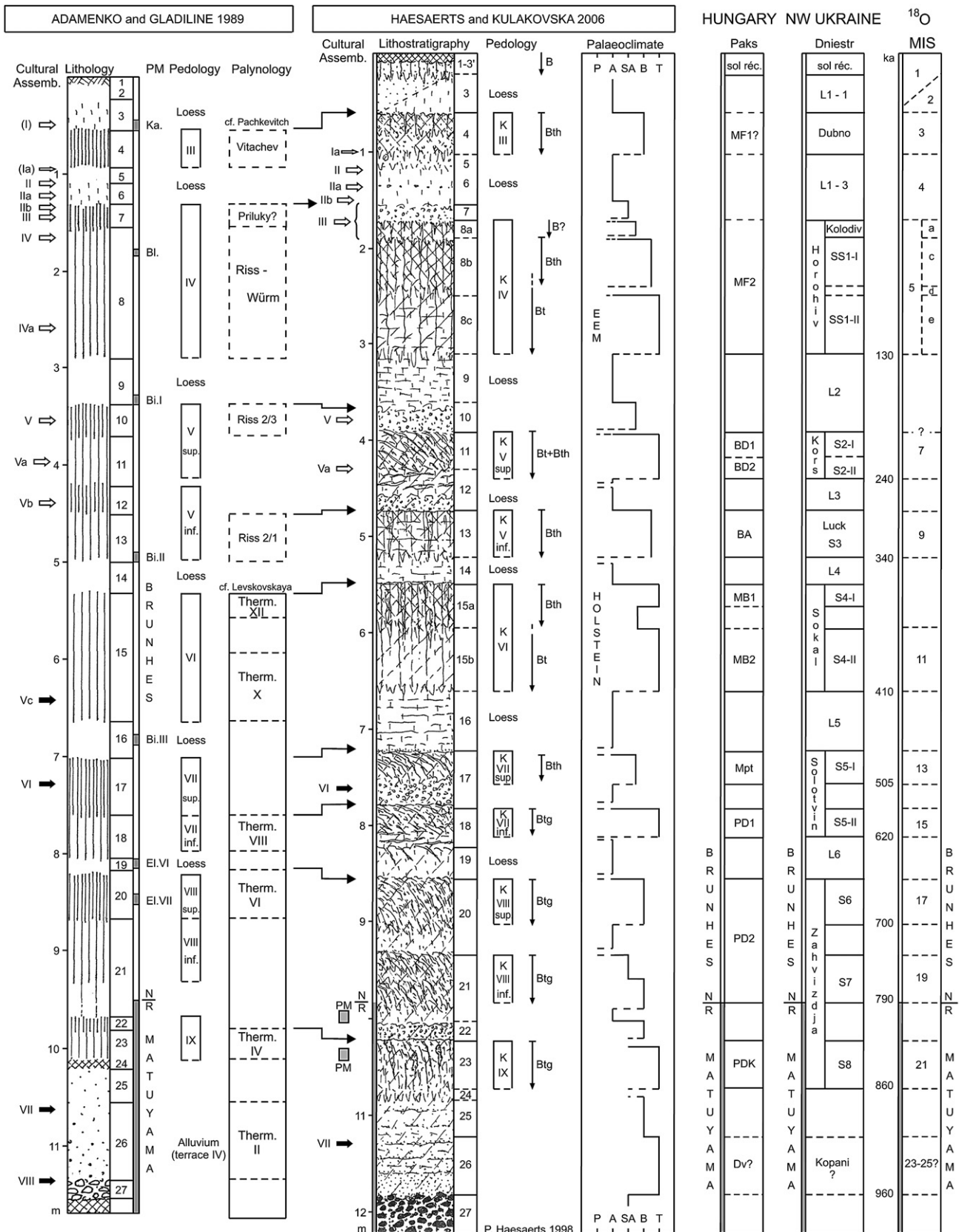


Fig. 3. The integrated loess-paleosol sequence of Korolevo, compared to the loess sequences of Hungary (Pécsi, 1985) and NW Ukraine (Bogutski and Lanczont, 2002), and with the marine isotopic stages of ODP Site 677 (Shackleton et al., 1990). Graphic symbols (cultural assemblages); small white arrow: Early Upper Palaeolithic; large white arrow: Middle Palaeolithic; black arrow: Early Palaeolithic. Abbreviations (Palaeoclimate): P, periglacial; A, arctic; SA, subarctic; B, boreal; T, tempered.

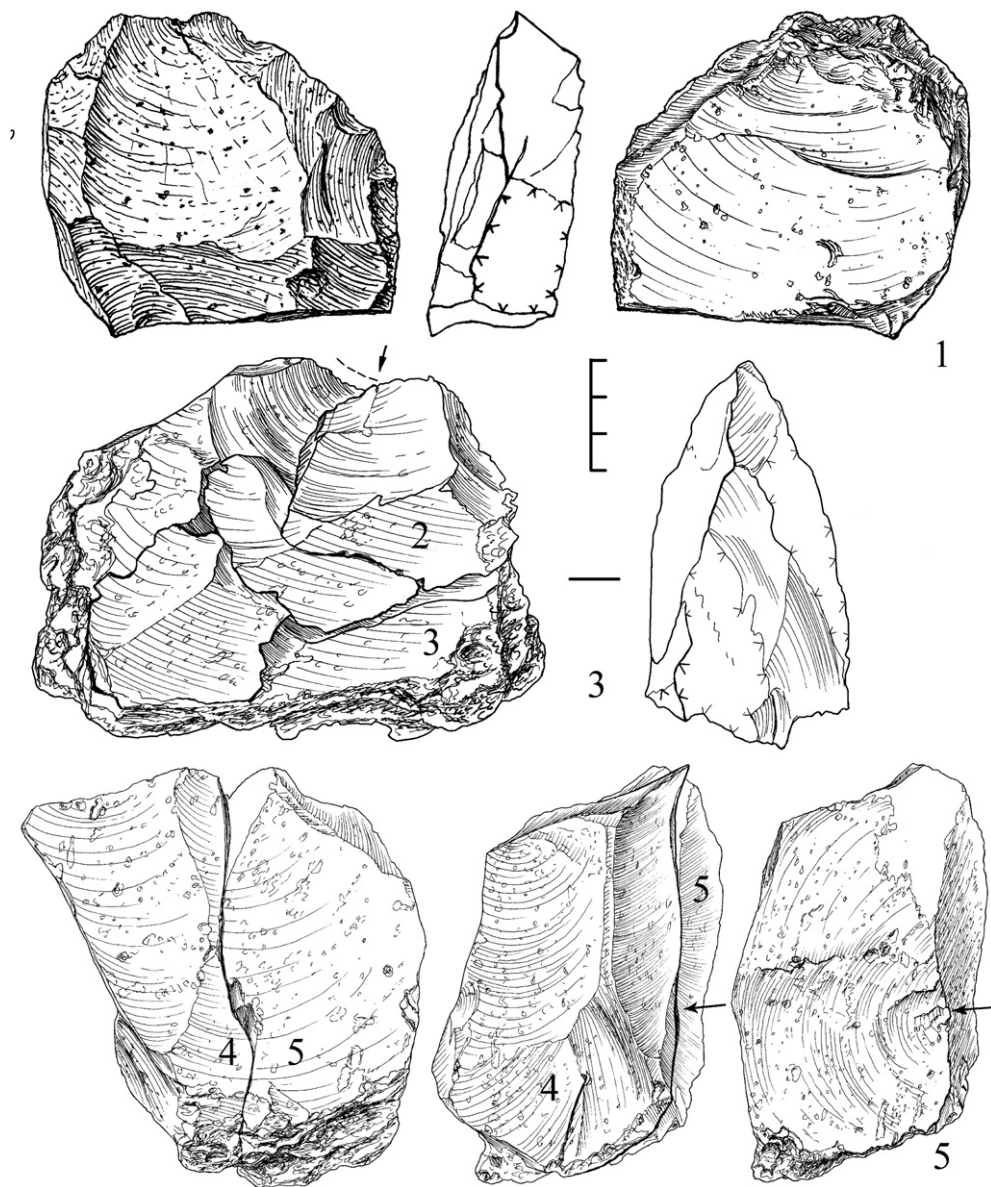


Fig. 4. Korolevo, excavation area IX, level VI. Cores (andesite).

