ŠTUDIJNÉ ZVESTI ARCHEOLOGICKÉHO ÚSTAVU SAV 60, 2016, 5–29

STONE INDUSTRY FROM KOŠICE-GALGOVEC AND ITS PLACE IN THE EVOLUTION AND DIFFERENTIATION OF THE EASTERN LINEAR POTTERY CULTURE*

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Key words: Košice, Eastern Linear Pottery culture, Bükk culture, settlement site, stone industry

Kľúčové slová: Košice, kultúra s východnou lineárnou keramikou, bukovohorská kultúra, sídlisko, kamenná industria

The article evaluates the lithic industry from the site of Košice-Galgovec within the Eastern Linear Pottery Culture and in comparison with finds from Košice-Červený rak and Čečejovce. The finds were obtained during investment investigations in 1997–2000 along the route of the Myslavský stream where the settlement of the oldest phases of the Neolithic – the protolinear phase (Košice-Červený rak), Tiszadob group (Galgovec I–III), Bükk culture on both sites – was concentrated. The settlement by the Tiszadob group is found on the site of Galgovec III, feature 2/97, dated to: 6310 ±40 BP, calibrated 5300–5210 BC and 6261 ±35 BP, calibrated 5170–5140 BC. 654 chipped stone artefacts of the Tiszadob group were analysed as well as 28 examples of rough industry and 204 artefacts from the mixed horizon of the Tiszadob group and the early phase of the Bükk culture (feature 8/2000). Compared to older periods, obsidian was used more frequently in the Tiszadob group. The changes in the typological-technological content of the inventories probably reflect the various functions of the settlements.

SITE DESCRIPTION AND EXCAVATIONS

The prehistoric settlements in the area of present-day Košice concentrates in its south-east part, on the terraces of the Myslavský stream. Beginning from the 1950's remains of settlement from various phases of the Eastern Linear Pottery Culture (ELPC) were uncovered on the terraces of both sides of this stream. To the same microregion belong the sites on the banks of small streams in the area of Košice-Barca and in neighbouring localities.

On the terraces of the Myslavský stream the Neolithic settlements can be seen from the very beginning of the ELPC (Košice-Červený rak), to Barca III group (Košice-Barca III, Košice-Barca Svetlá III), the Tiszadob group (Košice-Galgovec), and subsequently, till the oldest phase of the Bükk culture (Košice-Červený rak, Košice-Galgovec). Settlement throughout the ELPC phases is observable as complexes of pits with various functions. The pits are often intersecting. The areas of the various settlements were larger but some sites have been completely or partially destroyed by industrial works.

The site of Košice-Galgovec is situated on the left terrace of the Myslavský stream. From the west it is adjacent to the site of Košice-Červený rak, and from the east to the site of Košice-Barca (Fig. 1).

In 1997 the construction of a road, 2000 m long (*Kaminská 1999*) destroyed some of the Neolithic sites between Košice-Červený rak and Košice-Barca. The greatest damage suffered the site of Košice-Červený rak, close to the oldest features (Protolinear phase) investigated in 1980 (*Kaminská 1981*; *Kaminská/Kaczanowska/Kozłowski 2008*; *Šiška 1989*).

* The study was made possible by the financial support of Polish National Science Centre (NCN) grant No 2085/B/H03/2011/40 and as part of the project of the VEGA Grant agency No 2/0006/14 of the Slovak Republic.

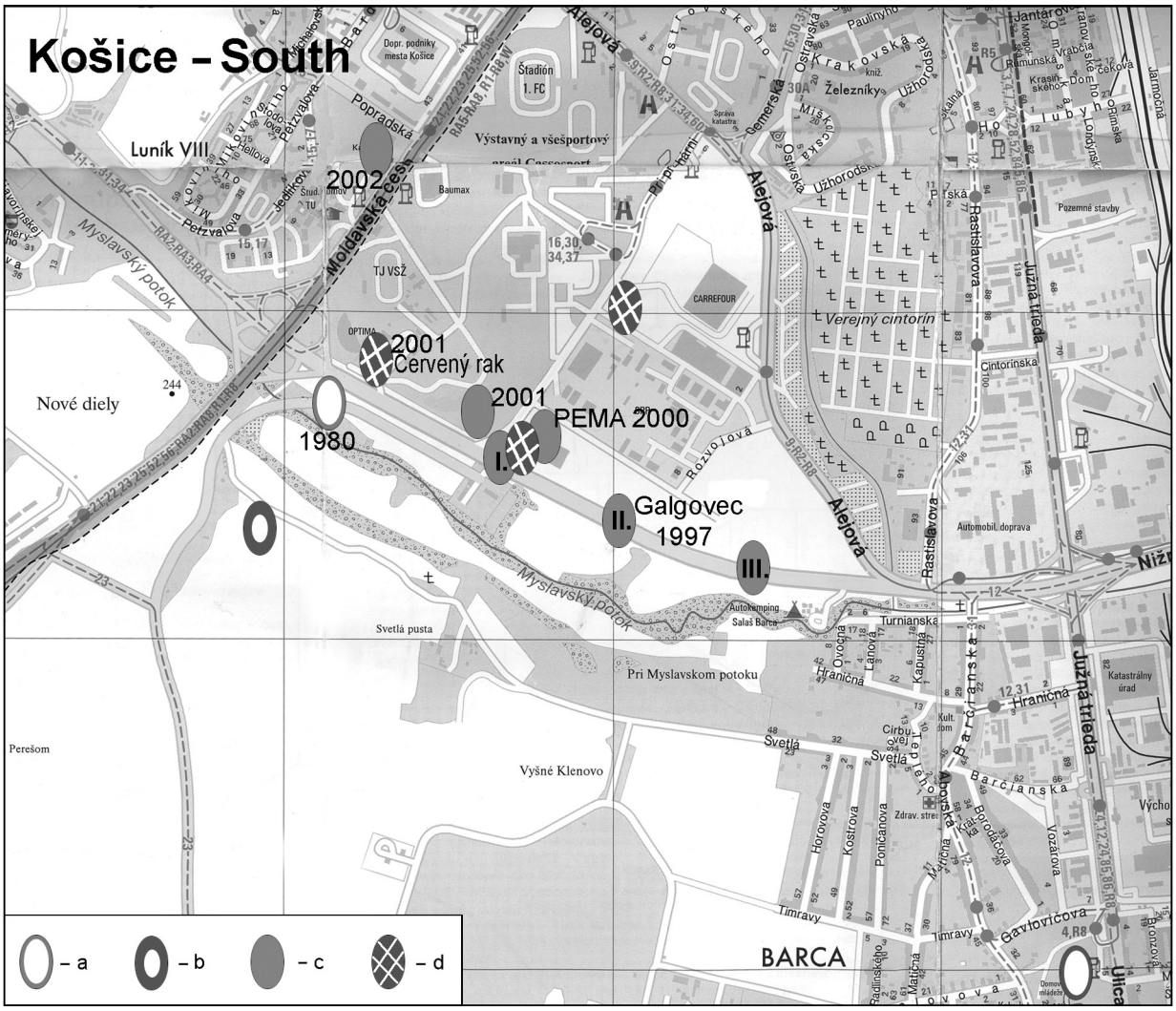


Fig. 1. Košice Basin. Map of the Neolithic sites on the terraces of Myslavský stream. Legend: a – Early Eastern Linear Pottery culture; b – Group Barca III, Early Linear Pottery culture; c – Group Tiszadob, Early Linear Pottery culture; d – Bükk culture.

The site of Galgovec is also situated on the constructed road. It was divided into two sectors: the western sector designated as Galgovec I, and the eastern sector designated as Galgovec II. The sites of Galgovec II and III yielded the features of only one settlement phase, whereas at Galgovec I, besides the features ascribed to the Tiszadob group, there were as well the features belonging to the Bükk culture.

At the site of Galgovec I, north of the features investigated in 1997, rescue excavations were carried out when a parking lot for PEMA Lorries was being built (*Kaminská 2001*). Regretfully, not all the features were covered by the rescue excavations. Field work was continued in 2001. During the construction of an OPTIMA shopping centre at the site of Červený rak features of the Bükk culture were uncovered (*Kaminská/Novák 2002*). In the western part of the site of Galgovec I six features ascribed to the Tiszadob group were investigated (*Béreš/Novák 2002*; *Hreha 2005*).

In 2002, to the north west of the site of Galgovec I, at a distance of 400 m from it, a settlement representing the Tiszadob group was discovered (*Horváthová 2003*) during the construction of a Kaufland shopping centre.

Because the materials from rescue investigations were only partially analysed we cannot today define the structure of Neolithic settlement on the terraces of the Myslavský stream. Observations in other microregions of Eastern Slovakia (*Šiška 1989*, 40) have shown that the settlement network consisted of separate, smaller settlements. After the analyses for the whole microregion are completed this assertion can be confirmed for the Košice Basin.

Settlement structure and habitation features at the site of Košice-Galgovec

The analysis of the features excavated and identified using geophysical methods in 2000 at the site of Galgovec I, suggests that these are multiphase features, stratigraphically superimposed.

In 1997 four features ascribed to the Tiszadob group were discovered. They were all large: up to 10 m long. In 2000 in the profile of the road, in the southern part of the site, intersecting pits were uncovered, designated as feature 9/2000, whereas in the northern part of the site a concentration of pits, designated as feature 8/2000, was investigated. The top portion of this feature had been destroyed. The boundary of the younger pits that cut the filling of the lower pit could not be precisely demarcated. However, ceramic finds point to the presence of two occupational phases: the Tiszadob group and the early Bükk culture documented by the presence of thin-walled pottery decorated with incised ornament. Other features (1–7/2000) were ascribed to the Piliny culture of the Bronze Age.

At Galgovec II, in 1997, three features ascribed to the Tiszadob group were discovered.

The best preserved features were explored at the site of Galgovec III. These were 4 pits filled with abundant finds; feature 9/97 also contained a hearth. Only feature 2/97 had a regular sub-rectangular outline; it, too, contained a hearth.

Archaeozoological and archaebotanical examinations assert that the settlement at Galgovec was located in the environment of oak forest (*Quercus sp.*) that covered the meanders of the Myslavský stream (*Hajnalová/Mihályiová 1999*, 73). Timber of oak, sycamore (*Acer sp.*), beech tree (cf *Fagus sylvatica*) and ash tree were used as building material. Plant macroremains are represented by wheats (*Triticum monococcum* and *Triticum diccocum*), barley (*Hordeum vulgare*), and peas (*Pisum sativum*). Animal bones, mainly of sheep and goat, are rare. Fishbones found in pit fillings (*Hajnalová/Mihályiová 1999*) indicate that the diet of inhabitants also included fish.

Dating

The early phase of the Eastern Linear Pottery Culture from Červený rak provided an AMS date of 6 520 ±50 year BP (Poz – 22131) (= 5540–5410 cal BC – *Kaminská/Kaczanowska/Kozłowski 2008*) The next phase of the ELPC is represented at the site of Barca III (*Hájek 1957*). Ceramic finds of this phase were recovered at the site of Košice-Barca-Gyilkos and Košice-Barca-Svetlá III (*Bánesz/Lichardus 1969*; *Lamiová-Schmiedlová/Miroššayová 1991*, 23). Regretfully, there are no dates for Barca III group.

Dates have been obtained, on the other hand, for the Tiszadob group from the site of Galgovec III. Two samples from the hearth in pit 2/97 have been dated: sample I – 6310 ±40 BP (5300–5210 cal BC – Vera 748), sample II – 6260 ±35 BP (5170–5140 cal BC, VERA 749). A similar date was obtained from pit 9/97 (*Stadler et al. 2000*).

Tiszadob pottery

As a rule decorations occur on bowls (Fig. 2: 1, 2), often pedestalled (Fig. 2: 3). Ornaments form multiple lines: combinations of meanders, spirals, rectilinear patterns and stabs. The combination of incised and black-painted ornaments also occurs, which resembles the ornaments on pedestalled bowls of the early phase of the ELPC. Dense, incised linear decorations on thin-walled pottery are further continued in the Bükk culture.

Thick-walled pottery is represented by vases, storage vessels decorated with perforations below the rim, also with stabs or finger-impressions on the belly. Moreover, indentations and barbotino ornaments also occur.

