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Early Upper Palaeolithic in the Russian Plain: Streletskayan flaked stone artefacts and technology

BRUCE A. BRADLEY, MICHAEL ANIKOVICH & ENGENII GIRIA*

The artefact assemblages from early Upper Palaeolithic sites in eastern European Russia contain flint tools of more Middle Palaeolithic type. With these artefacts are bifacially thinned triangular forms that may represent the first use of this technology in the area, and perhaps anywhere in Europe.

Introduction

Early Upper Palaeolithic sites in Eastern Europe show clear cultural variations that allow us to indentify a series of archaeological cultures. The Kostenki–Streletskaya (Streletskayan) is of particular interest. It was originally distinguished by A.N. Rogachev (1957) on the materials from the Kostenki–Borshchevo region. It was not long before this material became well-known beyond Russia (e.g. Klein 1969, Kozlowski J., Kozlowski S. 1975; McBurney 1976). In the 1970s–'80s one of Rogachev's students, M.V. Anikovich, continued to investigate this archaeological culture using new methods and techniques (Anikovich 1977; 1992; Rogachev & Anikovich 1984). The following is a summary of what the authors currently know about the Kostenki–Streletskaya archaeological culture with a focus on bifacial technology of the flaked stone assemblages.

Geographical distribution

The known Streletskayan sites are concentrated in the Kostenki–Borshchevo area of the Middle Don Region (FIGURE 1): Kostenki 1, Layer V; Kostenki 6 (or Streletskaya 2); Kostenki 11, Layer V; and Kostenki 12, Layers Ia and III (FIGURE 2). Other Streletskayan sites are Sungir in the Klyazma Basin (Bader 1978), Biryuchya Balka on the Lower Severski Donets (Matyukhine 1990; 1994), and Garchi 1 on the Lower Kama, in the Ural Region (Guslitzer & Pavlov 1993).

Chronology

Streletskayan chronology is based on the sequence of Upper Palaeolithic sites in the Kostenki–Borshchevo region (FIGURE 3), dated by the stratigraphy of loessic colluvium containing humic beds and, in some places, *in situ* buried soils. On a second Pleistocene terrace, humic beds overlie the upper alluvial complex, and are subdivided by loessic colluvium and volcanic ash lens (Hoffecker 1987: 274). Streletskayan sites are included in both Lower and Upper humic beds.

Until recently, both humic beds were thought to have been derived from a soil of Bryansk age, usually correlated with Stillfried B, Denekamp, Arcy etc. (Klein 1969: 48). New data shows the geological age of the Lower humic bed must be earlier: no younger than the Hengelo–Podradem oscillation (Anikovich 1993: 13). Analysis of a Kostenki volcanic ash showed it is of Italian origin and most likely related to catastrophic eruptions in the region of the Flegrey Fields no later than 35,000 b.p. (Medekestsev *et al.* 1984). This indicates that the earliest Streletskayan sites (Kostenki 12, Level III and Kostenki 6) are older than 35,000 b.p. Streletskayan assemblages identified in the bottom of the Upper humic bed (Kostenki 1, Layer V; Kostenki 11, Layer V; and Kostenki