Korolevo levels VI and VII were determined to be Early Paleolithic. The status of level VIII will be discussed below.

3. Korolevo, level VI

In the Beyvar area, rich collections of level VI material were found more or less *in situ* in excavation areas IX and XI (Fig. 2B). In the Gostry Verkh area, level VI was recovered *in situ* from two separate sondages, 18 and 26, and in excavation area XIII (Fig. 2A). Haesaerts observed an artifact from level VI in precise stratigraphic position within a geological profile made during the 1998 season (Haesaerts and Koulakovska, 2006). The stratigraphic position of level VI artifacts has consistently been noted at the top of paleosol VII (inter-Mindel; lithological layer 17) – OIS 14 (Fig. 3).

3.1. Archeological collection

The investigation of the main features of level VI is based on the collection (more than 5000 artifacts) from excavation area IX (Beyvar location) (Fig. 2B). More than 95% of artifacts are made from

local volcanic andesite. Quartzite, sandstone, jasper, slate, and quartz raw materials are not numerous. The andesite artifacts have grayish-blue dense patina and numerous deep cells of leaching on the surface.

In general, the authors accept Gladiline's opinion that the andesite surface condition of level VI is different from the andesite of other levels of the Korolevo site (Gladilin and Sitlivy, 1990a). The degree of leaching of the surface of andesite artifacts of other archaeological levels of Korolevo is different as well. The common andesite time scale created by Gladilin on the base of Korolevo archeological and raw material sequence was used for separation of "cultural-chronological complexes" (Gladilin and Sitlivy, 1990a). This chronological method is based mainly on visual exterior features. These features were used to isolate some artifacts from the collection, allowing recognition of artifacts from the different excavation areas, sondages, profiles, and from the surface.

In the publications about Korolevo, the term "cultural level" (Kulakovskaya, 1999, 2003, 2009) refers to lithic collections that were found *in situ* in separate excavation areas. Analysis of this lithic material correlates the stratigraphic position of cultural levels

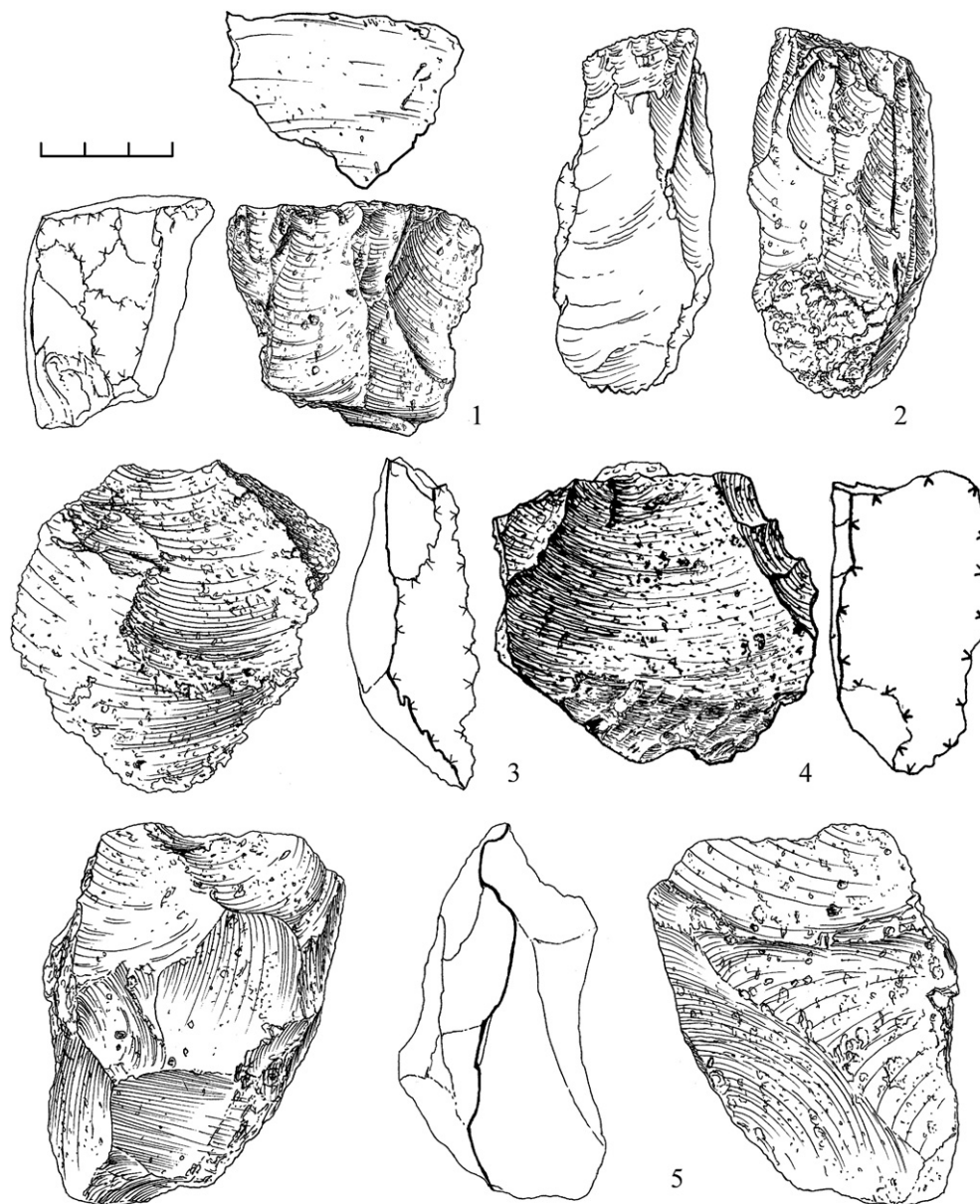


Fig. 5. Korolevo, excavation area IX, level VI. Cores (andesite).

between excavation areas, and considers typological analysis between these levels. These analyses lead to the conclusion that the different collections should be considered as one industry (Usik, 2006, 2009).

In the collection of level VI from excavation area IX, the andesite by its chemical structure and appearance is not uniform as for other collections (Kulakovskaya, 1999, 2003, 2009; Usik, 2006, 2009). Nevertheless, from the point of reduction strategy and typology, this collection looks homogeneous. Additionally, cores and tools made using different raw materials are morphologically identical.

3.2. Core reduction strategies of level VI

Interpretation of the largest part of the collection of level VI, represented by andesite nodules and blocks without clear traces of intentional reduction by hammering, is difficult. By-products of this reduction, in the form of chunks and flake-like items without clear traces of hammer utilization, also pose difficulties for determination.

These artifacts were related to “non-core processing (the technique of breaking and shattering)” ... “these artifacts are more probably the product of extremely primitive technique of stone working-shattering and breaking the initial concretions without any system” (Gladilin and Sitlivy, 1987, 1990b).

Here, these reduced andesite items are termed ‘chunk-cores’. The products of reduction are termed ‘chunk-flakes’, which in contrast to other chunks have dorsal and ventral surfaces, but have no determined striking platform and point of percussion (see Fig. 11:1,2).