The neck of one of the vases was decorated with a plastic ornament in the form of a human face. The face is delimited with a plastic band,

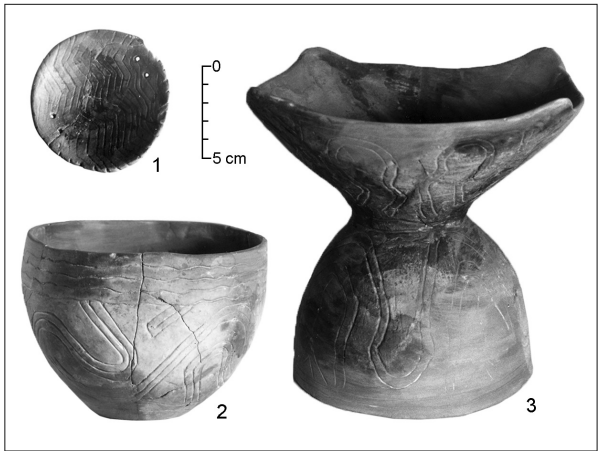


Fig. 2. Košice-Galgovec III, excavations 1997. Pottery of the Tiszadob group from feature 9/97.

the nose is a boss, the eyes and mouth are formed by indentations (Fig. 3). Analogous representations are known from the Tiszadob group from Šarišské Michaľany (*Šiška 1989*). Miniature goblets and bowlets (Fig. 2: 1), clay beads and fragments of bracelets were also registered.

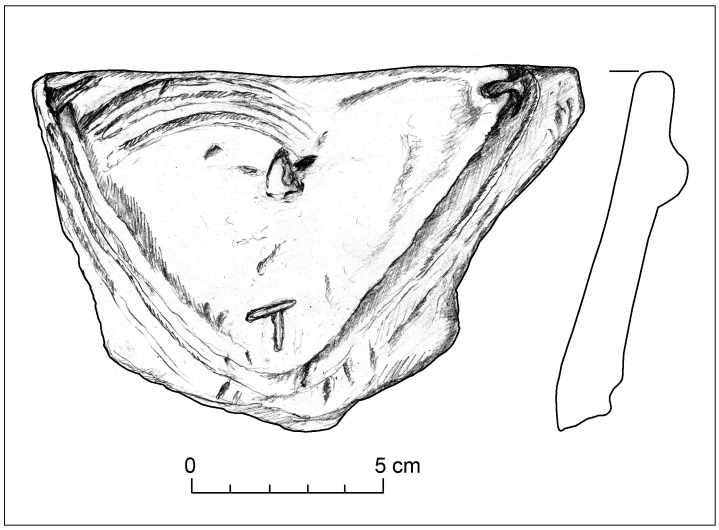


Fig. 3. Košice-Galgovec III, excavations 1997. Representation of the human face on the vessel from feature 9/97.

Bükk culture pottery

The Bükk culture evolved on the ELPC substratum and spanned at least part of the Middle Neolithic. It was registered at the following sites: Košice-Červený rak (*Kaminská/Novák 2002*, 82, 83), Košice-Galgovec, Košice-Barca I, Barca III, Barca-Svetlá III, Barca-Starý kaštieľ, Barca-Gyilkos (*Bánesz/Lichardus 1969*). Typical ceramics from these sites are thin-walled hemispherical bowls decorated with incised or painted ornaments.

Chipped stone artefacts

All artefacts has been analysed: from the features with only diagnostic pottery of the Tiszadob group separately from feature 8/2000 where pottery of Tiszadob group was mixed with sherds typical for the Early Bükk culture.

Tab. 1. Košice-Galgovec. Structure of major technological categories.

Technological category	Tiszadob group	%	8/2000	%
Cores	18	2.7	5	2.4
Flakes	299	45.8	66	32.3
Blades	167	25.4	72	35.2
Chips	91	13.9	34	16.6
Tools	60 (+2)*	9.2	23	11.2
Splintered pieces	5	0.7	1	0.5
Others	12	1.8	3	1.5
Total	652 + 2	–	204	–

* Pieces collected on the surface.

Chipped stone artefacts of the Tiszadob group

The structure of major technological groups

The assemblage consists of a total of 654 chipped stone artefacts. The most numerous group were flakes (299 – 45.8%); blades (167 – 25.6%), retouched and functional tools (62 – 9.2%) were next. The proportion of cores is relatively small (18 – 2.7%). Splintered pieces were few (5 – 0.7%). Undeterminate fragments and others also occurred (12 – 1.8%). This structure is typical of sites situated outside deposit areas and clearly documents that, at least part of raw materials processing was done on-site. Not only blanks but also tools were manufactured, which is evidenced by a large quantity of chips (notably obsidian chips; Tab. 1).

Tab. 2. Košice-Galgovec. Raw material structure.

Raw material	Tiszadob group	%	8/2000	%
Obsidian	292	44.6	126	61.7
Limnoquartzite „Banské type"	215	32.8	50	24.5
Other limnoquartzites	104	15.9	10	4.4
Black hornstone	2	0.3	5	2.4
Radiolarite	1	0.1	–	–
Jurassic flint	0	0.0	5	2.4
Cretaceous flint	1	0.1	1	0.5
Others and undetermined	39	4.5	7	3.4
Total	654	–	204	–

Raw materials

The most commonly exploited raw material was obsidian (292 specimens – 44.6%), probably Carpathian 2 whose deposits are situated at a distance of about 60 km from the site. Grey, opaque Banské type limnoquartzite (215 specimens – 32.8%) also played a major role. Its large concretions are found in the Slanské Mountains at a distance of about 30 km. Other limnoquartzites (white, beige, yellow, dark transparent, banded – 104 specimens – 15.9%) were also registered, which may come from neovolcanic regions of the Slovakian-Hungarian borderland. A unique rock is brown radiolarite (1 specimen – 0.1%), probably from central Slovakia. Extralocal all transcarpathian raw materials, are, too, extremely rare (Cretaceous flint from the Volhynia-Podole Plateau (1 specimen). The raw materials structure is provided in Tab. 2.

Cores

The assemblage at Galgovec provided 18 cores (including 6 fragments) and 2 cores found on the surface of the site. As a rule the cores were made from Banské type limnoquartzite (7 specimens); obsidian cores (6 specimens) and from white limnoquartzite (5 specimens) were fewer, matt grey-beige flint of unknown provenance (1 specimen), and from black hornstone (1 specimen) were also recovered.

Two types of core reduction sequences were distinguished:

- on flat concretions the reduction began with the preparation of lateral or postero-lateral trimming edges,
- reduction was restricted to platform preparation: either a single flake was detached or centripetal preparation was applied.

In the first type of reduction the flaking surface was located on the narrower facet (Pl. I: 5, 3), in the second sequence the flaking surface overlapped onto the core side; in further stages of reduction the flaking surface became rounded and flattened. From both reduction sequences mainly narrow blades were obtained.

In further stages of reduction tablets were detached and cores were gradually shortened. Sometimes, cores showed centripetal scars (Pl. I: 4). In the final stage cores were very short (Pl. I: 1).

An exception was a residual core on a thick flake, with the flaking surface located on the dorsal side, perpendicular to the flake axis (Pl. I: 2).

Some cores showed single, short scars in the distal part which, however, do not point to intentional change of orientation.

In the residual stage of reduction some cores were transformed into sub-discoidal cores from which flake blanks were detached (Pl. II: 1, 4).

One flake core was flat, transversally fractured.

In the residual stage some specimens functioned as hammerstones or splintered pieces.

Splintered pieces

There were 4 splintered pieces and a specimen re-worked from a core. All the specimens, except one, were made on flakes; they are small in size, bipolar, with weak splintering (Pl. II: 3). Three pieces were from obsidian, two from limnoquartzite.

Flakes

The inventory provided 283 flakes. In this group also belonged splinters, tablets, and overpassed flakes. Most often the flakes were made from Banské type limnoquartzite (109 specimens – 38.5%), or from obsidian (98 specimens – 34.6%). Flakes from white, opaque limnoquartzite were, too, fairly frequent (42 specimens – 14.8%). Other raw materials, such as quartz, occurred sporadically.

Flake size varied. Length is between 10 to 88 mm, width is between 8 to 63 mm, and thickness between 1 to 26 mm. Obsidian flakes were slightly smaller; their length is between 13 to 53 mm whereas flakes from Banské type limnoquartzite are between 15 to 88 mm long. The width of obsidian specimens is between 11–42 mm, and that from Banské type limnoquartzite is between 10–63 mm. Thus, the latter flakes are larger and more robust than obsidian specimens.

The differences in the frequencies of the various butt types of obsidian flakes and flakes from Banské type limnoquartzite confirms that preliminary stages of reduction were different for each of these two raw materials (Fig. 4).

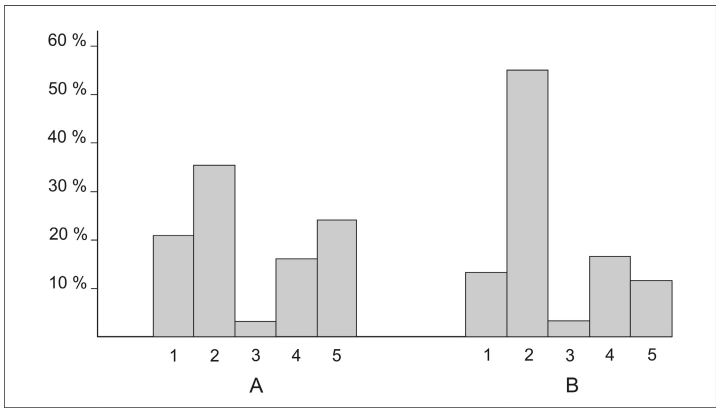


Fig. 4. Košice-Galgovec. Frequency of flake butt types: A – obsidian; B – limnoquartzite of Banské type; 1 – unprepared; 2 – formed by single bow; 3 – dihedral; 4 – facetted; 5 – linear/punctiform.

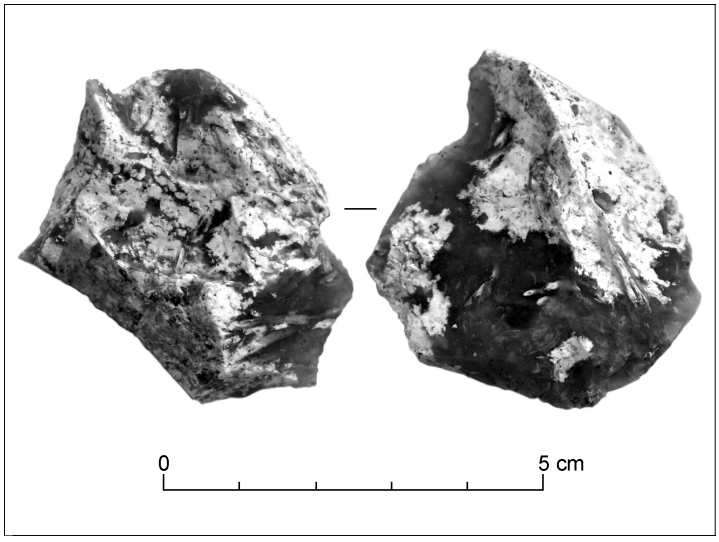


Fig. 5. Košice-Galgovec. Two flakes from yellowish limnoquartzite struck from one core, forming a refitting.

Preliminary core preparation was less often carried out for obsidian than for Banské type limnoquartzite. It is also interesting that the percentage of, larger or smaller, areas of dorsal cortex is higher among obsidian flakes (48 specimens – 48.9%; this includes 12 wholly cortical flakes i. e. 12.2% of all obsidian flakes) than among flakes from Banské type limnoquartzite (28 specimens i. e. 25.6% which includes 8 wholly cortical flakes i. e. 7.3%). It can be assumed that unworked obsidian concretions were brought to the site more often. Obsidian nodules were more intensively exploited and obsidian cores were rejuvenated by detaching the tablets, making shorter obsidian cores.

A refit of two flakes from yellow limnoquartzite indicate that other types of limnoquartzite were also worked on-site (Fig. 5).

Blades

The assemblage yielded 167 blades which is 25.6% of the inventory. In this group also belong: trimming and subcrested blades (10 specimens), also overpassed blade. Blades are dominated by obsidian specimens accounting for 50.8% of all blades (85 specimens). Blades from Banské type limnoquartzite were less numerous (55 specimens). Other raw materials played a minor role: only one blade is made from extralocal Cretaceous transcarpathian flint (Pl. II: 2).