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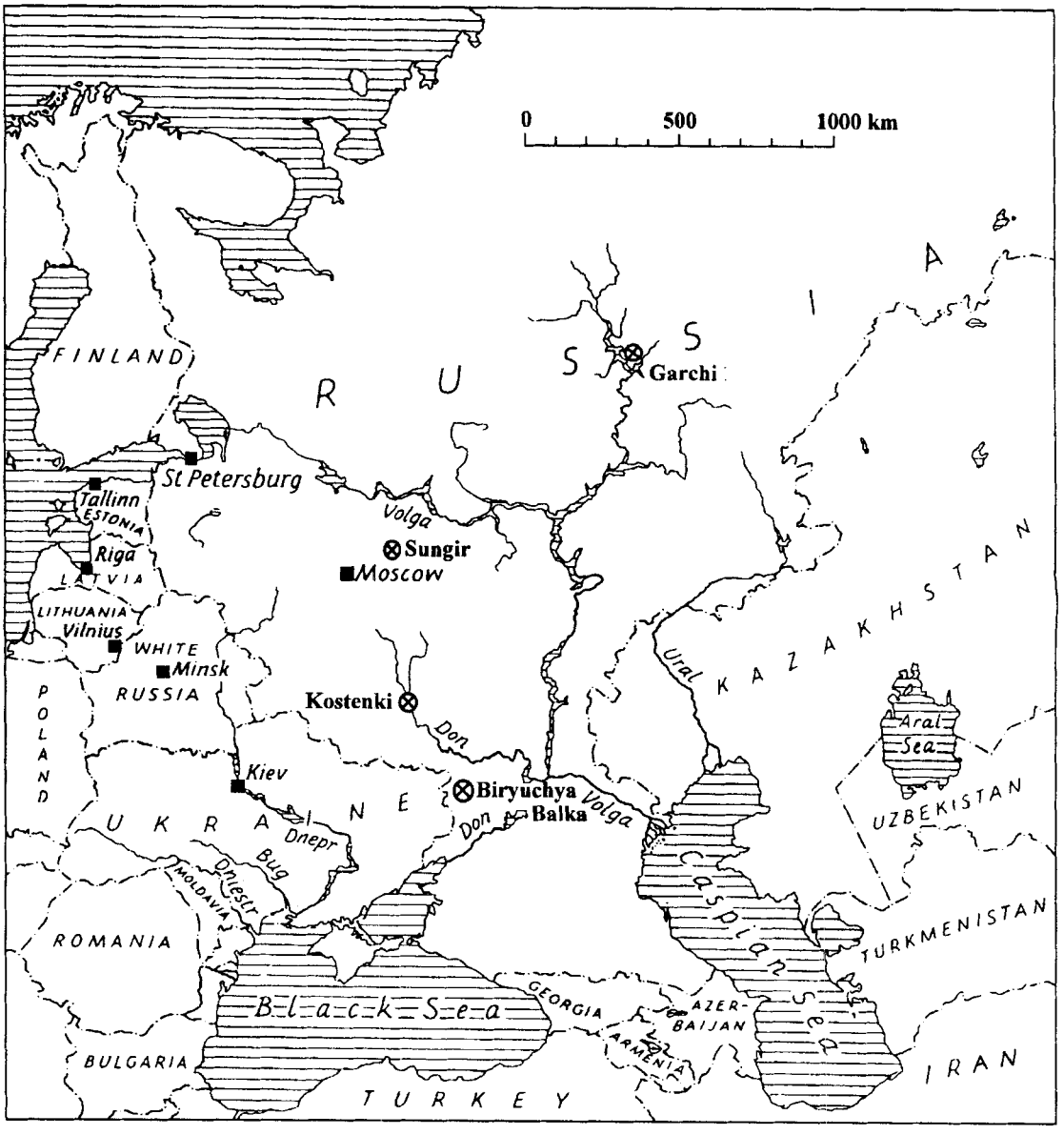

FIGURE 1. *Locations of Streletskayan sites in European Russia (map after Dolukhanov 1993: 153).*

12, Layer Ia) are dated to the very beginning of the Bryansk interstadial. In particular, this is shown by radiocarbon determinations (TABLE 1).

Sungir is the youngest known site of the Kostenki–Streletskaya culture with its cultural layer associated with the upper part of the Bryansk buried soil. The geological ages of Biryuchya Balka and Garchi 1 are as yet unknown, and radiocarbon dates are absent.

Cultural stages and tool typology

Chronology and some flaked stone typological traits of the Streletskayan industries allow us to identify four stages in the development of the Kostenki–Streletskaya archaeological culture.

Stage 1 is represented by two sites in the Kostenki–Borshchevo region, Kostenki 12, Layer III and Kostenki 6 (or Streletskaya 2), both in the Lower Humic bed. Materials from