Possibly, these artifacts are the result of use of stone anvils or the result of fire influence. However, traces of the bipolar technique were not observed. There are traces on cores when the blow went very far from the edge (Fig. 4:4,5). Prominent cones on some flakes indicate excessively hard blows. In some cases, the angle between platform and working surface of cores and flakes is less than 90°. Together, these factors could influence the appearance at least some part of the fragments, chunk-cores and chunk-flakes.

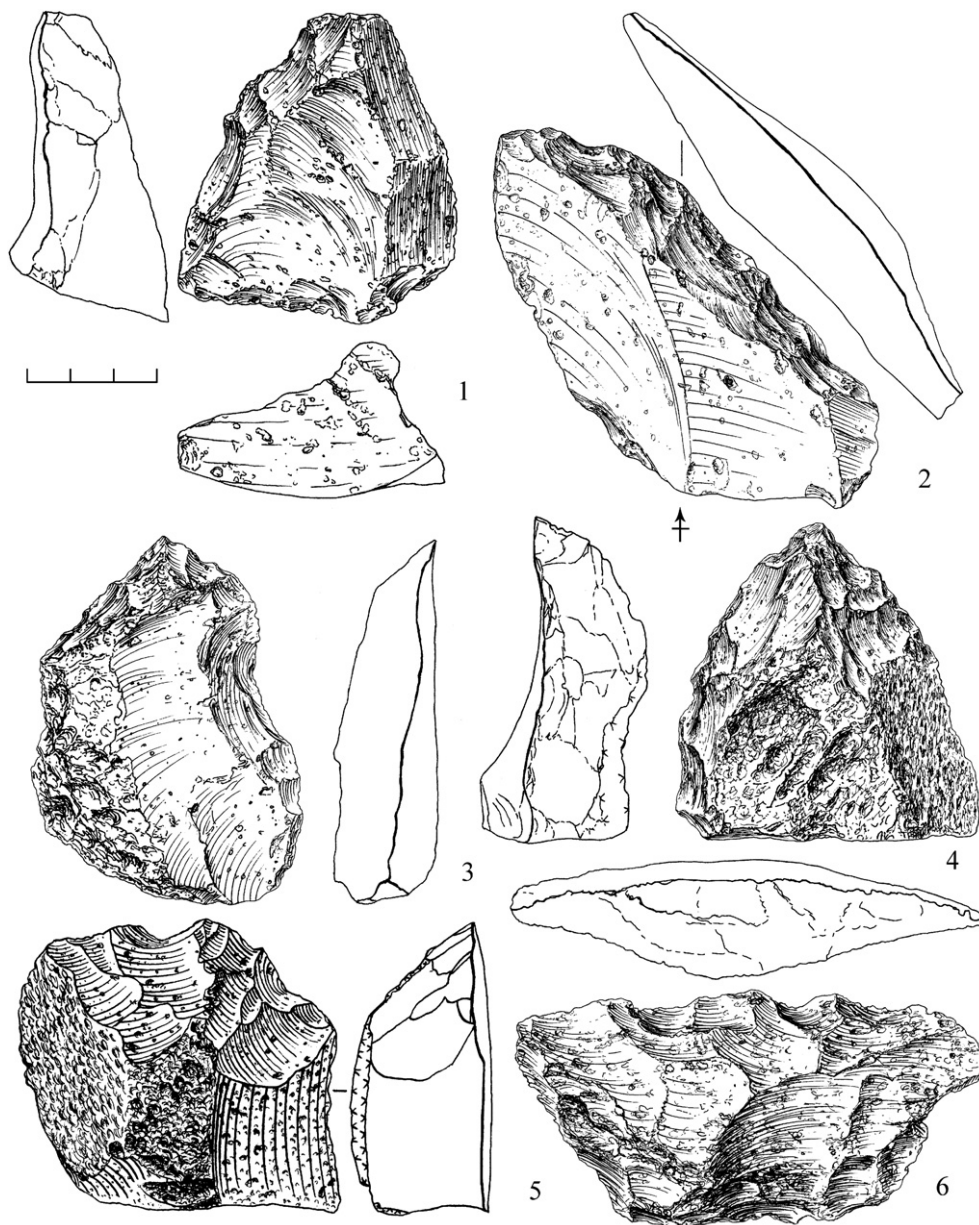


Fig. 6. Korolevo, excavation area IX, level VI. Tools (andesite).

Numerous fragments, chunk-cores and chunk-flakes are a feature of the industry. Experimental investigation is necessary for final clarification of the determination of the reduction process or the nature of origin of chunk-flakes and chunk-cores.

From the level VI collection, more than 150 cores were analyzed. The main group of cores demonstrates a simple unidirectional system of reduction. These are single platform cores with one unidirectional negative on the working surface (Figs. 4:3 and 5:4). In other cases, this results from some consequent removals in one modal direction but which are not parallel. Additionally, there are some double and multiplatform cores with the same style of unidirectional reduction. Numerous flakes with one flat negative on the surface are strongly connected with this system.

The second group of cores is represented by single, rare double and multiplatform cores with parallel scar patterns. Unidirectional parallel cores with flat short working surface predominate. There are a few samples with bidirectional and orthogonal parallel scars. Flat rectangle examples are most frequent. Some semi-pyramidal,

semi-cylindrical and pyramidal cores are present in the collection (Fig. 5:1,2).

A small set of cores represents mixtures of simple unidirectional and parallel scar patterns. In one case the core has one working surface with radial reduction and another unidirectional one (Fig. 4:1). A small number of radial (centripetal) cores demonstrates the exploitation of flat working surfaces (Fig. 5:5). Kombewa cores with one negative mainly on the ventral surface are not numerous (Fig. 5:3). In the collection, there are undetermined cores and core fragments.

Core platforms are mostly cortical or flat. A hard hammer was used for the core reduction. The technology of blank production demonstrates a simple way of reduction of local surface or local surfaces of the cores. There are no traces of Levallois or proto-Levallois reduction strategies or traces of technology of formation of convexity of the working surface for the Levallois end-product, as mentioned for complex VI (Gladilin and Sitliviy, 1990b). A few cores from level VI typologically resemble Levallois (Figs. 4:1 and 5:4), but no features characteristic of Levallois reduction strategy were