Majority of blades are fragments; only 48 specimens were complete. The length of complete specimens is between 22 to 74 mm; blades between 22 to 37 mm (24 specimens) were the most frequent.

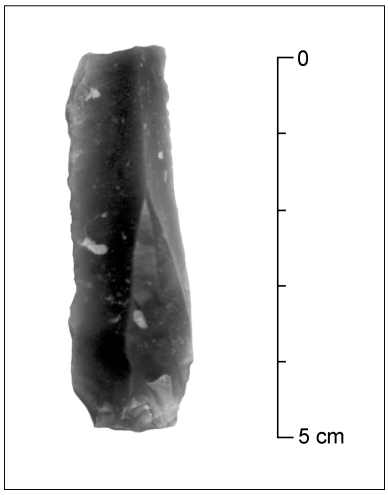


Fig. 6. Košice-Galgovec. Blade from Jurassic flint.

The group in the length mode of 49–57 mm (12 blades) was also fairly numerous. Shorter blades were predominantly made from obsidian (ca 80%). Longer blades were mainly made from limnoquartzite Banské type (11 specimens; Pl. II: 6); obsidian is not represented.

The width of blades and fragments is between 7 and 22 mm, the most numerous group are blades between 12 to 14 mm (69 specimens). Blade thickness is between 1 to 13 mm. Trimming blades, subcrested blades and overpassed blades were thickest. These specimens that were detached in the early stages of core reduction, are also fairly large.

Blade butts are usually single-blow, less often prepared. The comparison of butts of obsidian blades and blades from limnoquartzite Banské type indicates that despite differences in size (obsidian: 22–43 mm, Banské type limnoquartzite: 28–74 mm) the method of core preparation was similar for both raw materials (Fig. 6).

Majority of blades were devoid of cortex; cortex occurred only on 32 specimens. Cortical blades were predominantly from obsidian (20 blades of which 2 are wholly cortical). This indicates that obsidian nodules or cores in the early stages of reduction were brought to the site; preliminary processing of concretions or cores from Banské type limnoquartzite was carried away from the site.

Among cortical blades, specimens with lateral cortex predominate. These blades may come from the extension of the flaking surface.

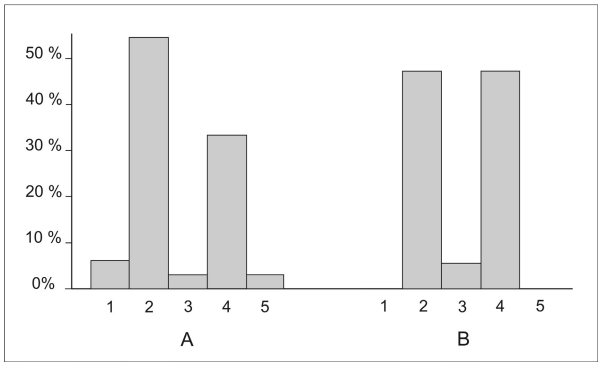


Fig. 7. Košice-Galgovec. Frequency of blade butts. A – obsidian; B – limnoquartzite of Banské type; 1 – unprepared; 2 – formed by single blow; 3 – dihedral; 4 – facetted; 5 – linear/punctiform.

Analysis of the dorsal pattern shows that unidirectional scars are the most frequent (75 out of 91 registered specimens – 82.4%). Blades from preparation or change-of-orientation are sporadic (5%), especially among obsidian blades. Flake scars on the dorsal side were registered only on obsidian blades. These blades were, in all likelihood, detached in advanced stages of core reduction (3 specimens).

Most blades have parallel lateral sides and a straight or weakly convex profile, which indicates that they were detached from single-platform cores with a narrow, rectangular or triangular flaking surface. The comparison of butts of flakes and blades made from obsidian and Banské type limnoquartzite attests that: a) although the reduction of blade blanks from each raw material was similar, b) cores, from each material, were differently prepared and/or rejuvenated (Fig. 7). Obsidian concretions were less carefully prepared: the pre-core stage (with a lateral trimming edge) was less often used. In the group of crested and sub-crested blades only one obsidian specimen was found.

Cores from Banské type limnoquartzite in the preliminary stage had a single-blow platform, subsequently the platform was rejuvenated by detaching small flakes (this is also evidenced by the drop in the frequency of single-blow butts and the increase in the frequency of prepared butts).

Chips

The assemblage contained 91 chips from retouch and/or core rejuvenation. Most frequent are obsidian chips (60–65.9%), much more numerous than chips from Banské type limnoquartzite (20–21.9%). Individual specimens from white (5), yellow (3), dark transparent (1) limnoquartzite and unidentified raw material (2) also occurred.

Tools

From Galgovec 62 tools and an undeterminate fragment of a retouched tool were recovered. The most numerous category were retouched blades (17 specimens) and flakes (12 specimens). Truncations were less numerous (8 specimens, including a double truncation), sickle inserts (3 specimens without retouch and 3 specimens on retouched tools), end-scrapers (4 specimens), side-scrapers (4 specimens), and perforators/becs (3 specimens). Other tool groups are represented by one or two items: burins (1 specimen), notched-denticulated tools (4 specimens), shouldered blades (2 specimens), and an edge hammerstone on a flake.

End-scrapers (4)

In this group belong:
– distal fragment of macroblade end-scraper (Pl. II: 5),
– distal fragment of the flake end-scraper with straight front (Pl. II: 8),
– end-scrapers on flakes: with an S-shaped front (Pl. II: 7) and a double end-scraper with the fronts perpendicular to the flake axis (Pl. II: 9).

All end-scrapers are made from obsidian.

Burin (1)

– a burin on a snap made on an obsidian a macroblade, with alternate microscars on lateral edges (Pl. III: 10).

Perforators/becs (4)

– two slender specimens on bladelets: one is with a well-distinguished tip (Pl. III: 2), the other was shaped by alternate retouch (Pl. III: 1),
– atypical bec shaped by two Clactonian notches in the proximal part of a blade (Pl. III: 5). The specimens were made from Banské type limnoquartzite, from yellow transparent limnoquartzite, and from obsidian (atypical bec).

Truncations (8)

Truncations are a strongly varied group consisting of:
– two straight truncations on blades, made from obsidian (Pl. III: 9, 3),
– an oblique proximal truncation on a blade, with fine lateral retouch made from obsidian (Pl. III: 6),
– 3 blade truncations shaped by inverse retouch in the distal (2) or in the proximal part (1), made from brown (Pl. III: 7), white and Banské type limnoquartzites,
– Short double truncation on obsidian blade (Pl. III: 4),
– Short double end-scraper on the mesial fragment of bilaterally retouched obsidian blade (Pl. III: 8).

Retouched blades (17)

– 7 specimens with unilateral obverse retouch: which can be: continuous (Pl. IV: 11) or partial flat retouch (Pl. IV: 6). One specimen had the tip thinned by Kostenki technique on the ventral side (Pl. IV: 3). Obsidian or Banské type Limnoquartzite.
– 3 blades had inverse unilateral retouch (Pl. IV: 7), or possibly inverse retouch overlapping the proximal part (Pl. IV: 5). The specimens were made from obsidian or Banské type limnoquartzite.
– 3 fragments of specimens with continuous, obverse bilateral retouch, fine, semi-steep (Pl. IV: 1, 8, 9). All made from obsidian.
– 4 mesial fragments of blades with bilateral alternate retouch (Pl. IV: 2, 4), made from obsidian.

Retouched flakes (13)

Flakes were predominantly with retouch on lateral edges:
– a flake with unilateral obverse retouch, from Banské type limnoquartzite (Pl. IV: 10),
– 2 specimens with inverse unilateral retouch: semi-steep fine (Pl. V: 7), and flat retouch (Pl. V: 8), made from obsidian,

– an obsidian specimen with bilateral, obverse, fine, semi-steep retouch (Pl. V: 9),
– three specimens with bilateral, alternate retouch, made from obsidian (Pl. V: 1, 2, 10),
– three fine flakes with partial lateral obverse retouch (Pl. V: 4, 6); made from obsidian and Banské type limnoquartzite.

Only three flakes had transversal retouch: two flakes from Banské type limnoquartzite were with distal retouch (Pl. V: 3, 11), and one obsidian flake had lateral-proximal retouch (Pl. V: 5).

Denticulated-notched tools (3)

Only 3 denticulated-notched tools were recovered: a flake with Clactonian notches on the circumference (Pl. VI: 3), from limnoquartzite, and an obsidian flake with lateral retouch and Clactonian notches (Pl. VI: 1).

Side-scrapers (4)

Five different types of side-scrapers were found:
– a bifacial side-scraper shaped on the circumference of a thick flake from Banské type limnoquartzite (Pl. VI: 4),
– a bilateral side-scraper shaped by bifacial retouch on a flat-convex obsidian concretion (Pl. VI: 2),
– a bilateral, straight-convex side-scraper shaped by fine, irregular made from Banské type limnoquartzite (Pl. VII: 9),
– a side-scraper shaped by weakly denticulated retouch in the proximal part of a flake from white limnoquartzite (Pl. VII: 8).

Sickle inserts (6)

Six sickle inserts included 3 unretouched pieces and three on retouched tools (2 truncations and 1 retouched blade). All the specimens show sickle gloss; the criterion for their identification was not morphological but functional.

Sickle inserts differ as to the location of sickle gloss and the presence or absence of retouch.

The following items were distinguished:
– 2 specimens with sickle gloss oblique, with the blunted back shaped by inverse retouch. Gloss can occur on the proximal break (when the truncation is distal without gloss – Pl. VII: 5) or on the distal break (Pl. VII: 6).
– Retouched blade with oblique sickle gloss.
– Unretouched blade used as sickle insert in the distal part (Pl. VII: 1),
– 2 unretouched blades with sickle gloss parallel to the edge (Pl. VII: 3).

The specimens were made from Banské type limnoquartzite.

Shouldered blades

Two shouldered blades with proximal notches were recovered, made from Banské limnoquartzite (Pl. VII: 2, 4).

Moreover, a large flake from Banske type limnoquartzite, which on one edge was used as a hammerstone, was ascribed to functional tools (Pl. VII: 7).

Scatter pattern of chipped stone artefacts in Tiszadob group features

Chipped stone artefacts occurred in pits: 1/97(Galgovec I), 3/97 (Galgovec II), 2/97, 9/97, 10/97 (Galgovec III) and 9/2000. The artefacts frequencies in the various pits are different: in pits 2/97, 9/97 the biggest quantity of artefacts concentrated (147–380 specimens). The remaining pits contained between 8 to 62 artefacts. The pits with more than a hundred artefacts exhibit a greater range of various functions. The inventory structure of the pit 9/97 with the biggest number of artefacts pointed to on-site processing of raw materials (the domination of flakes and chips, a relatively large number of cores and much smaller of tools and blades). The inventory of pit 2/97 (similar to that of pit 8/2000) shows almost equal number of flakes and blades, numerous chips and, also, a high index of tools (Tab. 3).

Tab. 3. Košice-Galgovec. Main technological groups in particular features. Galgovec I: pit 1/97; Galgovec II: pit 3/97; Galgovec III: pits 2/97, 9/97, 10/97.

Technological category	1/97	2/97	3/97	9/97	10/97	8/2000	9/2000
Cores	–	4	2	12	–	5	–
Flakes	5	45	22	200	3	66	24
Blades	2	43	8	88	3	72	23
Chips	2	37	3	40	1	34	8
Tools	3	16	7	28	–	23	6
Splintered pieces	–	2	1	1	1	1	–
Others	–	–	–	11	–	3	1
Total	12	147	43	380	8	204	62

Chipped stones from feature 8/2000

Of special interest is feature 8/2000 where the interstratification of Tiszadob group pit and the pits attributed to the early phase on the Bükk culture can be seen. This feature provided 204 artefacts. Unfortunately, they were collected without precise stratigraphic position and cultural attribution.

The raw materials composition in feature 8/2000 differs somewhat from that of features exclusively with Tiszadob pottery (Tab. 3). The role of obsidian is bigger, whereas limnoquartzites (probably of local origin and of Banské type) became less important. Moreover, a small series (5 specimens) of artefacts made from Jurassic flint from Kraków-Częstochowa Jurassic Plateau (Fig. 8; Pl. VIII: 8) also occurred. The presence of these artefacts points to the intensification of contacts on the north-south axis, as early as in the Early Phase of the Bükk culture. South contacts are further confirmed by Bükk type ceramic imports and obsidian in the LBK sites in Lesser Poland (*Kaczanowska/Godłowska 2009*). It is likely that Spiš was intermediary for these contacts, as in this region both of the LBK and the Bükk culture settlements co-occur (*Soják 2000*).