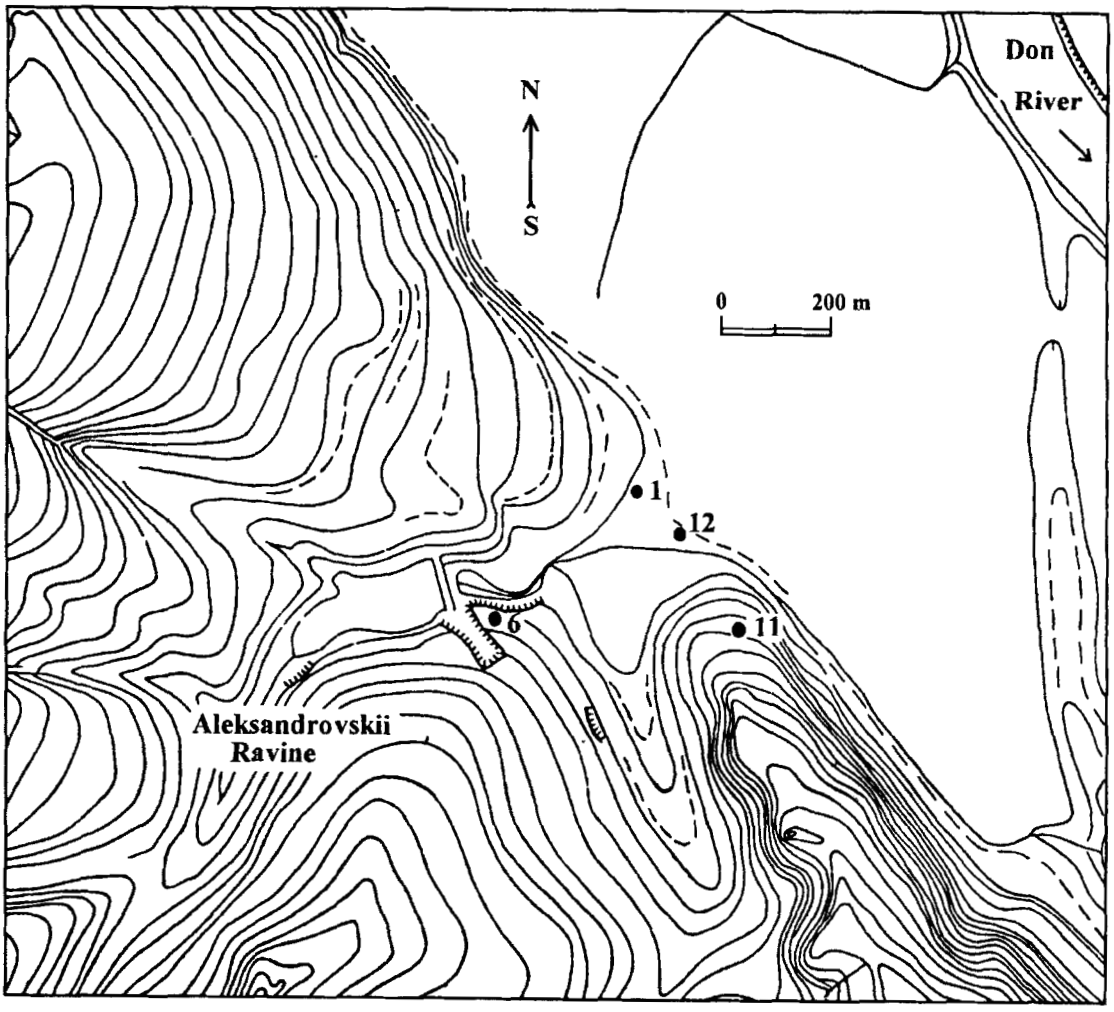

FIGURE 2. *Locations of Streletskayan site components in Kostenki (from Rogachev 1955: figure 1).*

Kostenki 12, Layer III are most characteristic. The assemblage is extremely archaic in both technology and typology. Blades are nearly absent: only three tools are made on large blades or blade-flakes; the rest are on tabular fragments and flakes. Of 1100 stone artefacts reliably associated with this layer, 160 are considered tools. Most of the types are Middle Palaeolithic, including sidescrapers, both single and double (some convergent and some oval), and Mousterian and Quinson points. Knives were made on tabular pieces of yellow flint with bifacial retouch along one edge. More typical Upper Palaeolithic tools are also present, endscrapers being the most characteristic. They are small with continuous edge retouch, producing a roughly triangular form. Two thick 'chisels' are very distinctively Streletskayan. Burins are virtually absent. Four other tools are atypical scaled pieces. The most characteristic tools are bifacial points (n=25). They include triangular points with concave bases, considered typical of the Streletskayan (FIGURES 4 & 5); 'poplar-leaf' points (FIGURE 6), double-pointed pieces etc. Many of them are unfinished pieces, which makes it difficult to make exact typological assignments. Along with bifacial leaf-points, oval bifaces are known from Kostenki 12, Layer III.