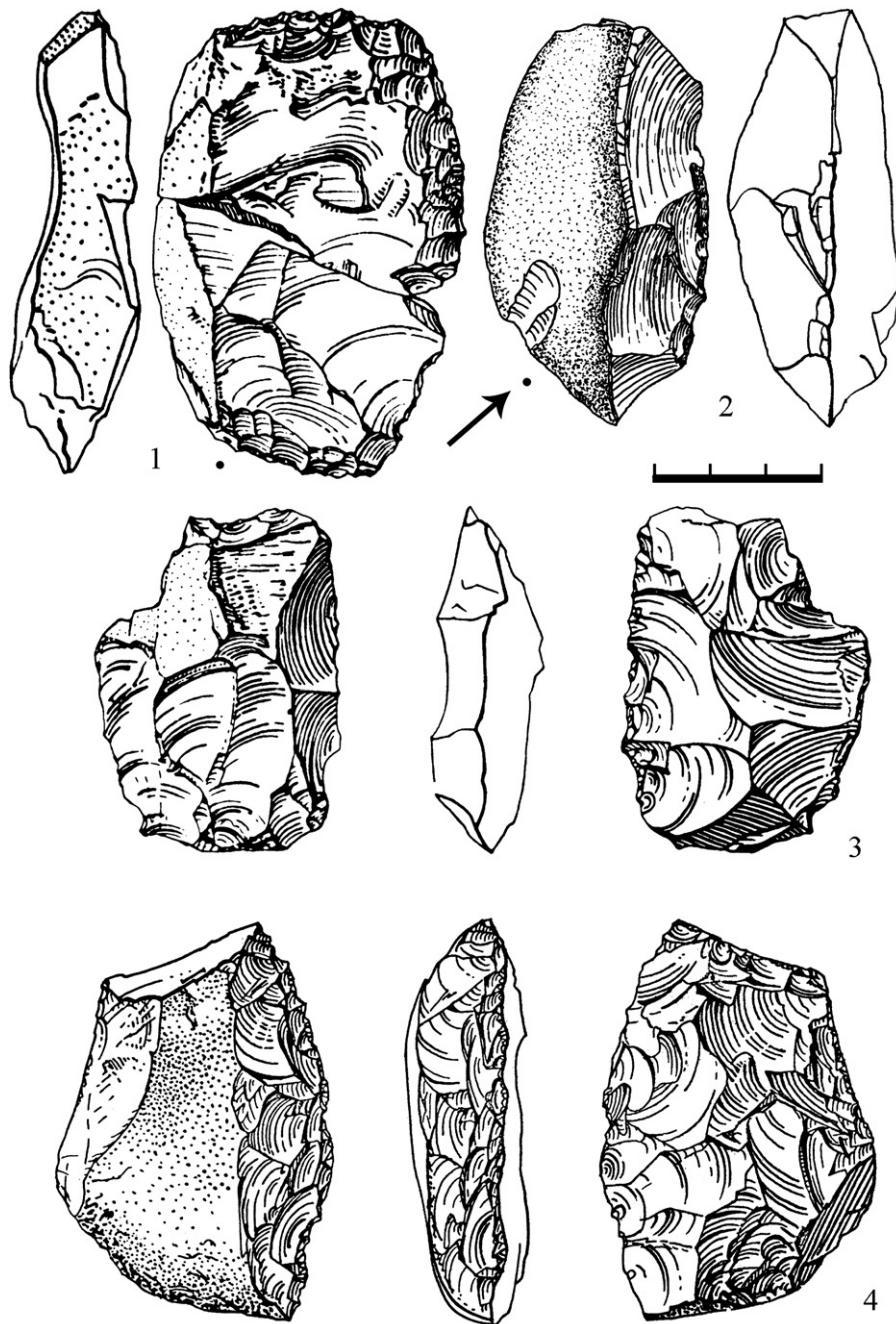


Fig. 7. Korolevo, excavation area IX, level VI. Tools. 1 – sandstone; 2 – slate; 3, 4 – jasper?

found. Simple radial cores with flat working on the definite stage of reduction could be similar to classical tortoise Levallois ones.

3.3. Typology of level VI

From the collection of level VI, 85 tools were analyzed. In the typology of level VI, side-scrapers are predominant. The largest fraction of side-scrapers is represented by longitudinal (Figs. 6:1, 7:1 and 8:2), diagonal (Figs. 6:2 and 7:2) and transversal convex samples. Convergent (Fig. 6:3,4) and double samples are rare. Dejetes samples are absent.

In the formation of tool edges, scaled retouch was mainly used. The working side of some tools was high and formed frequently by stepped retouch, resembling Quina or semi-Quina retouch. This kind of retouch was found on andesite and non-andesite tools (Figs. 6:3,4 and 8:2,3).

There are tools with high working sides created by wide crude facets. Taking into account the presence of side-scrapers with high stepped retouch, it is possible to classify marked tools as semi-finished, left on the primary stage of the working edge formation. Definite standardization of these side-scrapers, with either surface-tool or crude surface retouch (Figs. 6:1 and 7:2), was noted.

The second group is represented by tools with denticulate working edges created by wide facets (Fig. 6:5,6). In some cases, wide facets are associated with small facets. Some denticulate side-scrapers show stages of working edge rejuvenation when the process was not complete. Some notched tools are present. Choppers and cutting tools on flakes are represented by single items.

The industry of level VI can be defined as an industry with predominant unifacial tools. However, in the tool kit there are bifacial

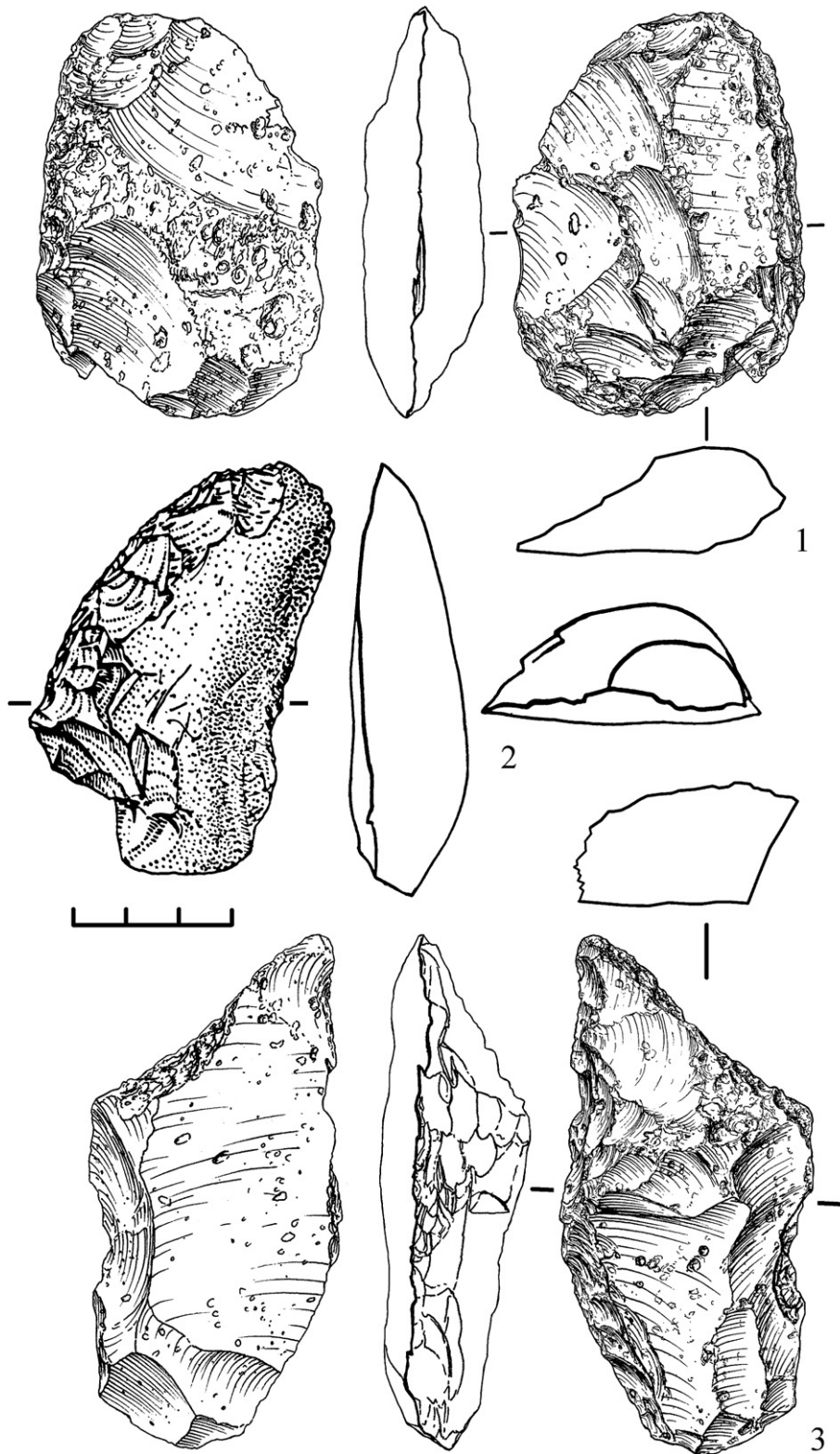


Fig. 8. Korolevo, excavation area IX, level VI. Tools. 1, 3 – andesite; 2 – sandstone.

items. One is a plane-convex sidescraper made from a primary jasper flake (Fig. 7:4). The high dorsal side was formed by stepped retouch. The flat ventral side was thinned by wide scars. The edge opposed to the working edge has additional bluntness. The terminal edge of the tool has flat ventral thinning with flat burin-like spells. This tool,

unique in the collection, is more typical for Micoquen industries and similar to the so-called Prondnik knife (*Keilmesser*). The stepped retouch of this tool is very characteristic for level VI.