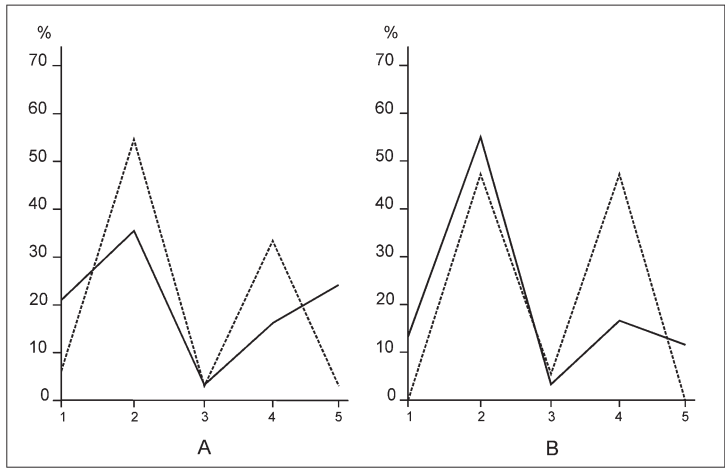


Fig. 8. Košice-Galgovec. Comparison of flakes (continue line) and blades (interrupted line) butt types: A – obsidian; B – limnoquartzite; 1 – unprepared; 2 – formed by single blow; 3 – dihedral; 4 – facetted; 5 – linear/punctiform.

Similarly, the inventory structure of feature 8/2000 differs from that of the other features in the proportion of blades higher than that of flakes (Table 3). This could be related to the fact that limnoquartzites with poor cleavage had been, partially, abandoned in favour of the obsidian from Carpathian 2 deposits.

Coring technique does not show major differences in comparison to the other features, which is evidenced by the small series of cores (Pl. VIII: 1, 5, 6) and splintered pieces (Pl. VIII: 7). A higher index of blade blanks can also be seen in the tool group: as much as 78% of all tools were made on blades, whereas in features of Tiszadob group only 55% are blade specimens.

The structure of retouched tools in feature 8/2000 does not exhibit major dissimilarities in comparison to the other features. There were: short end-scrapers on blades (Pl. VIII: 2, 4), blade end-scrapers on slender, regular blades with lateral retouch (Pl. VIII: 3), a lateral angle burin (Pl. IX: 11), an atypical perforator on a flake (Pl. IX: 2), and several oblique truncations shaped by obverse (Pl. IX: 3, 12) or inverse retouch (Pl. IX: 13) of which one is a double specimen (Pl. IX: 5). One of truncations was made on blade-like flake (Pl. IX: 9), and one is short, combined with an end-scraper (Pl. IX: 1). The index of blades with lateral retouch in feature 8/2000 is slightly higher than in the other features (39%; Pl. IX: 4, 7, 10, 14). Individual retouched flakes (Pl. IX: 8) and sickle inserts (Pl. IX: 6) were also registered.

However, the series of artefacts was too small to draw conclusions on its base about the differences between the Tiszdob and the Early Bükk chipped stone industries.

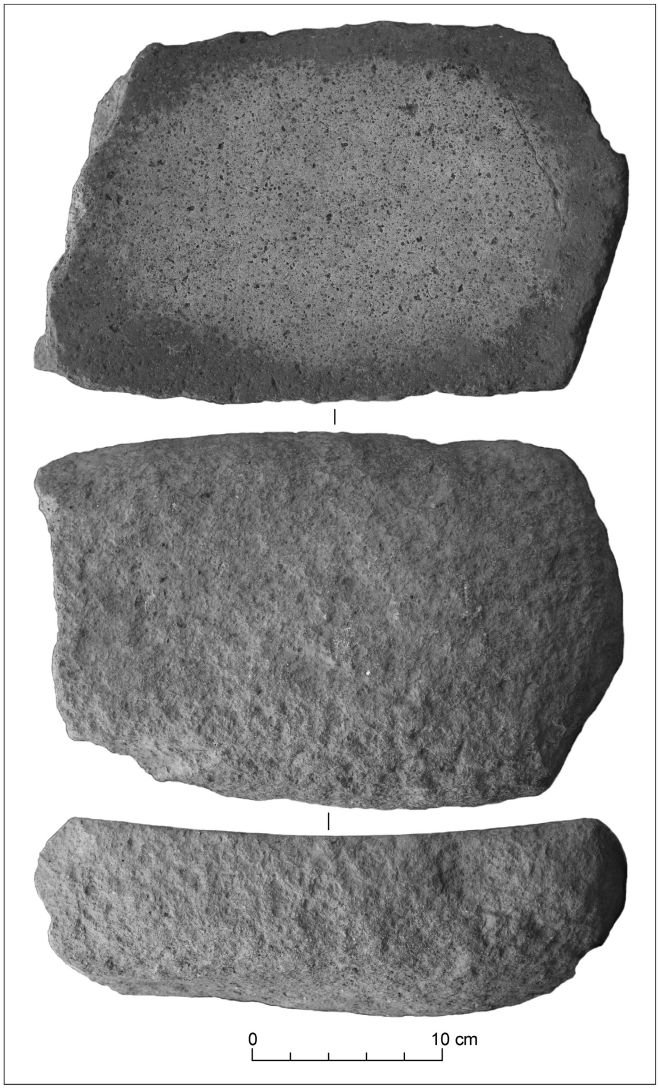


Fig. 9. Košice-Galgovec. Fragment of the lower grinding stone.

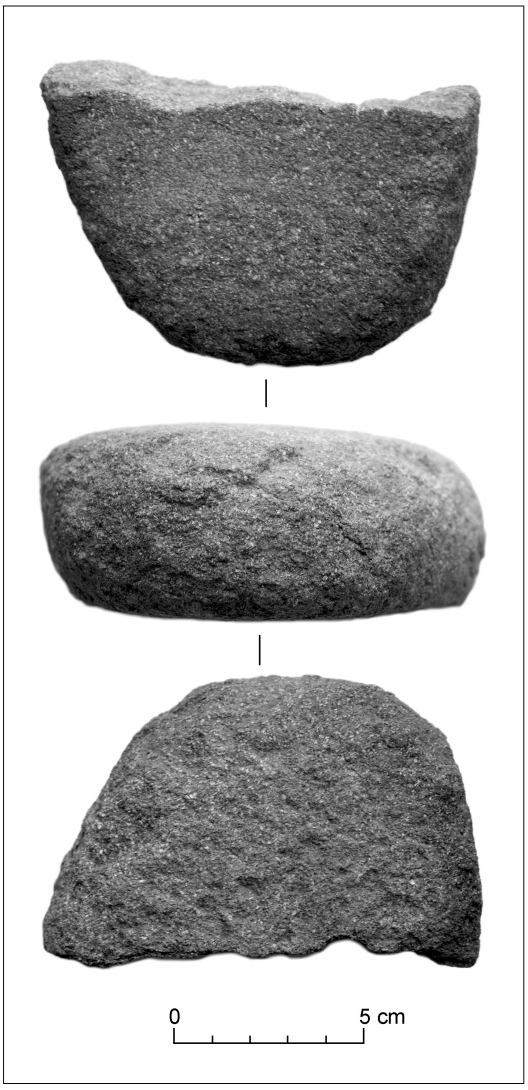


Fig. 10. Košice-Galgovec. Fragment of the upper (active) grinding stone.

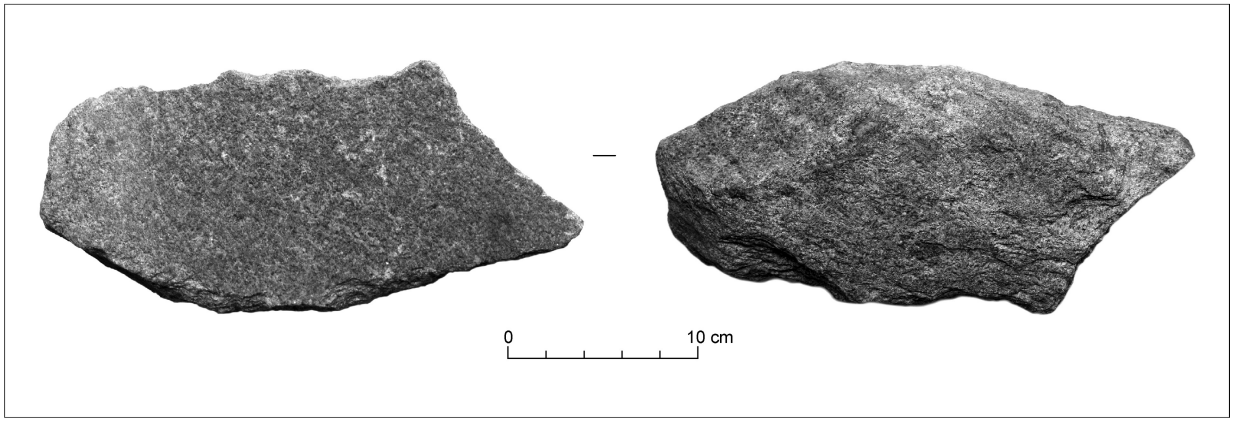


Fig. 11. Košice-Galgovec. Fragment of the grinding stone with one working surface.

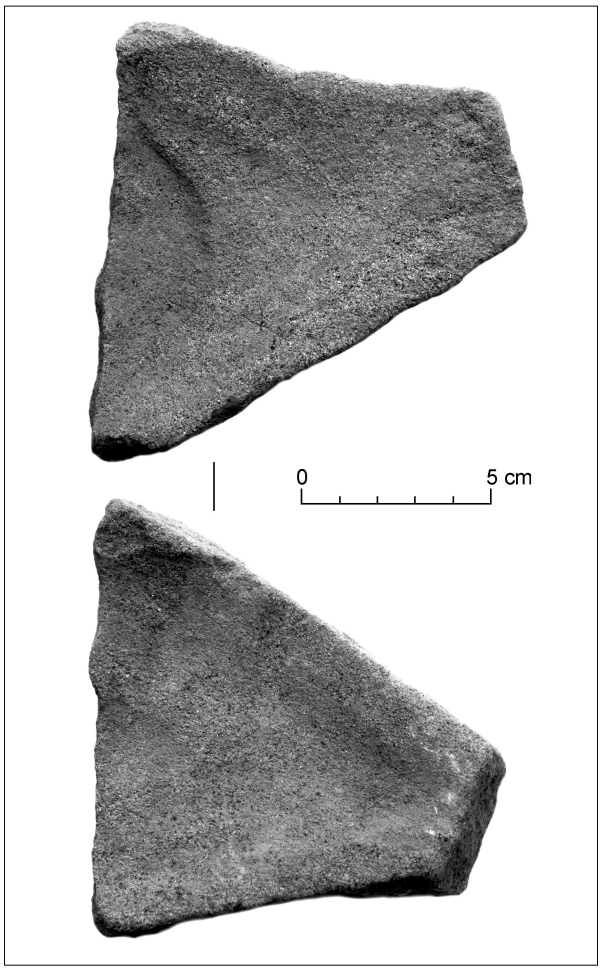


Fig. 12. Košice-Galgovec. Fragment of plaquette with two concave working surfaces.