Stage 2 is best represented by the assemblage from Kostenki 1, Layer V. Of the 2500 stone artefacts recovered from this layer, 150 are

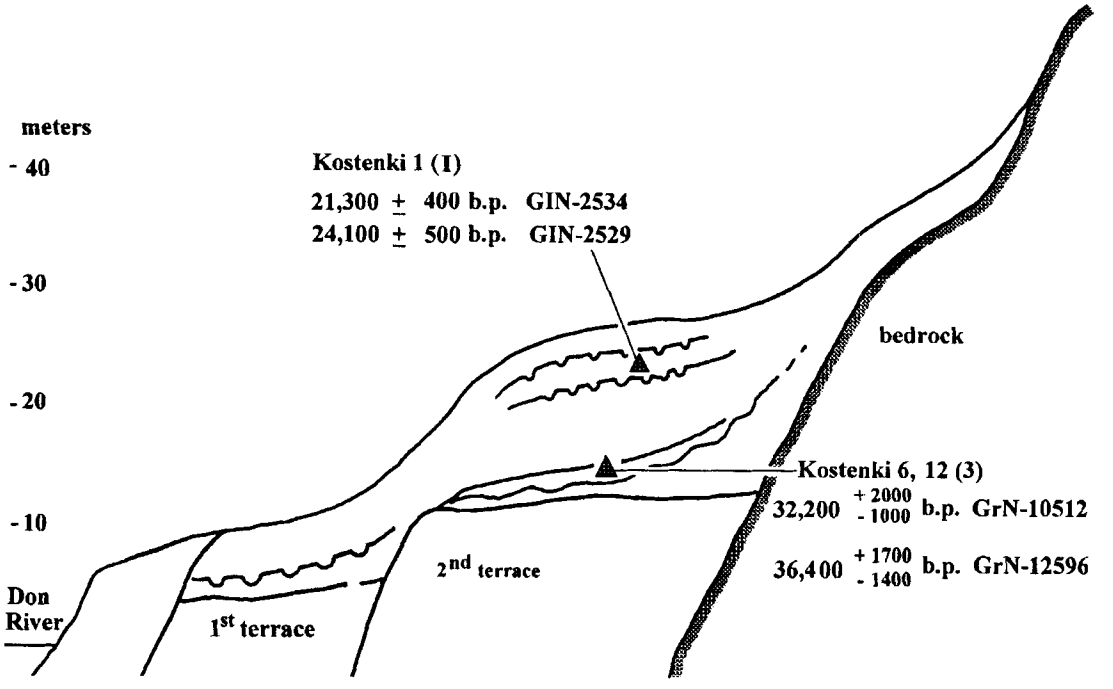

FIGURE 3. *Stratigraphic positions and ^{14}C date ranges of Kostenki 1 (I) Kostenki–Avdeevo archaeological culture, and Kostenki 6 and Kostenki 12 (III) Streletskayan archaeological culture.*

site	layer	determination (b.p.)	lab. no.	sample
Kostenki 1	V	27,390±300	LE-2030	mammoth tooth
Kostenki 1	V	30,170±570	LE-3542	mammoth tooth
Kostenki 12	Ia	28,700±400	LE-1428A	wood charcoal
Kostenki 12	Ia	30,240±460	LE-1428B	wood charcoal
Kostenki 12	Ia	31,150±150	LE-1428V	mammoth tooth
Kostenki 12	Ia	31,900±200	LE-1428G	mammoth tooth
Kostenki 12	Ia	32,700±700	GrN-7758	wood charcoal
Sungir		24,430±400	GrN-5446	material unknown
Sungir		25,500±200	GrN-5425	material unknown

TABLE 1. *^{14}C dates from Streletskayan sites.*

tools. The knapped stone technology is the same as Kostenki 12, Layer III, although the number of tools on blades is somewhat higher. This industry differs from Stage 1 mainly in an increased relative quantity of typical Upper Palaeolithic tool form categories as well as their increased standardization. For example, the endscrapers resemble those from Kostenki 12, Layer III, but their shapes are more standardized. Short triangular scrapers along with large and small cordiform endscrapers are characteristic. Burins are rare, but transverse burins are noteworthy as a specific 'Streletskayan' type. Borers and scaled pieces are typical. Bifacial tools (n≈50) are in most cases the same types as in Stage 1, but triangular points with concave bases are more frequent and occur in a variety of sub-types, distinguished by size, proportions, and base shape. Miniature points deserve special mention as possible arrow-points. Asymmetrical bifacial knives and backed bifacial knives with convex blades appear. Mousterian types are represented by sidescrapers, Mousterian points and Quinson points.