Two samples made from slate and jasper raw material can be determined as pre-forms of bifacial tools (Fig. 7:3). These have

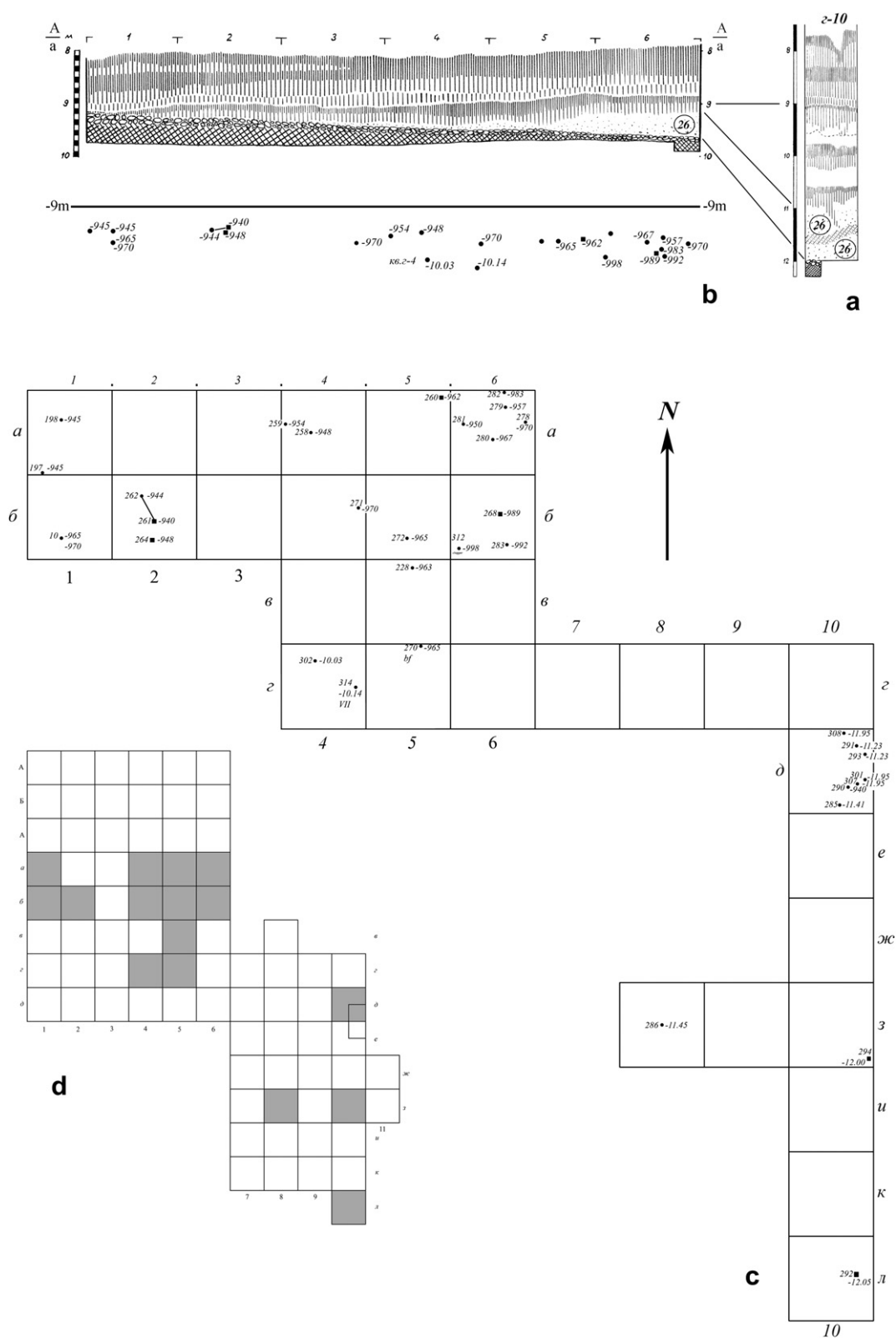


Fig. 9. Korolevo, excavation area XIII: a – Northern profiles; b – vertical position of artifacts of level VII; c, d – 1984–1986 plans of artifacts of level VII.

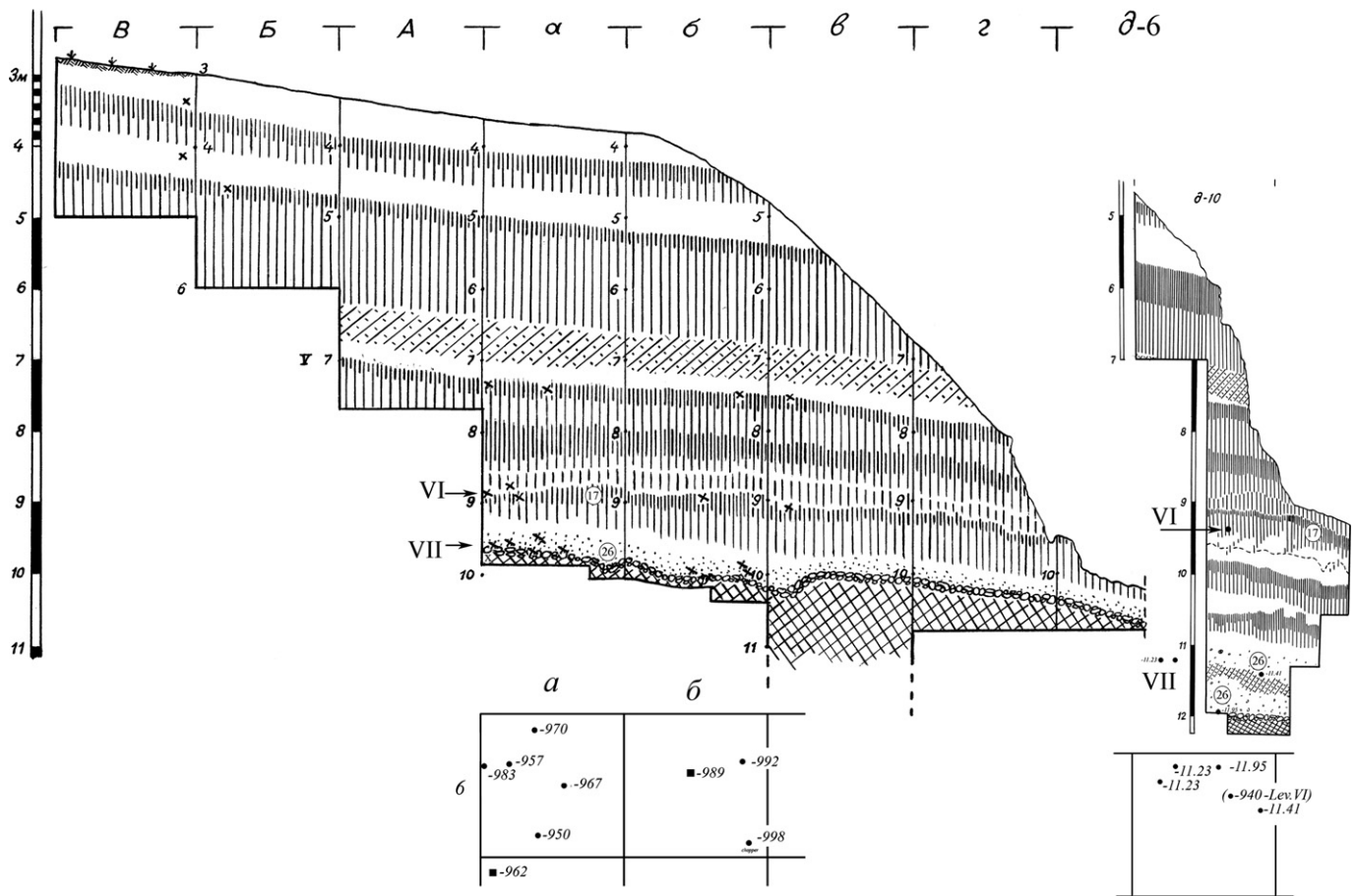


Fig. 10. Korolevo, excavation area XIII: profiles of Eastern wall and plans of level VII.