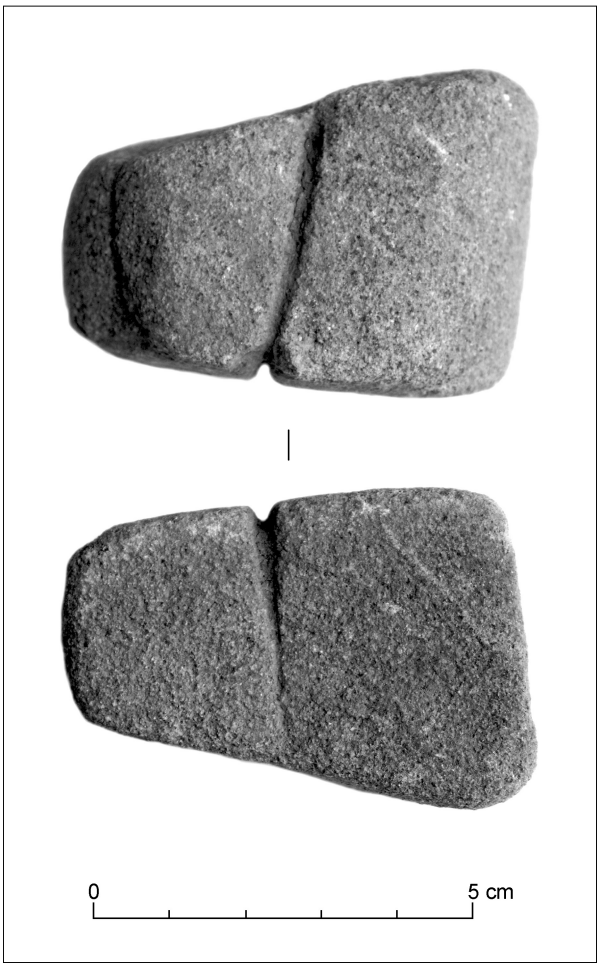


Fig. 13. Košice-Galgovec. Fragment of a pounder.

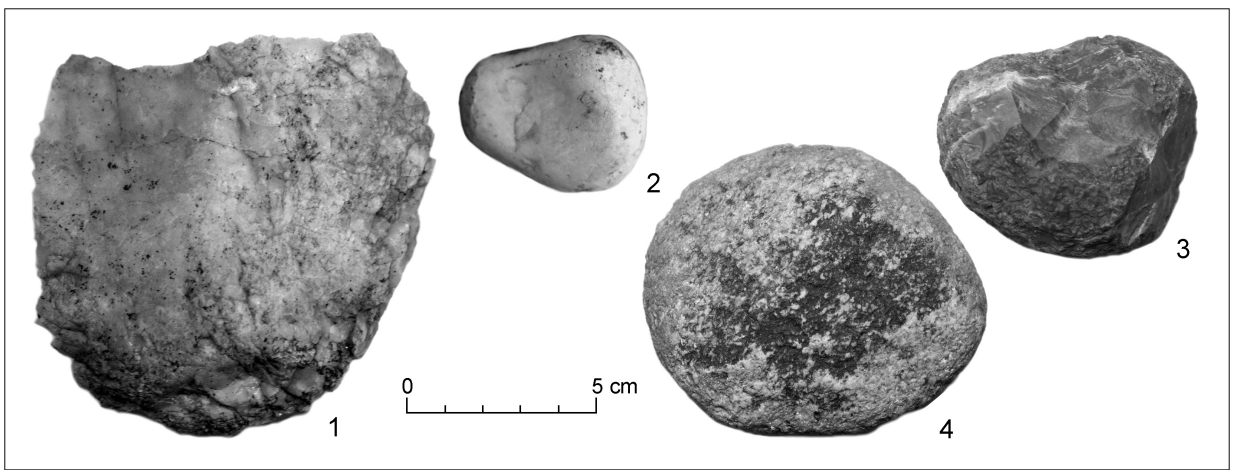


Fig. 14. Košice-Galgovec. Hammerstone-grinders.

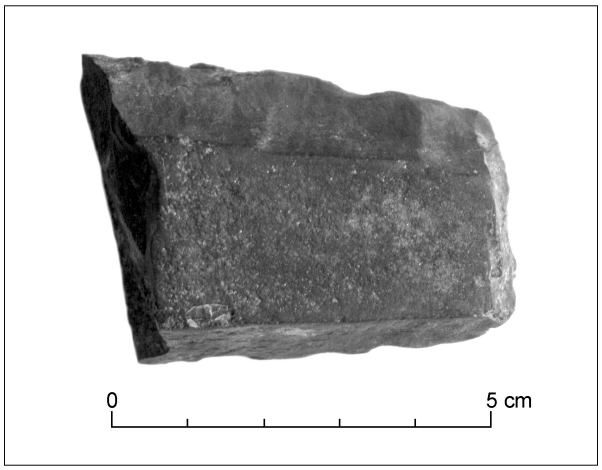


Fig. 15. Košice-Galgovec. Plaquette with series of scars.

Ground stone industry

28 ground stone implements were recovered; this small series of artefacts are analysed for the whole inventory, including feature 8/2000:

- a fragment of a lower quernstone; the upper surface is weakly concave, the lower surface was worked by pecking and slightly polished (Fig. 9),
- 2 fragments of "loaf" shaped upper quernstones. One was made from sandstone, the other from shale (Fig. 10),
- 2 fragments of quernstones, each with one polished surface, made from fine-grained sandstone (Fig. 11),
- a biconcave plaquette; the depressions are bowl-like; from fine-grained sandstone (possibly a rubber – Fig. 12),

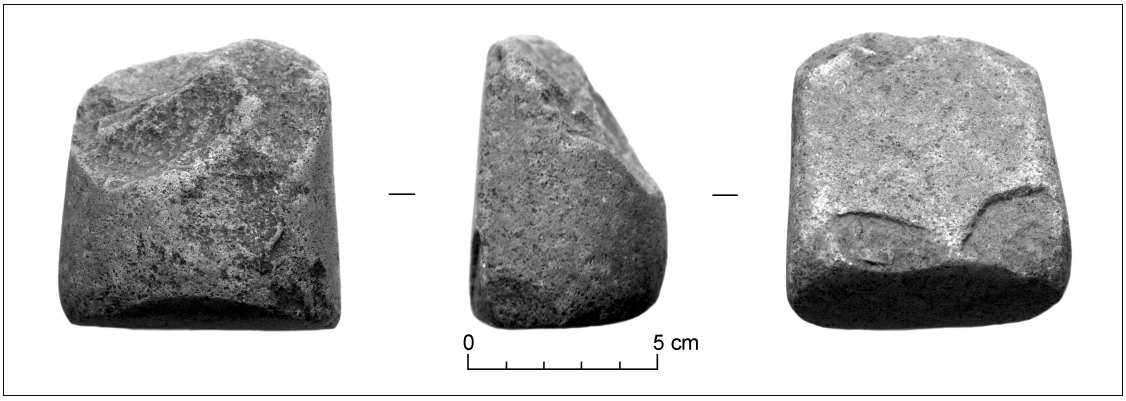


Fig. 16. Košice-Galgovec. Fragment of horse-shoe adze.

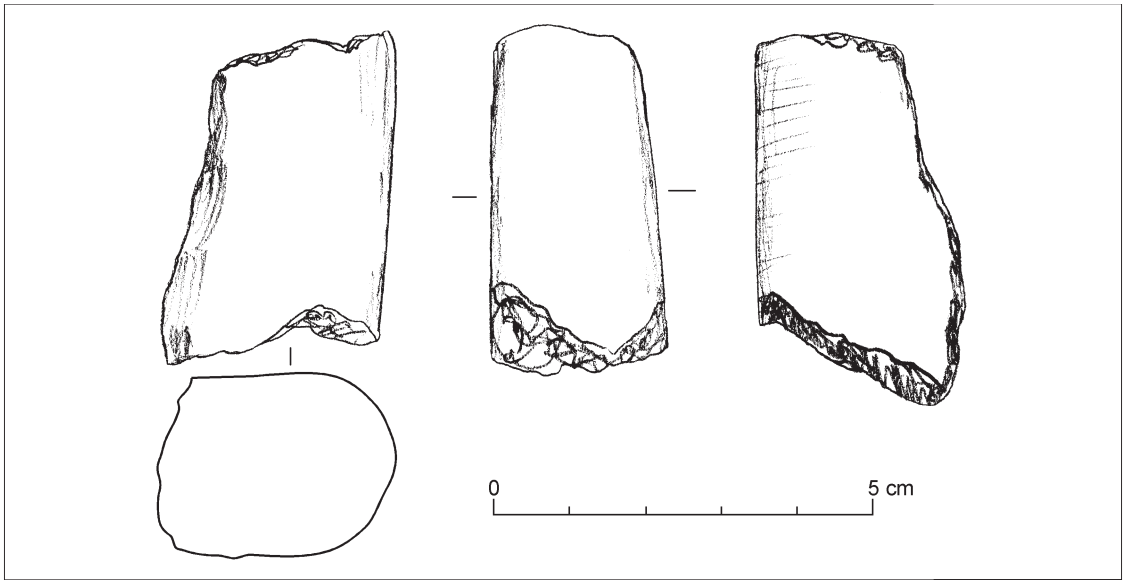


Fig. 17. Košice-Galgovec. Fragment of the axe or adze.

– a weight with a groove for suspending it; from sandstone (Fig. 13),
– 12 hammerstones (10 from quartz, 2 from thick-grained sandstone).

Some specimens were complete and some preserved as fragments; predominantly circumferential (Fig. 14).

– a fragment of a plaquette with scars on the circumference; from black hornstone (Fig. 15). Possibly, this is a half-product of a ground or a polished implement,
– 6 shale chunks.

Moreover, 2 fragments of plano-convex axes from greenish sedimentary rock (Fig. 16; 17) were ascribed to polished tools.

The number of ground and polished stone tools is relatively small. All the artefacts ascribed to this group with the exception of hammerstones are strongly damaged. The polished implements have been preserved as fragments of the two axes and ground stone implements of two quernstones. This situation is different from that at other sites of the same chronological horizon of the Eastern Linear Pottery Culture where, for example at Polgár 31 – Ferenci hát (*Raczky 2004*; *Raczky/Anders 2009*) a large number of ground stone artefacts were recovered. At some Bükk culture sites a large number of polished stone artefacts, as well as their half-products occurred, which suggests the existence of centres of axe/adze production such as e. g. at Šarišské Michaľany (*Kaczanowska/Kozłowski/Šiška 1993*).

The place of Košice-Galgovec in the evolution of the Eastern Linear Pottery Culture in the Košice Basin

The available data enables us to compare the industry from Galgovec with two sites of the Eastern Linear Pottery Culture: Košice-Červený rak (*Kaminská/Kaczanowska/Kozłowski 2008*) and Čečejovce (*Kozłowski 1989*).

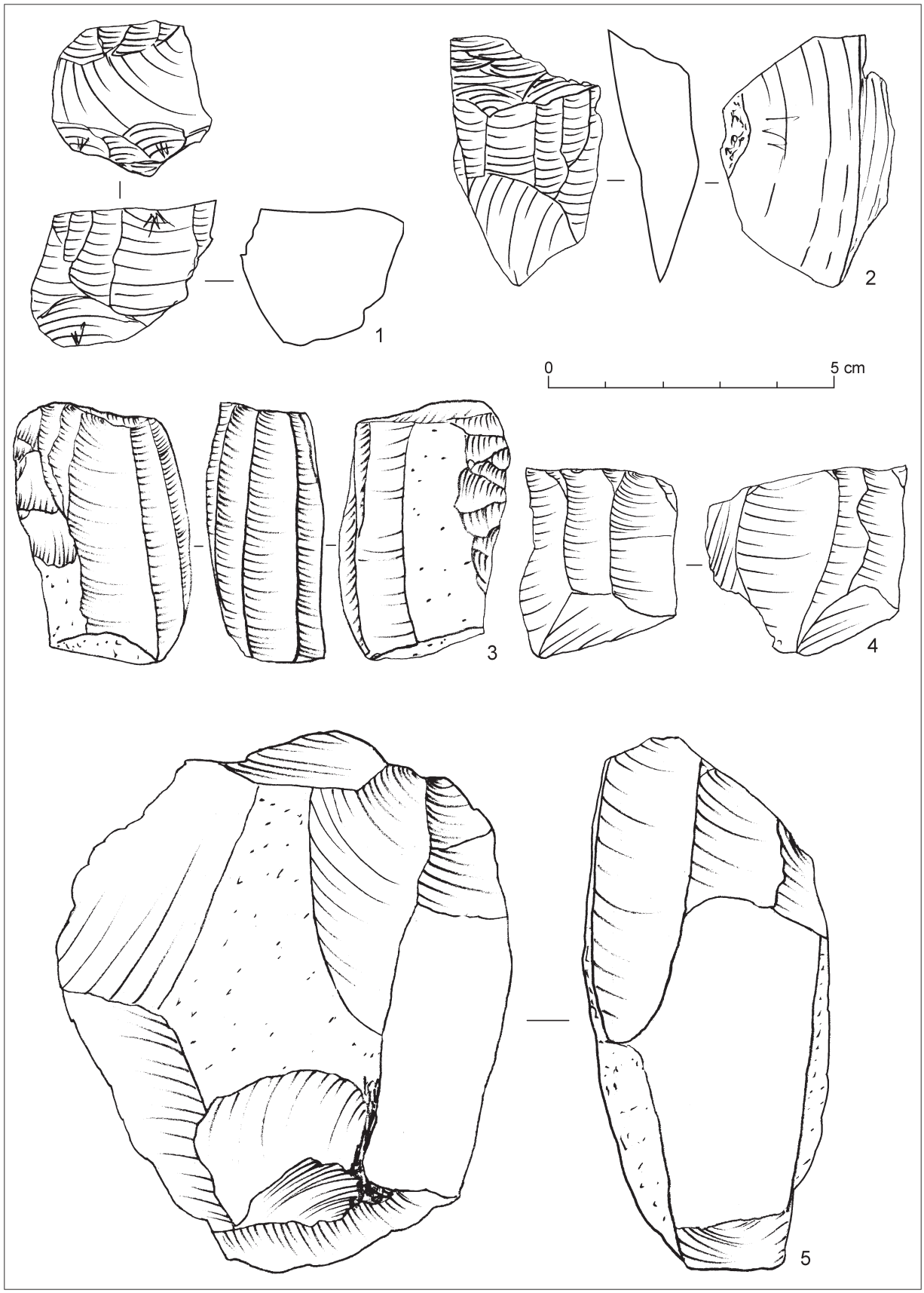
The two latter, fairly early, and the site of Galgovec differ as to the frequency of mezolocal Carpathian obsidian 2. The frequency of this raw material increases sharply from 29.3% at Košice-Červený rak and 32.8% at Čečejovce to 44.6% at Galgovec. On the other hand, the proportion of a variety of local limnoquartzites drops. At Galgovec the range of raw materials is the biggest, where besides local and mesolocal raw materials also extralocal, trans-Carpathian Cretaceous flint occur in Tiszdob group features and in a feature with Early Bükk culture sherds occur not only a flint from Volhynian-Podolian Plateau but also Jurassic flint from the vicinity of Kraków.