The industry from the Upper Palaeolithic site of Garchi 1, on the Lower Kama, northern

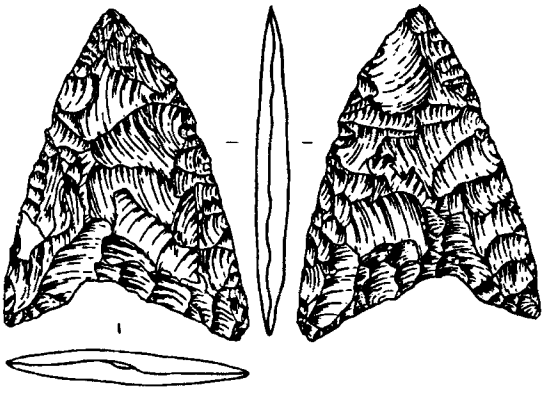

FIGURE 4. *Triangular bifacially thinned point from Kostenki 1, Level V.*

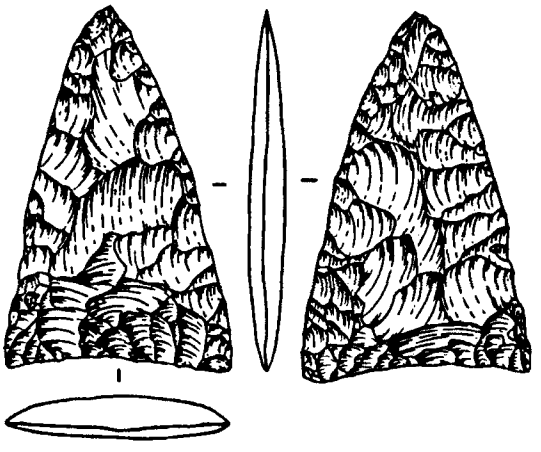

FIGURE 5. *Triangular point from Kostenki 1, Level V.*

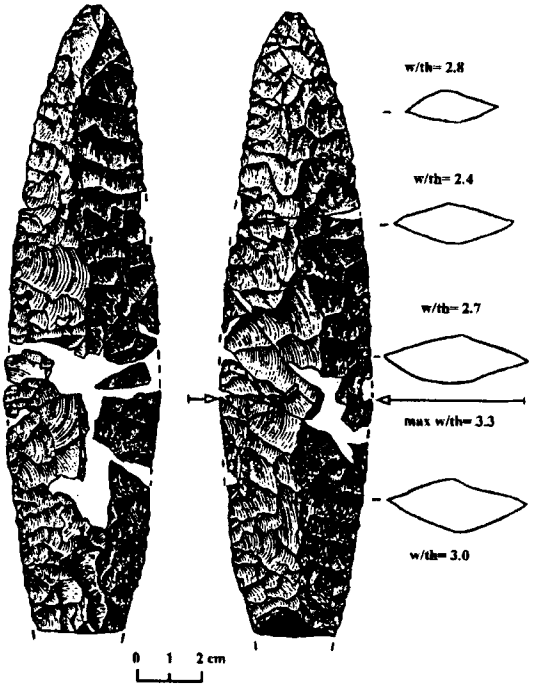

FIGURE 6. *'Poplar-leaf' point from Kostenki 4, Level 1 (not thinned), with its width/thickness ratios.*

Ural Region, in spite of its long distance from Kostenki, is the closest typological analogy to Kostenki 1, Level V (it contains the same types and sub-types of endscrapers, triangular points, sidescrapers, etc.). This leaves no doubt that Garchi 1 belongs to Stage 2 of the Kostenki–Streletskaya archaeological culture, though its geological age is still unknown (Guslitzer & Pavlov 1993).

Stage 3 is represented by materials from Biryuchya Balka. This many-level site was discovered in 1987 by A. Matyukhin in the lower reaches of the Severski Donets and the materials are still being studied by him. The authors do not know the exact number of cultural layers or their geological ages. Inspection of some of the collection leaves no doubt that at least one of the layers is Streletskayan. The rich collection of more than 600 stone tools (Matyukhin 1990) includes features characteristic of Stage 2 (triangular and cordiform endscrapers, triangular bifacially thinned points with concave bases, and thick 'chisels') and features characteristic of the final stage (4) of the Kostenki–Streletskaya archaeological culture (see below). This mixture allows the assemblage to be treated as Stage 3.