primary flakes and wide facets trimmed on the ventral and dorsal sides. Working edges have sporadic retouch. In this case, a primary stage of bifacial trimming can be determined. One andesite bifacial tool, which looks finished from the point of secondary flaking, is morphologically similar to those mentioned above (Fig. 8:1).

Additionally, three andesite artifacts were determined as fragments of bifacial tools. In the tool kit of level VI, one of the main tool types is side-scrapers with high (thick) working sides formed by stepped retouch. Other tools (notched, denticulate and axe-like) are not standardized. The presence of some kind of bifacial tools in this industry is quite acceptable.

Such typological combination of side-scrapers with high working edge formed by steeped retouch together with single artifacts of the *Keilmesser* type is more common for Middle Palaeolithic, for instance, for industries of Eastern Charantian including Tata, Raj (Kozłowski, 1990–1991; Koulakovskaya et al., 1993), and Korolevo, level II (Kulakovskaya, 2009). On the other hand, the presence of Charantian/Proto-Charantien elements in Early Palaeolithic of Caucasus is mentioned (Lioubine, 1984, p. 69; Lioubine, 1998). Although the Early Palaeolithic industries of Caucasus and Carpathian regions are very different, some common features in the development of the ancient industries can be recognized in different regions of Eurasia. In this connection, the typological sets of the industries of Hight Lodge and Hoxne sites in Britain are not very different from the Middle Paleolithic ones (Roberts et al., 1995, pp. 169, 179–180; Bosinski, 1996, pp. 79–80).

For the industry of level VI, the following features are characteristic:

- unidirectional and radial reduction with usage of hard hammer;
- presence of numerous chunk-cores and chunk-flakes;

- single choppers and chopping tools;
- absence of hand-axes;
- predominance of side-scrapers, sometimes with clear steeped retouch;
- single bifacial tools (scrapers/*Keilmesser*).

4. Korolevo, level VII

Archeological level VII was found in situ in small pebble alluvium (level 26) under the Matuyama–Brunhes boundary (Adamenko et al., 1989, p. 18) in a very limited part of excavation XIII (Gostry Verkh area) (Figs. 9 and 10). This level was located in the upper part of geologic unit 26 of Gunz–Mindel alluvium (Gladilin, 1989a, p. 10). Haesaerts and Koulakovska (2006) did not separate levels 25 and 26 (Fig. 3): “Unites 25 et 26 (11,20 a 11,50 m). Sable limoneux a taches grises et ocre, passant vers le bas a un sable gris-jaune legerement stratifie, lequel repose au sommet du cailloutis de l’unite 27”.

All artifacts that were found in excavation area XIII during the 1984–1986 seasons were studied. In general, they consisted of isolated finds (from one to five) distributed throughout separate squares (Fig. 9c,d). Artifacts were noted at different depths (from –9.40 to 12.0 m), which can be explained by the substantial dip of the lithological layer towards the southeast (Figs. 9 and 10). In squares a/b-6, which are located near the represented profiles, the findings are distributed evenly from –9.5 to –9.92 m within the bounds of a single geological layer (Fig. 10).

In square d-10, lithological layer 26 is divided by a horizon of diluvium, suggesting a localized episode of disturbance within the stratigraphic sequence (Fig. 10). Above horizon 3, level VII artifacts

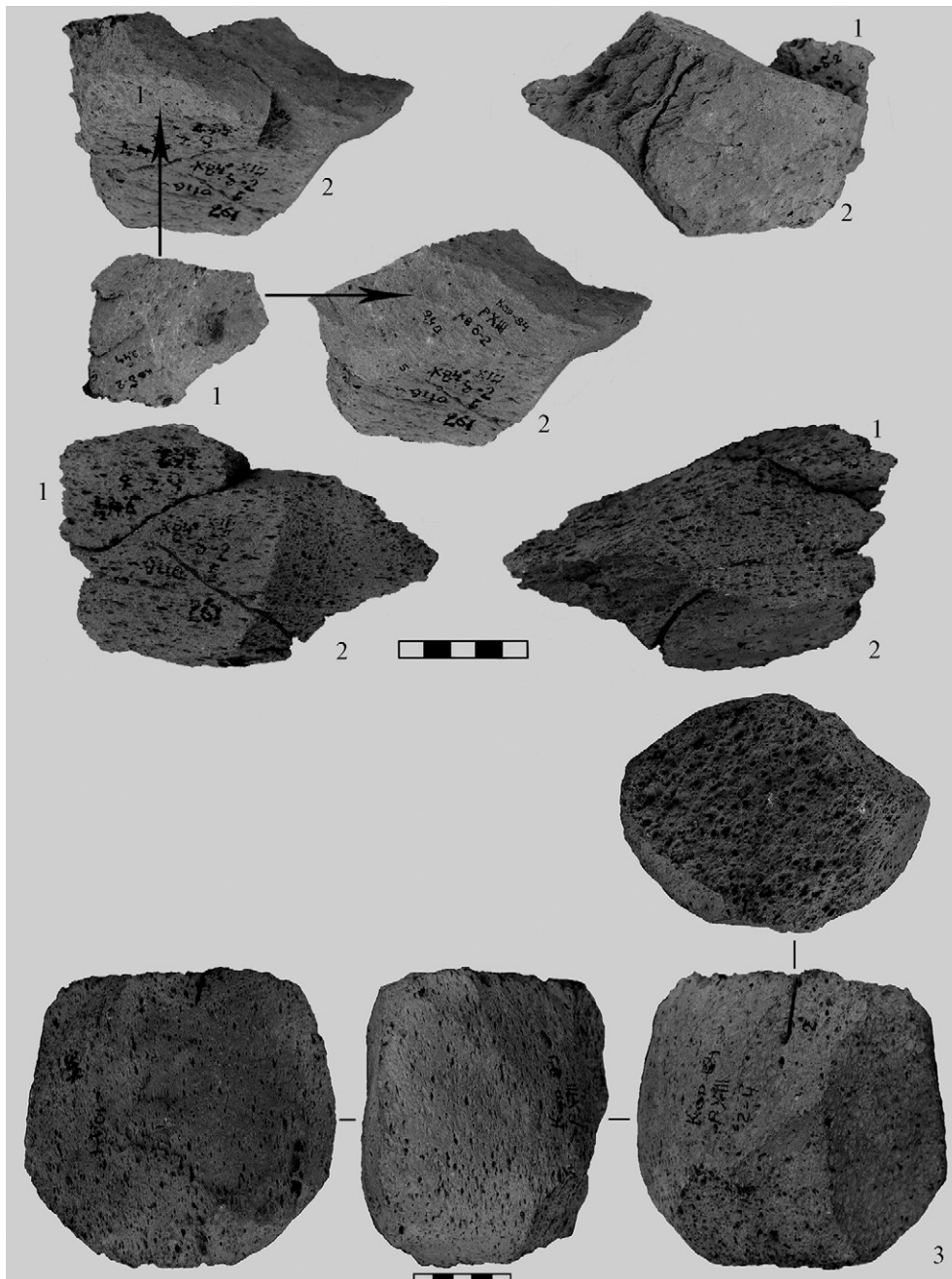


Fig. 11. Korolevo, excavation area XIII, level VII. 1 – chunk-flake; 2 – chunk-core; 3 – polyhedron (andesite).

were found (Fig. 10). Beneath this horizon, one flake and two chunks were found. There was no diluvium observed either above or below. Level VII is located within the alluvium of the terrace, but not within the upper portion as marked by Gladilin (1989a, p. 10). In sondages 18 and 26 and also in the 1998 season profile, which represents the main stratigraphic sequence of Korolevo, level VII artifacts are absent.