The structure of major technological categories changed at these sites to achieve maximum blade frequency at Galgovec. This phenomenon can be accounted for either by gradually perfected skills of knappers, or by transferring preliminary stages of core reduction beyond the living zone of the settlement at Galgovec. The process can reflect diachronic changes in the life ways of the Eastern Linear Pottery Culture – providing Galgovec is indeed the youngest site in this group.

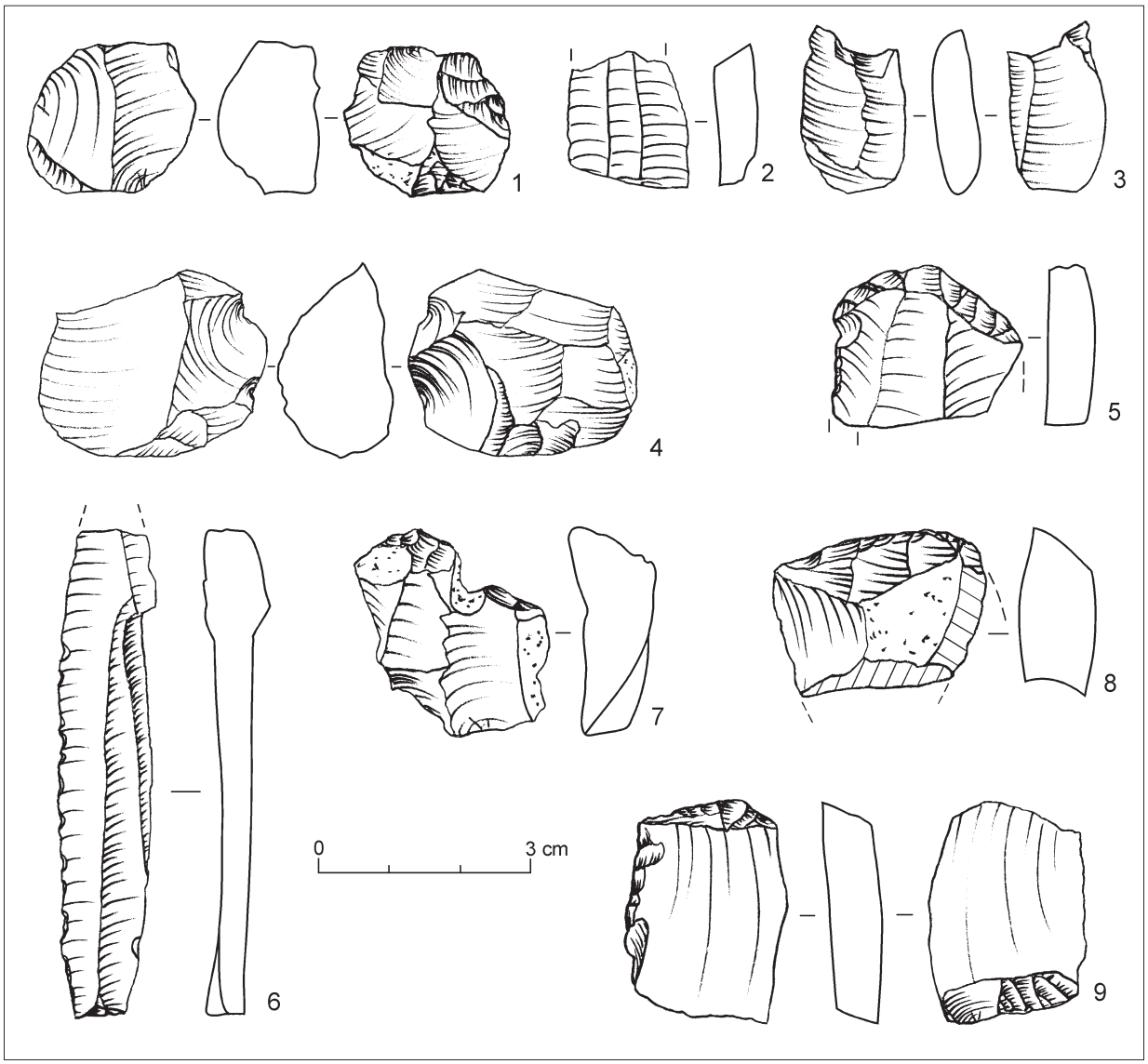
The changes in the tool frequencies were the opposite: at Košice-Červený rak and Čečejovce the tool frequency is higher than at Galgovec. This could have been caused by the fact that at Košice-Červený rak and Čečejovce most blades were modified into tools, or that at Galgovec some activities were carried out elsewhere, beyond the investigated part of the site.

As far as the structure of retouched tools is concerned at Košice-Červený rak – where the lithic series is small – tool groups occur that are not represented in a more numerous series at Galgovec or only poorly represented at Čečejovce. Most importantly, trapezes that occur at Košice-Červený rak (3 specimens) and Čečejovce (one specimen) are absent at Galgovec. Changes in the frequencies of specific tool groups also took place: at Košice-Červený rak and at Čečejovce retouched flakes are in ascendancy, where at Galgovec the proportion of retouched flakes is fairly high, retouched blades predominate. The domination of blades is similar to that registered at other sites in the Eastern Slovakian Plain (*Kozłowski 1997*). At Čečejovce the second largest group are end-scrapers, while at Galgovec they are only 6.4%.

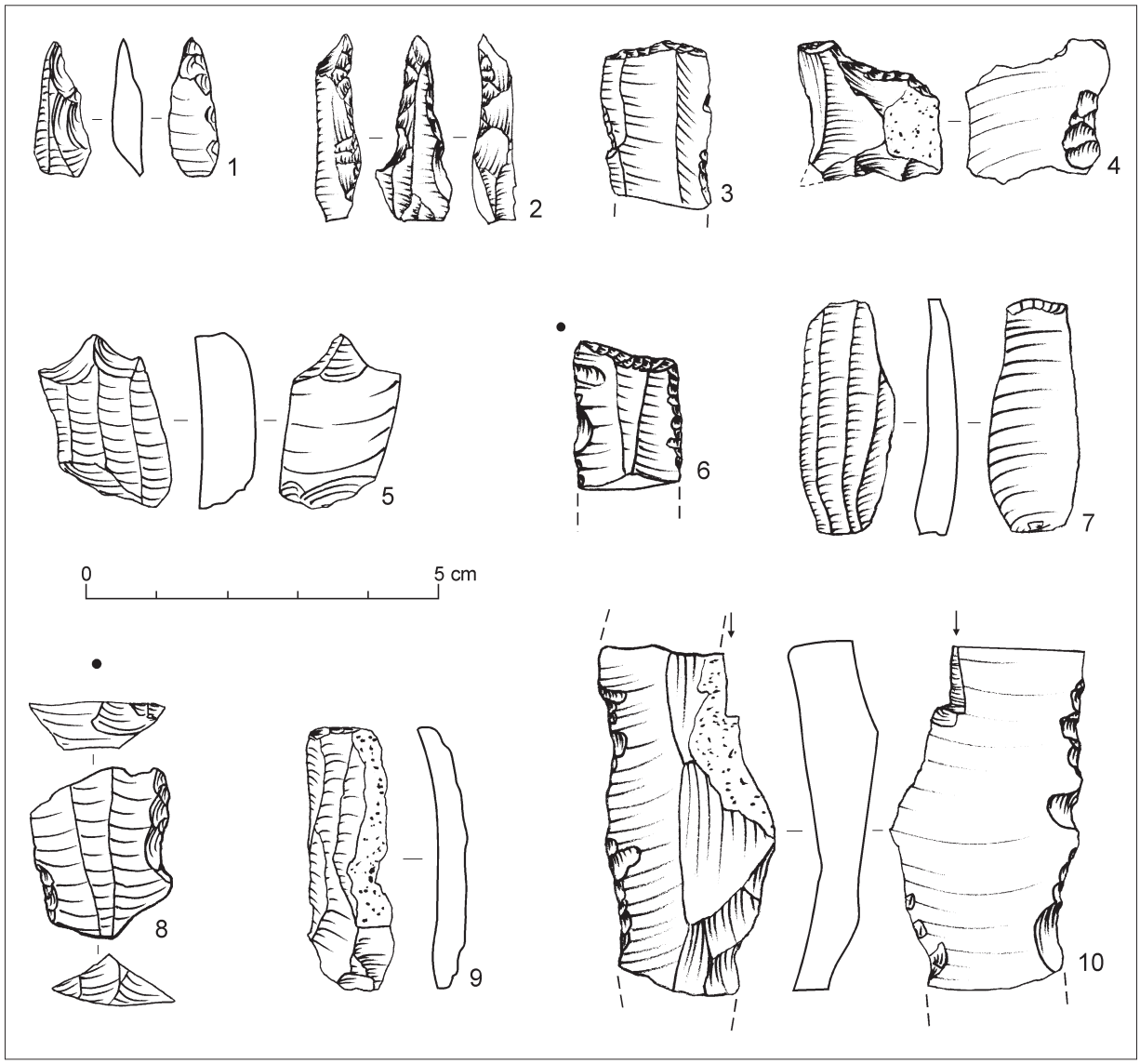
These differences could be the result of specific trends in the regional evolution and differentiation, but they could also have been caused by differences in the function of particular sites.