Stage 4 of the Streletskayan is represented at the site of Sungir, in the outskirts of the town of Vladimir in the Klyazma River Basin, northeast of Moscow (Bader 1978). The rich collection includes tens of thousands of artefacts, of which 2000 are tools. While retaining features typical of the Kostenki–Streletskaya culture, Sungir also has a large number of distinctive properties. There is an increased percentage of blades while the number of bifacial tools decreases sharply. There are only two sub-types of triangular points and only one type of bifacial leaf-point (almond-shaped points with rounded bases). Few of the approximately 400 endscrapers are like those characteristic of Kostenki 1, Layer V. Most are oval, round, or carinated and made on parallel-sided blades.

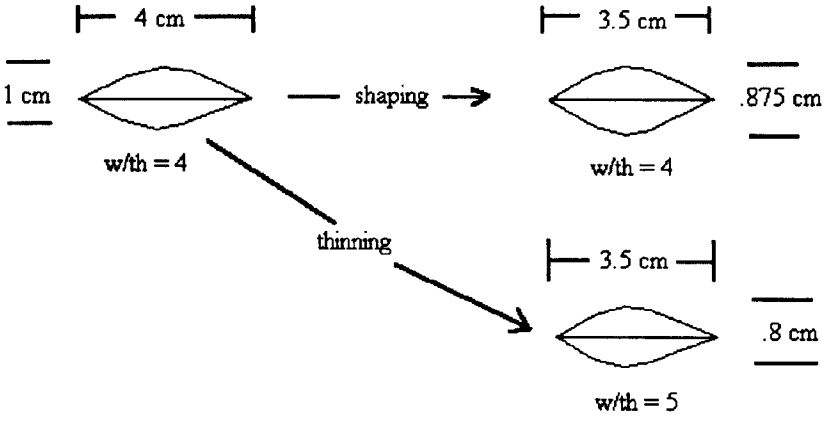

FIGURE 7. *Schematic illustration of relative shaping and thinning.*

There are also approximately 300 burins, the first time they are numerous in a Streletskayan assemblage. Scaled pieces (±300) are more common and more standardized than in the preceding stages. However, 'archaic' aspects of the assemblage keep the principal typological features seen in the preceding stages, although it makes up a much smaller percentage. This 'typological stability' of the Mousterian component is a very important feature of the Streletskayan.

The development of the Streletskayan was from flake- to blade-based tools, an increase in Upper Palaeolithic-type tools, and a relative decrease (in percentage) in Mousterian forms, which nevertheless continue throughout Streletskayan development. There is a sharp decrease in bifacial forms toward the end as well.

In a general sense the Kostenki–Streletskaya culture undoubtedly belongs to the Szeletoid technocomplex. In its final stage, clearly Aurignacoid features appear to be mixed with Szeletoid characteristics (Grigor'ev 1990).

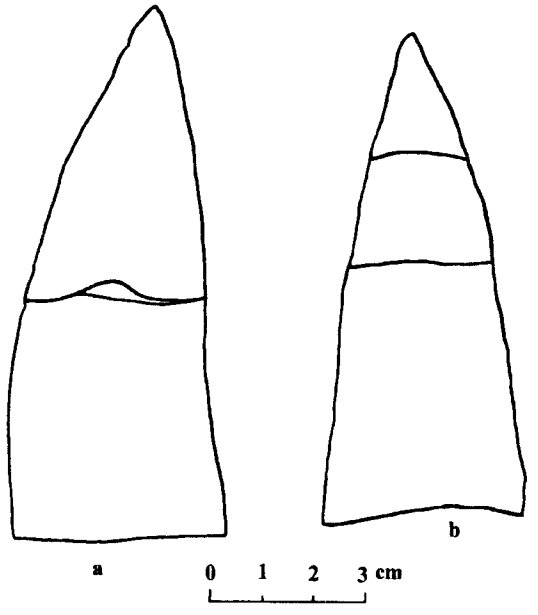

FIGURE 8. *Examples of breaks that occurred during bifacial thinning at Biryuchya Balka:* a *perverse fracture; and* b *end shock.*

Streletskayan bifacial flaked stone technology

The technology of bifacially flaked artefacts in the Streletskayan is complex and varied. Bifacial flaking includes simple edge shaping, bulbar thinning, complete surface shaping, and intensive thinning. This final category is of particular interest.