4.1. Archaeological collection of level VII

This collection of 33 lithic artifacts is comprised of 30 samples made from andesite, a locally available volcanic raw material. Two samples are made from quartzite and one from quartz. The andesite

artifacts exhibit a dense patina and multiple deep holes of leaching on the surface.

Gladilin and Sitlivy (1990a, pp. 39–41; Gladilin and Sitlivy, 1990b, pp. 25–26), attributed the collection of 1539 artifacts to cultural-chronological complex VII. Kulakovskaya (1999, 2003, 2009) stated that this cultural-chronological complex included mixed-findings from different excavation areas, sondages, profiles and from the surface. As with level VI, the main attribute used to determine which artifacts were attributed to this complex was the degree of leaching on the surface of the raw material (Gladilin and Sitlivy, 1990a).

Current description of the level VII material uses the limited artifacts from excavation area XIII, which were found *in situ*. The

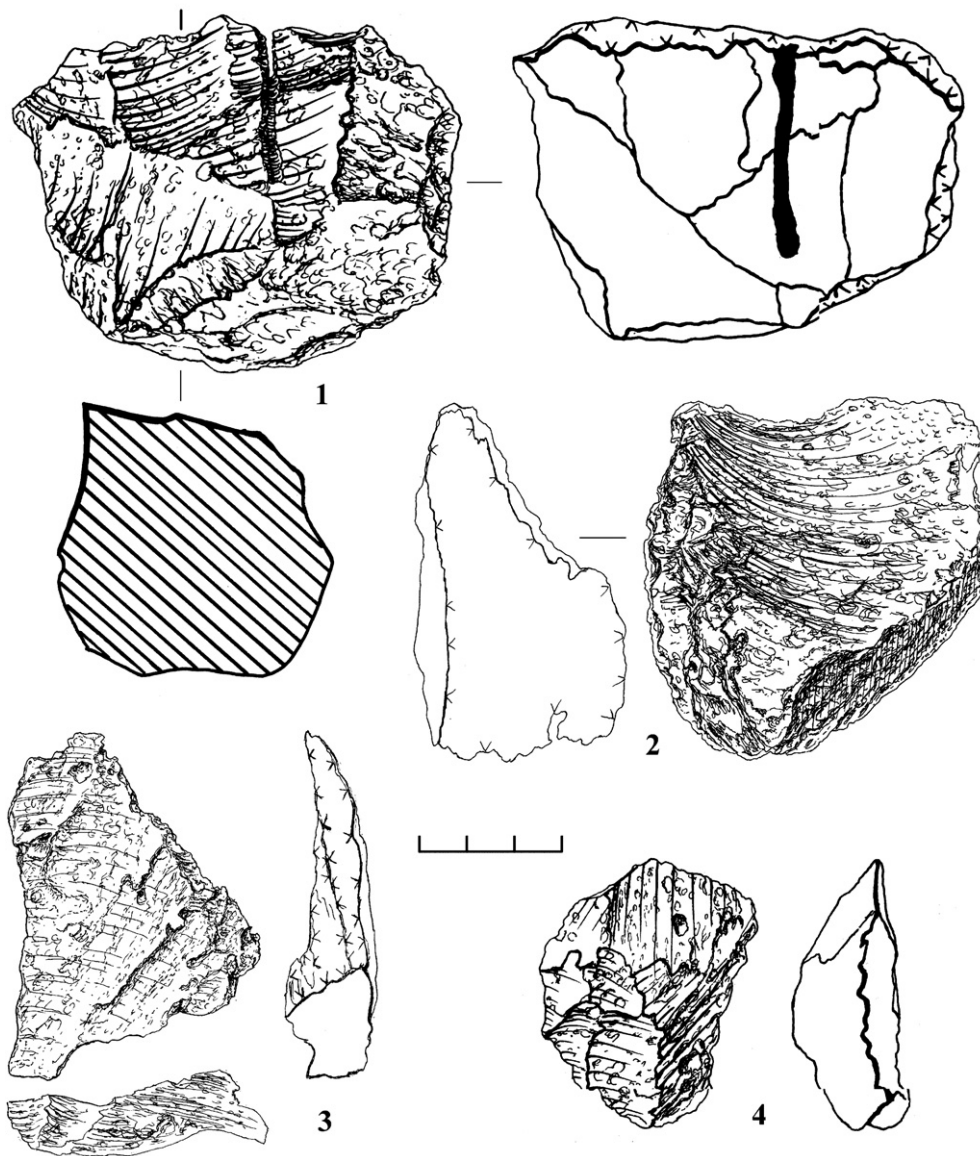


Fig. 12. Korolevo, excavation area XIII, level VII. 1, 2 – cores; 3, 4 – flakes (andesite).

artifacts (33) from this level include: polyhedron (1) (Fig. 11:3), core-like chunks (2) (Fig. 11:2), chunk-flakes (5) (Fig. 11:1), cores (5), flakes (12), chunks (4), fragments (1), chips (1) and tools (2). The polyhedron and core-like chunks have very similar flat and convex negatives on their surfaces. The morphology of the chunk-flakes conforms to these negatives. Chunk-flakes typically possess concave or flat ventral surfaces without clear traces of intentional reduction by hammering.

This mode of reduction might be connected to a specific mode of striking, or alternately could be attributed to thermal fracturing (?). Artifacts of this kind are numerous in the level VI collection. This kind of reduction is represented in level VII and VI, is rare in level Va, and is practically absent in the uppermost Middle and Early Upper Paleolithic levels of Korolevo site, where the andesite also was widely used. Thus, the influence of the natural factors on the fragmentation and fracturing of this raw material can be minimized or excluded. The artifacts are the results of a definite system of reduction.

Primary flaking is characterized by single platform unidirectional (3) (Fig. 12:2), parallel (Fig. 12:1) cores and a multiplatform core (Fig. 13:2) with unidirectional and parallel negatives on the working surfaces.

The reduction system is the simple unidirectional or parallel removal of blanks using hammer percussion from natural or flat platforms. This reduction system produced a few blanks from a single piece of raw material. The predominant mode of reduction is a unidirectional system, based on the single or consecutive removal of blanks from a single surface in one direction.

There are 12 blanks in the collection represented by debordant flakes (2) and flakes (10). Scar patterns include Kombewa (1), primary (6), unidirectional (4) (Fig. 12:3) and radial (1) (Fig. 13:4). Three flakes are false burins, a common breakage pattern resulting from the use of hard hammering. In the collection there are only two tools: a chopper (Fig. 13:3) and a fragment of a bifacial tool made on a primary flake (Fig. 13:1). The treatment of this bifacial tool is very similar to that usually used on chisels (*piece esquillee*).