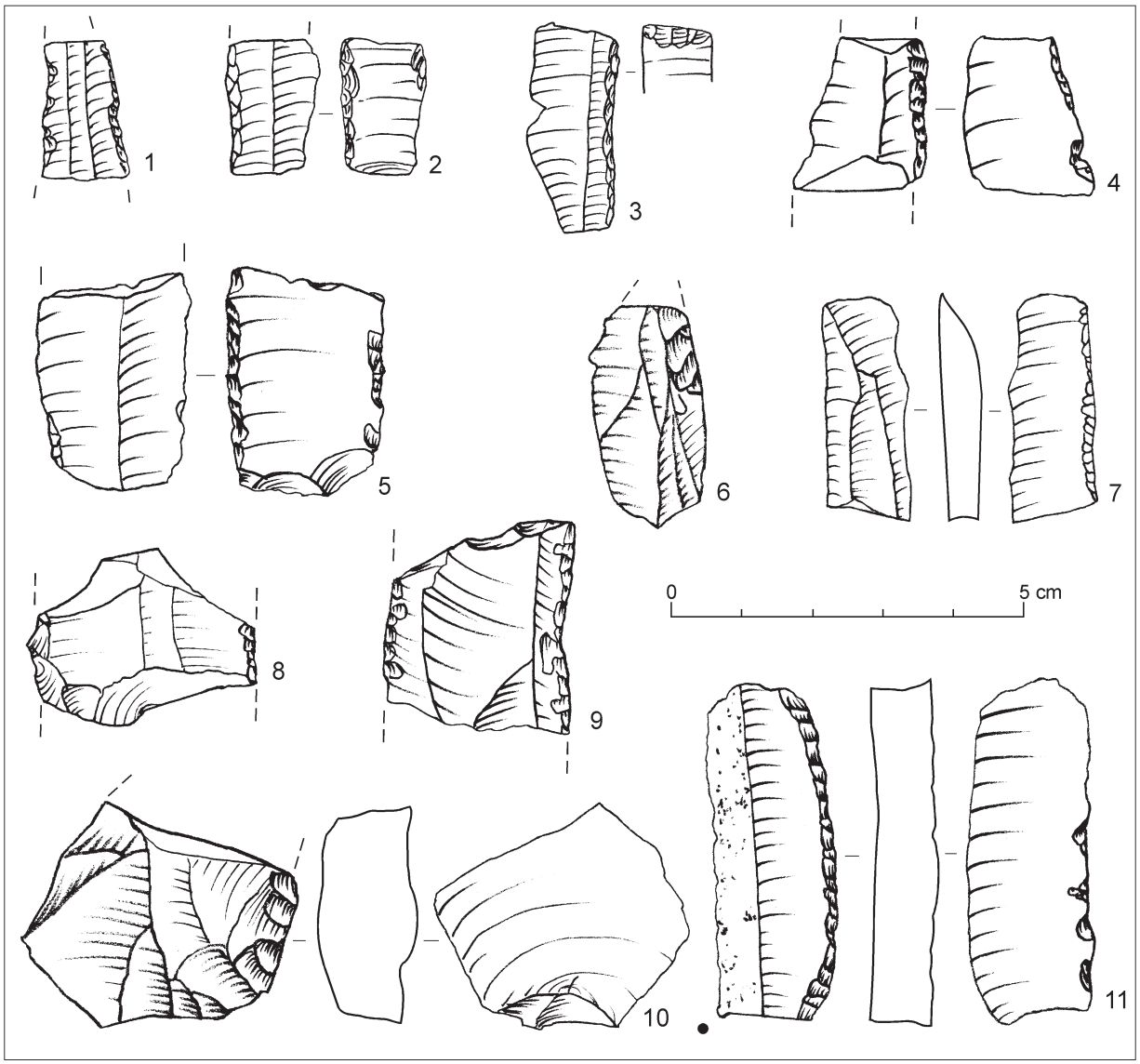
Pl. I. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1–5 – cores.



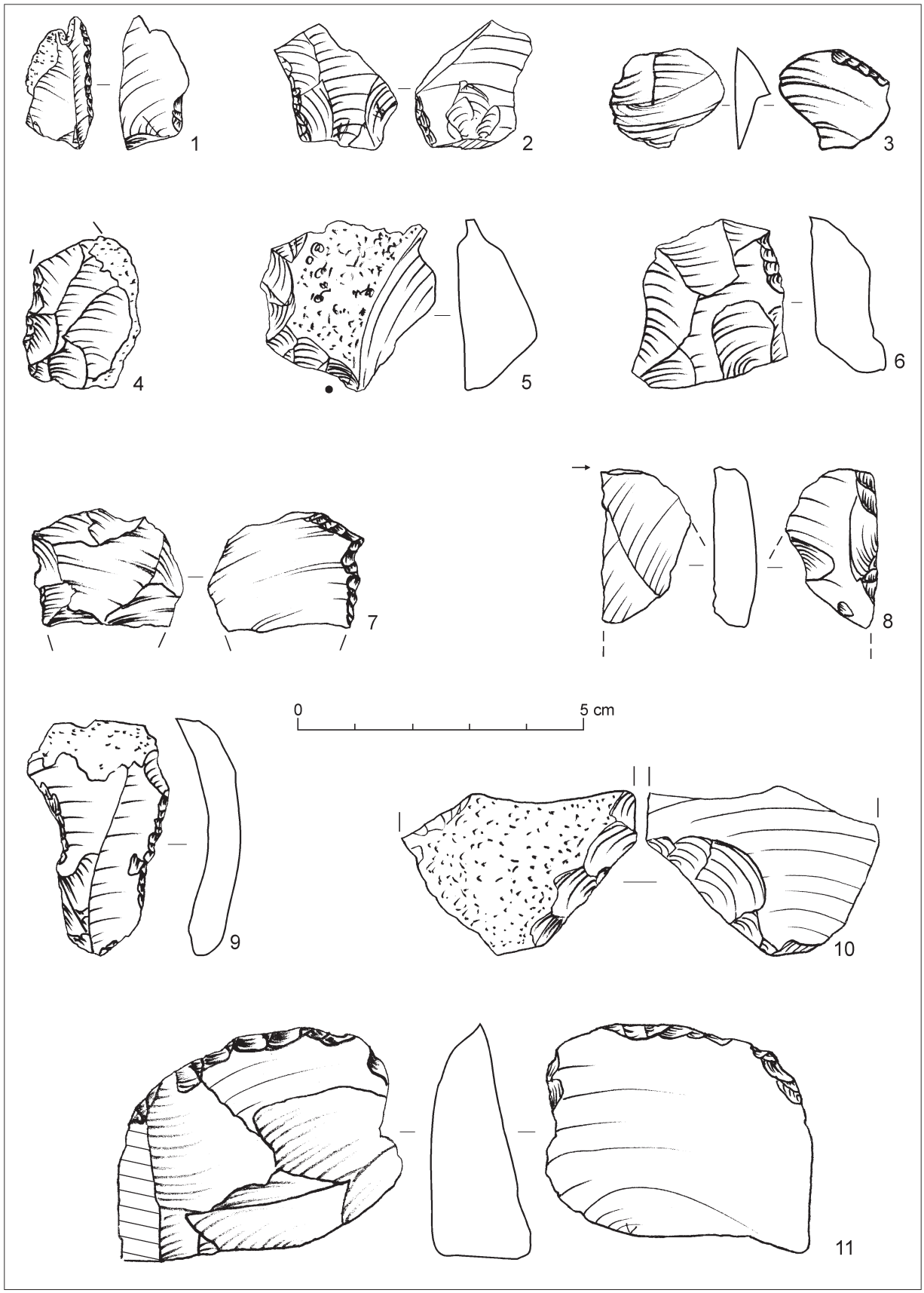
Pl. II. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1 – core; 2 – fragment of blade from Cretaceous flint; 3, 4 – splintered pieces; 5, 7–9 – end-scrapers; 6 – limnoquartzite blade.



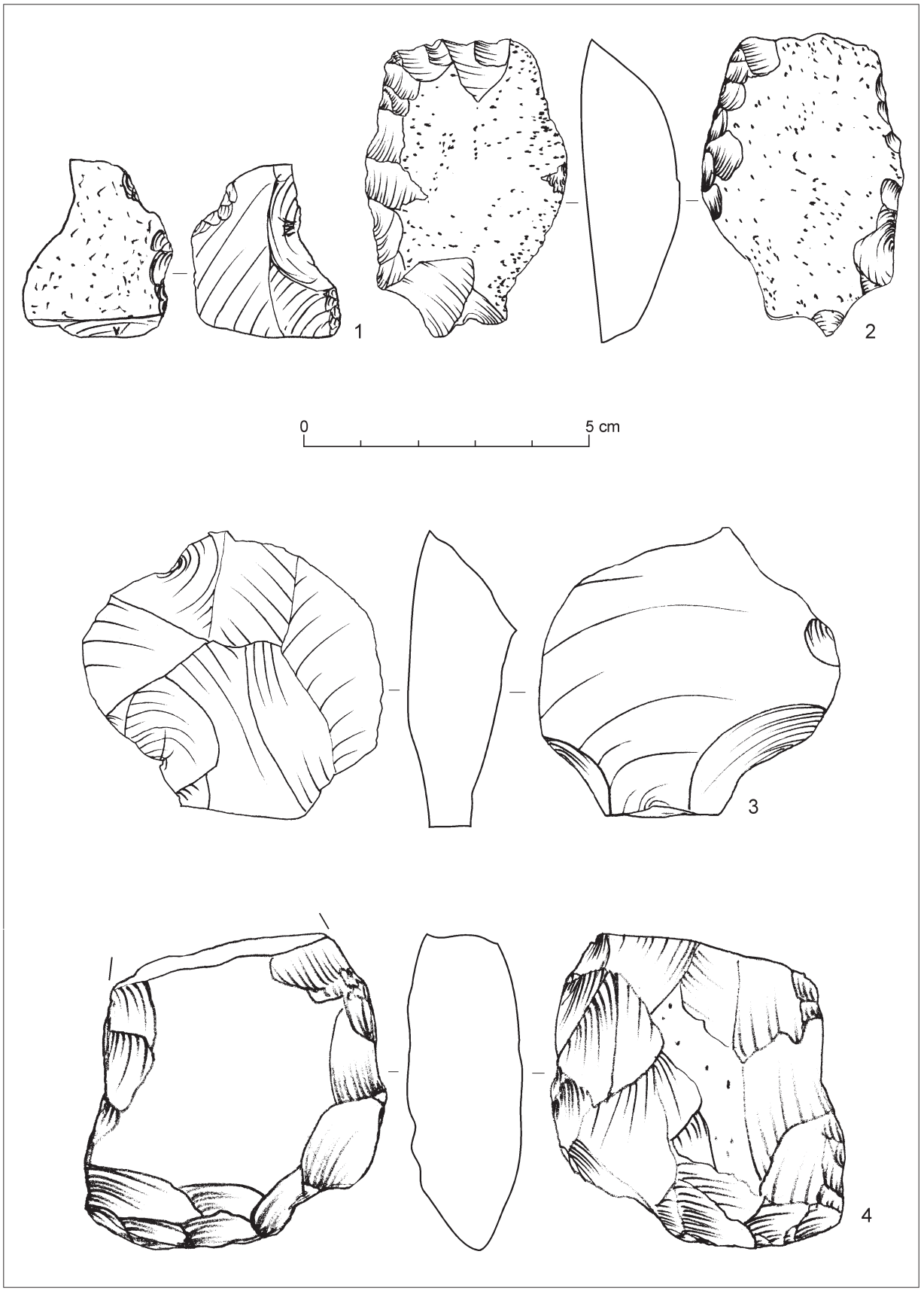
Pl. III. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1, 2, 5 – perforators/becs; 3, 4, 6–9 – retouched truncations; 10 – burin.