Bifacial flaking of stone artefacts, which began in the Lower Palaeolithic, was done to varying degrees throughout the Middle Palaeolithic. Of particular interest in the Streletskayan is intensive, all-over, bifacial thinning. To accomplish this with any degree of consistency requires specialized margin platform preparation. Not all well-made bifacial forms resulted from thinning processes (see FIGURE 6 for an example). Bifacial reduction of a piece is considered thinning when proportionally more material is removed from the surface of the piece than from the edge (FIGURE 7).

Examination of a number of bifacially flaked artefacts, from several sites, as well as a small collection of bifacial debitage from Kostenki 1, Level V, has resulted in the following obser-

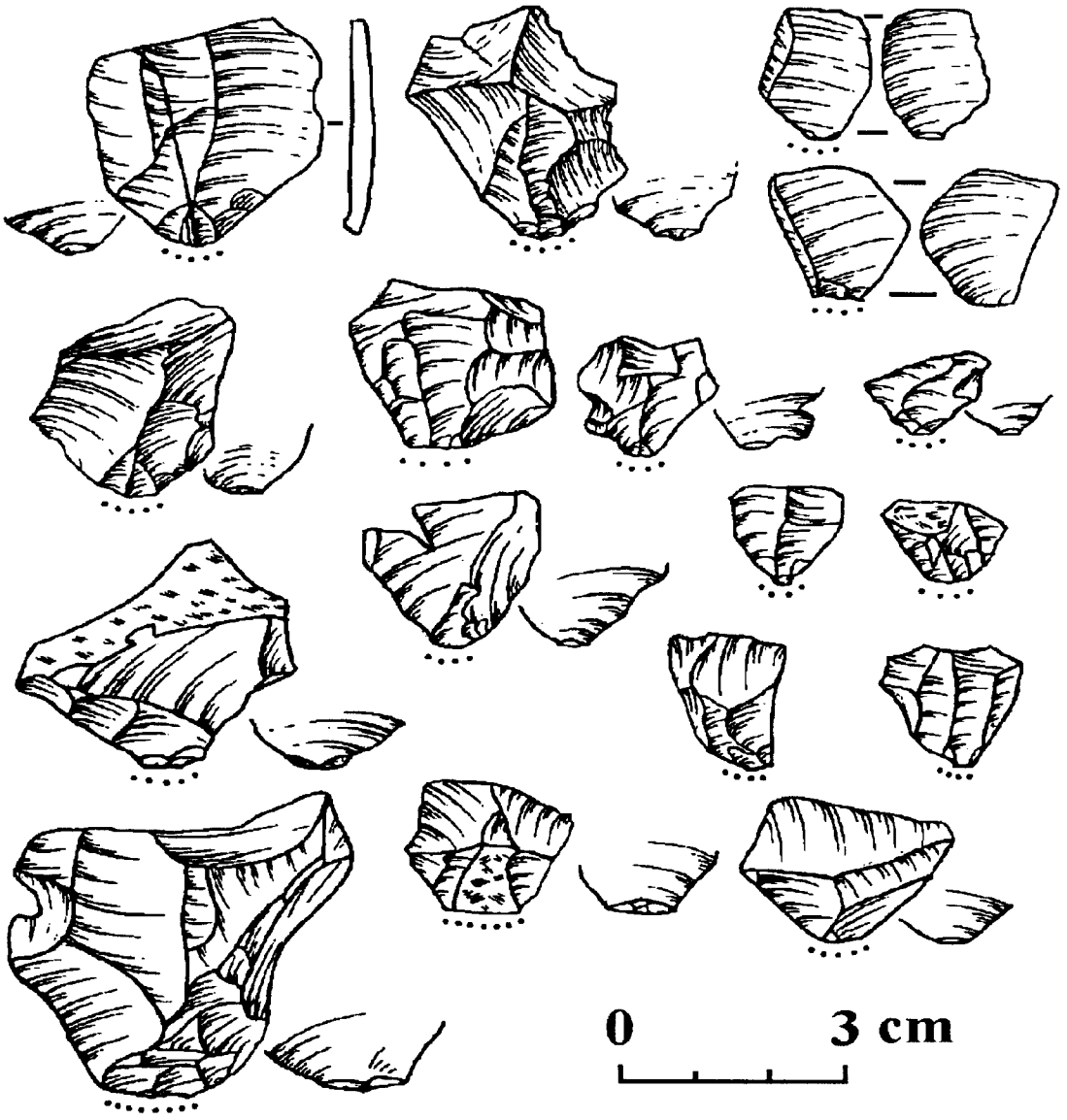

FIGURE 9. *Bifacial flakes and fragments for Kostenki 1, Layer V (dots indicate extent of platform grinding).*

vations. There were two basic approaches to the production of the triangular, indented base points. The first was the reduction of an unmodified piece of raw material or a thick flake. The second was the use of a relatively thin flake-blank.