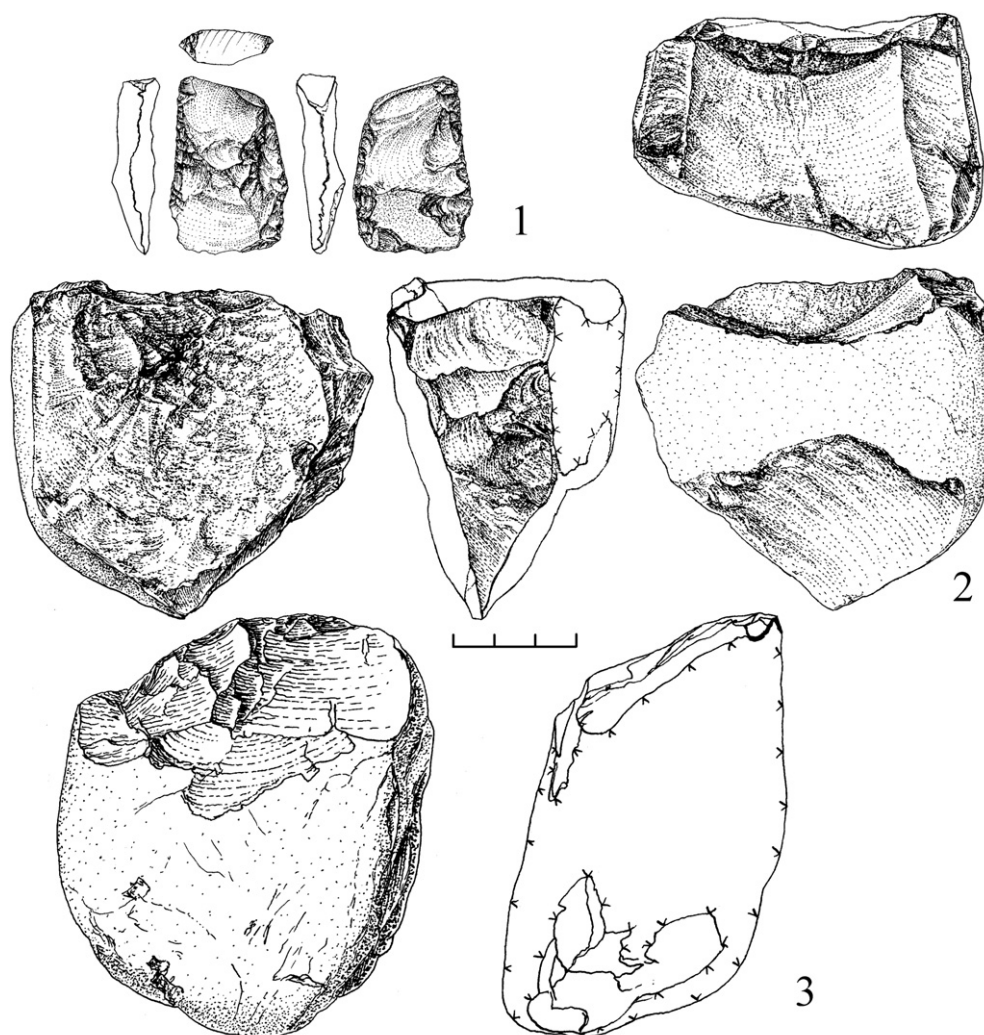


Fig. 13. Korolevo, excavation area XIII, level VII. 1 – bifacial tool (sandstone); 2 – core (quartzite); 3 – chopper (quartz).

The collection of in situ artifact of level VII is very limited (33 samples only). In the set there are small amount of artifacts (cores, tools) which can be determined as *fossil directure*. Therefore, it is difficult to determine the technique-typological face of the industry and also to find analogues among the other relatively contemporary materials. Some other Early Paleolithic industries such as Kärlich A, B, and Miesenheim also are represented by small numbers of artifacts (Bosinski, 1996, pp. 108–112).

5. Conclusion

Previously at Korolevo, it was determined that there were two cultural-chronological complexes (VII and VIII) found in sediments associated with the magnetic inversion, dating to more than 800,000 years ago (Adamenko et al., 1989; Gladilin and Sitlivy, 1990a). The lowest complex VIII was found in alluvium dominated by large pebbles (layer 27). Complex VII correlates to the upper part of the small pebble alluvium of layer 26. Adamenko et al. (1989) mentioned that the morphologies of layers 25, 26 and 27 are very similar.

The final reports of the 1984–1986 excavation seasons describe only a small collection from this cultural-chronological complex. The same report mentions a large number of andesite chunks and “dozens of cracked pebbles of sandstones and quartzite, but it is difficult to tell about the artificial origin of it” [Gladilin et al., 1985 final report ..., 1985, pp. 5–6]. After further analysis, it was determined that the

andesite chunks are natural, not artificial. [Gladilin, Field Diary 1986, 10 July record]. On pebbles “with the traces of the reduction” made on sandstone, quartz and quartzite, there is no evidence of artificial human production – these are not artifacts. According to the state of preservation and the stratigraphic position (sq.G-4, depth –10.14 cm), the large andesite polyhedron (Fig. 11:3) mentioned in the 1984 final report can be determined as belonging to level VII.

In conclusion:

- The stratigraphic position of the artifacts previously divided between levels VII and VIII is identical.
- The artifacts are located in a layer of alluvium overlying a coarse pebble layer that comprises the terrace. The analysis of individual artifact depths and correlations between geological strata support this conclusion.
- The levels of surface preservation on andesite artifacts originating from those sediments are identical.
- There are no morphological differences among those artifacts (Koulakovska and Usik, 2008).

Thus, there are no data indicating the existence of two cultural-chronological complexes situated beneath the Matuyama–Brunhes boundary at Korolevo.

The *in situ* artifacts from excavation XIII belong to a single archeological level, VII. This conclusion does not diminish the great

importance of Korolevo. The existence of an industry more than 950,000 years old provides insight into one of the most ancient Paleolithic habitations within all of Eurasia. Admittedly, the sample size from this collection is too small to permit wide conclusions. Suffice to say, several alternate modes of core reduction were observed, including the Kombewa method, as well as simple unidirectional, parallel, and radial reduction using a hard hammer. Among the tools, there is a classic Early Paleolithic chopper-tool and specimen with bifacial secondary flaking that falls outside the category of hand-axe.

Previously (Gladilin and Sitlivy, 1990a,b), complex VII of Korolevo was determined as an industry with Levallois and proto-Levallois technology. Simple unidirectional, parallel, radial and Kombewa reduction systems now can be distinguished.

Levallois and proto-Levallois were previously mentioned for level VI as well, but the authors do not agree with this conclusion. Simple unidirectional, different kind of parallel, rare radial and Kombewa cores with cortical or flat striking platforms are present in the collection of level VI of excavation area IX.

Reduction systems of blank production of levels VI and VII are very similar, including some kinds of technology which is not connected with traditional usage of hammers. The main attributes of core reduction can be found in other Early Paleolithic industries such as Bogatyri (Schelinsky and Kulakov, 2007).

The Early Palaeolithic of Korolevo site (levels VII and VI) can be determined as flake industries with single choppers and chopping tools and high level of side-scrapers (level VI). Following the contemporary view they can be determined as belonging to the so-called "Mode I". Technique-typological analysis of Early Paleolithic artifacts of Korolevo, which are produced from different types of raw materials, disproves the idea that the adoption of reduction system was related to the type of raw material.

The recent investigations in Korolevo provide evidence of the existence of Early Palaeolithic industries older than 500,000 years in the Carpathian region. Therefore, the previous point of view that the territory could be inhabited only after that time (Roebroeks and Kolfschoten van, 1995, pp. 297–321; Bosinski, 1996, p. 158; Bosinski, 2008, pp. 74–75) cannot be accepted now.

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