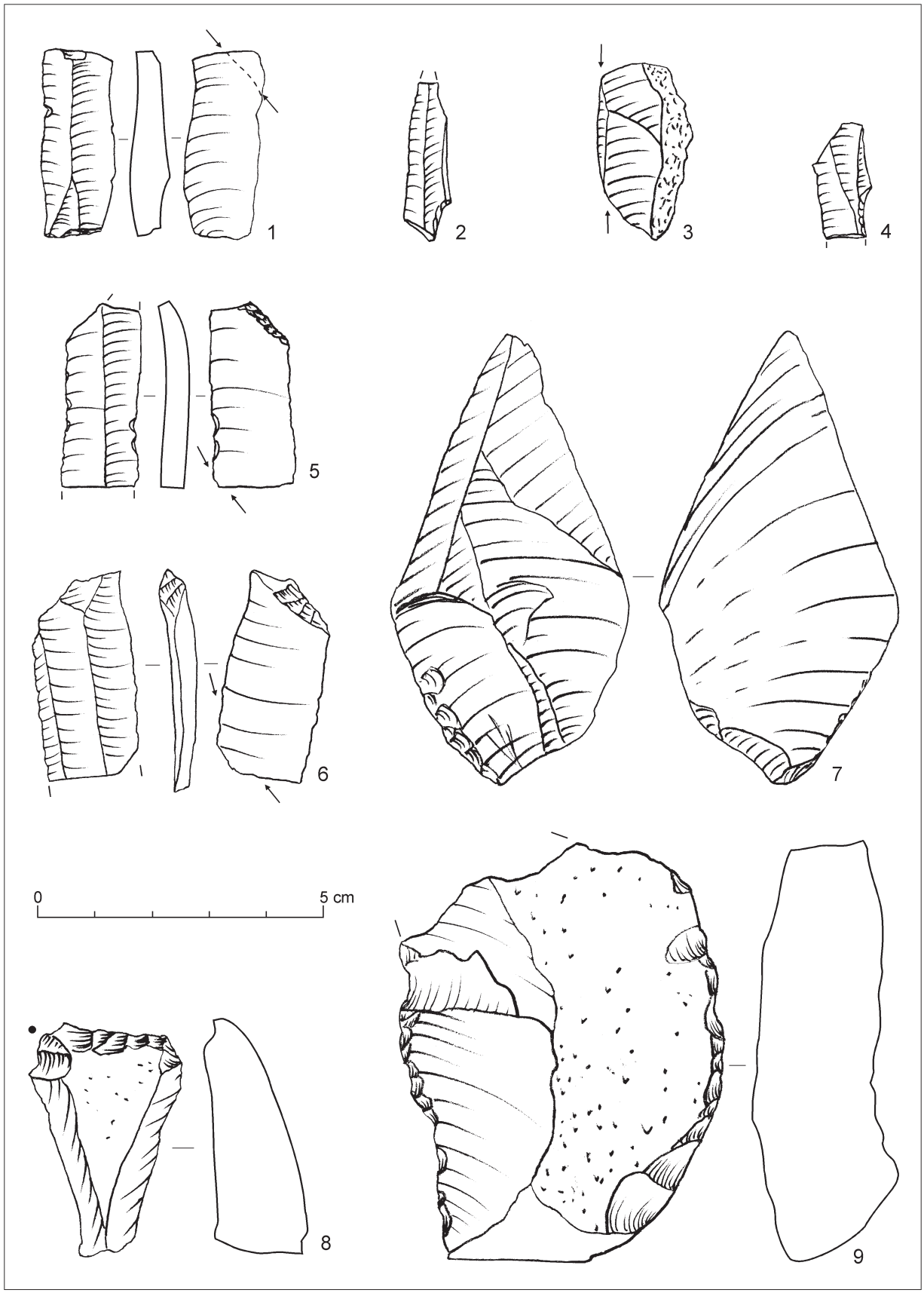
Pl. IV. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1–9, 11 – retouched blades; 10 – retouched flake.



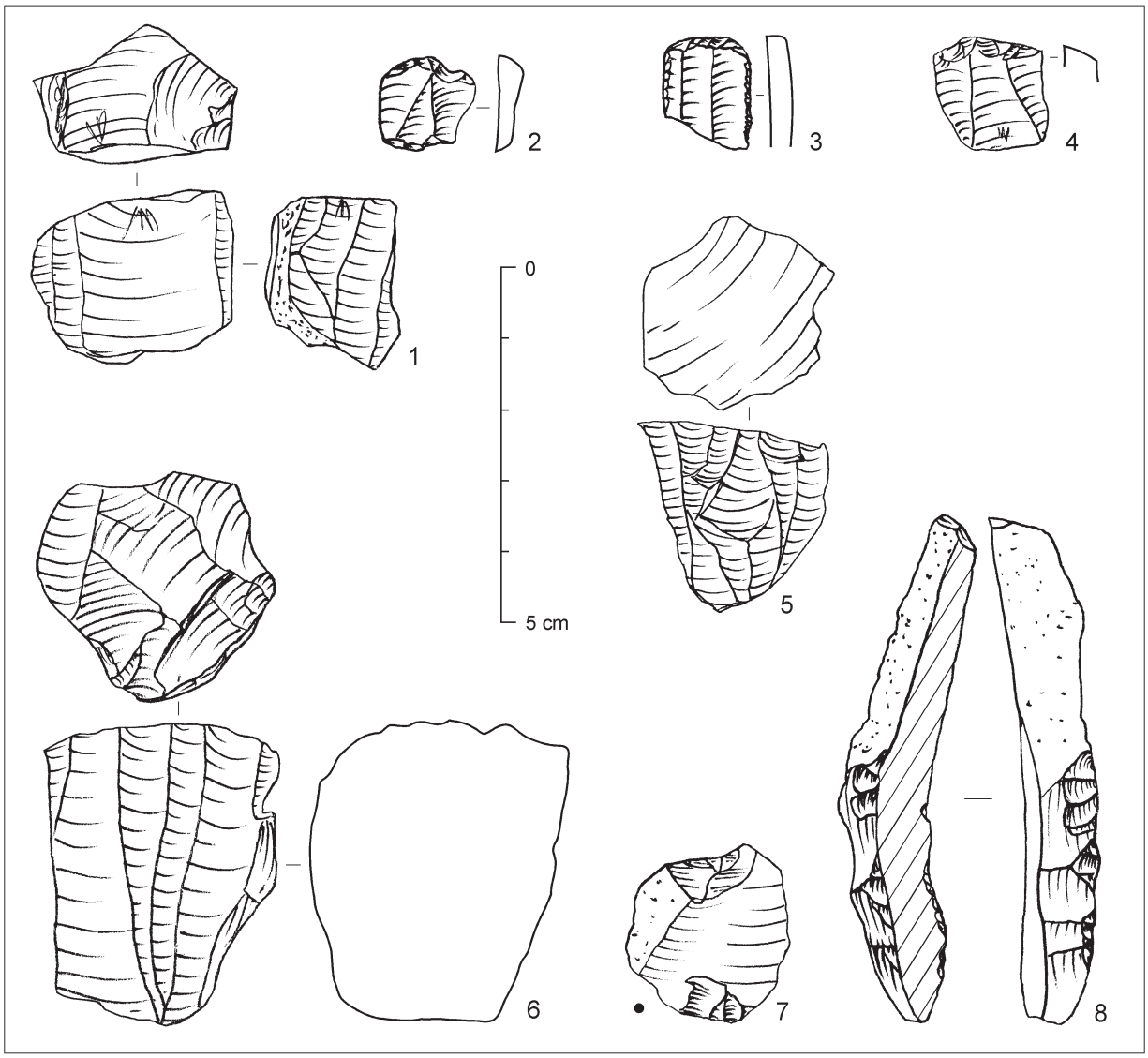
Pl. V. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1–11 – retouched flakes.



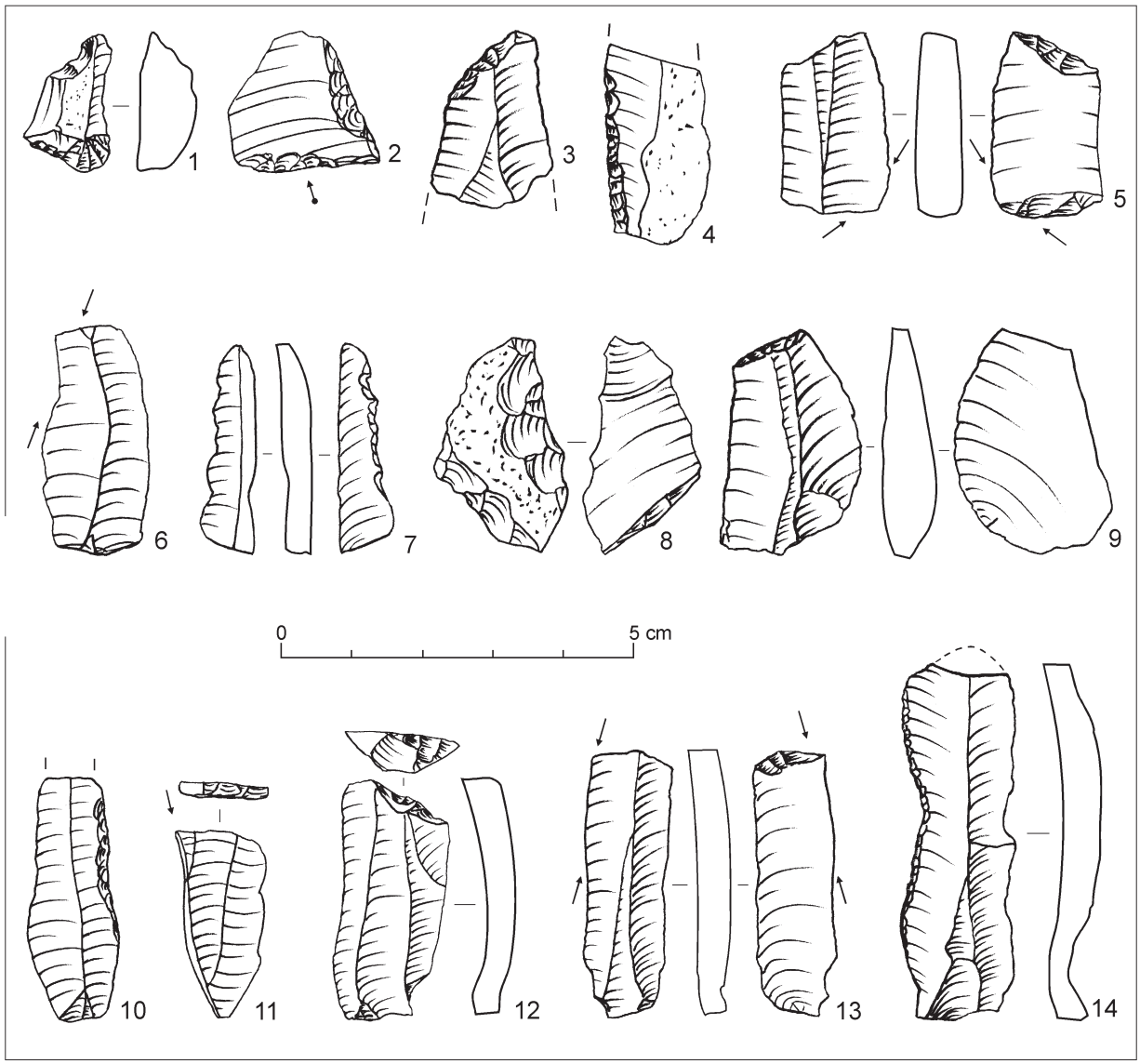
Pl. VI. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1, 3 – notched –denticulated tools; 2, 4 – side-scrapers.



Pl. VII. Košice-Galgovec. Chipped artefacts from Tiszadob group. 1, 3, 5, 6 – sickle inserts; 2, 4 – shouldered blades; 7, 8 – side-scrapers; 9 – flake from hammerstone.



Pl. VIII. Košice-Galgovec. Chipped artefacts from feature 8/2000 (mixed with Early Bükk culture finds). 1, 5–7 – cores; 2–4 – end-scrapers; 8 – crested blade.



Pl. IX. Košice-Galgovec. Chipped artefacts from feature 8/2000 (mixed with Early Bükk culture finds). 1 – Retouched truncation + end-scraper; 2 – atypical bec; 3, 5, 6, 9, 12, 13 – sickle inserts (5, 13 – on retouched truncations); 4, 7, 10, 14 – retouched blades; 8 – retouched flake; 11 – burin.

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Kamenná industria z Košíc-Galgovca a jej miesto vo vývoji a členení kultúry s východnou lineárnou keramikou

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SÚHRN

Článok hodnotí kamennú industriu z polohy Košice-Galgovec v rámci kultúry s východnou lineárnou keramikou a v porovnaní s nálezmi z Košíc-Červeného raka a z Čečejoviec. Nálezy boli získané počas investičných výskumov v rokoch 1997–2000 na terase Myslavského potoka, kde sa sústredilo osídlenie od najstarších fáz neolitu – protolineárna fáza (Košice-Červený rak), skupina Tiszadob (Galgovec I–III), bukovohorská kultúra na obidvoch polohách. Osídlenie skupinou Tiszadob je v polohe Galgovec III, objekt 2/97, datované na 6 310 ±40 rokov BP, kalibrovaných 5 300–5 210 rokov BC a 6 260 ±35 rokov BP, kalibrovaných 5170–5140 rokov BC. Analyzovaných bolo 654 štiepaných kamenných artefaktov skupiny Tiszadob, 28 kusov hrubej industrie a 204 artefaktov zo zmiešaného horizontu skupiny Tiszadob a starej fázy bukovohorskej kultúry (objekt 8/2000). V skupine Tiszadob došlo oproti staršiemu obdobiu k zvýšenému používaniu obsidiánu. Zmeny v typologicko-technologickom zložení inventárov pravdepodobne odrážajú rozdielne funkcie sídlisk.

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