The extremely important assemblage from Biryuchya Balka includes a wide range of forms representing all stages of bifacial thinning reduction. Unfortunately, the authors have only been able to make a cursory examination of some of these materials. Bifacial thinning was being done systematically; many bifaces were broken during manufacture with typical breaks including perverse fractures (Crabtree 1972: 82–3) (FIGURE 8a) and end shock (Crabtree 1972: 60–61) (FIGURE 8b). Margins were thin, and individual platform preparation was being done during the later stages of thinning. Chalk flint of excellent quality was being used,

maximum thickness	maximum width	w/th
Kostenki 1, Level V		
0·6	4·4	7·3
0·4	3·4	8·5
0·4	3·0	7·5
0·3	1·8	6·0
0·5	2·7	5·4
0·5	2·6	5·2
0·7	2·5	3·6
0·9	2·6	2·9
0·5	1·8	3·6
0·3	1·8	6·0
0·5	2·7	5·4
0·3	2·3	7·7
Kostenki 11, Level V		
0·6	4·7	7·8
0·35	3·7	10·6
Biryuchya Balka		
0·6	3·6	6·0
0·6	3·5	5·8
0·7	3·9	5·6
0·8	3·5	4·4
1·2	4·9	4·0
Sungir		
0·45	3·5	7·7
0·6	2·5	4·1
0·6	3·0	5·0
0·5	2·6	5·2
0·9	2·8	3·1
0·6	3·7	6·1
0·5	2·9	5·8
average		
0·57	3·1	5·4

TABLE 2. *Dimensions of finished Streletskayan bifacially thinned triangular points.*

and the sizes and forms of the raw material should not have placed any restrictions on the production of these bifacial artefacts.

In contrast to Biryuchya Balka, the bifacially thinned artefacts from Kostenki 1, Layer V were mostly made from multicoloured cherts that occur in fairly small angular pieces in glacial deposits. Several finished pieces and a collection of debitage were available for study. In every case, the finished pieces and the debitage were produced from chert that had been heated in such a manner that the flakability of the material was not damaged and was probably substantially improved. No unequivocal evidence that this was intentional heat treatment was observed, but it is very difficult to imagine a natural situation where this would be obtained.

The debitage, primarily from late-stage thinning and shaping, consistently exhibits carefully prepared platforms. Preparation included bevelling, isolation and moderate to heavy grinding (FIGURE 9). Flake scar patterns on the flakes and finished bifaces indicate that there was no specific pattern of removal. The isolation of some platforms, the evenness of the final margins and the thinness of the edges and platforms indicate that flaking was highly controlled and probably accomplished with an antler or bone billet. Some edge retouch, especially at the basal corners and tip, may have been done by pressure flaking.

That the triangular, indented-base Streletskayan 'points' resulted from a highly controlled, complex bifacial thinning technology is very clear. It is even likely that this technology included pressure flaking and intentional heat treating of raw material or blanks. The degree to which bifacial thinning was employed may be observed by examining the resulting thickness-to-width ratios (TABLE 2). Within a quite wide range (2·9 to 10·6), the average (5·4) compares very favourably to bifacially thinned artefact types in the Solutrean in southwest France (5·1); sample from illustrations in Smith (1966) and with palaeoindian types in North America (FIGURE 10). In fact, the average Streletskayan point is relatively thinner than Hell Gap points from the Casper Site (Frison 1974: 81) and Clovis points from the Fenn and East Wenatchee caches (unpublished data assembled by the senior author). On the other hand, all of these samples are relatively thinner than a group of fully-bifaced artefacts (not including handaxe forms) from Middle Palaeolithic (Mousterian) assemblages in the former Soviet Union; sample drawn from illustrations in *Palaeolithic USSR* (Boriskovskii 1984).

Bifacial thinning, a complex and difficult flaking procedure, has inherent risks and often results in failure. This risk is greatly reduced by careful preparation of the platforms and careful spacing of thinning flake remov-

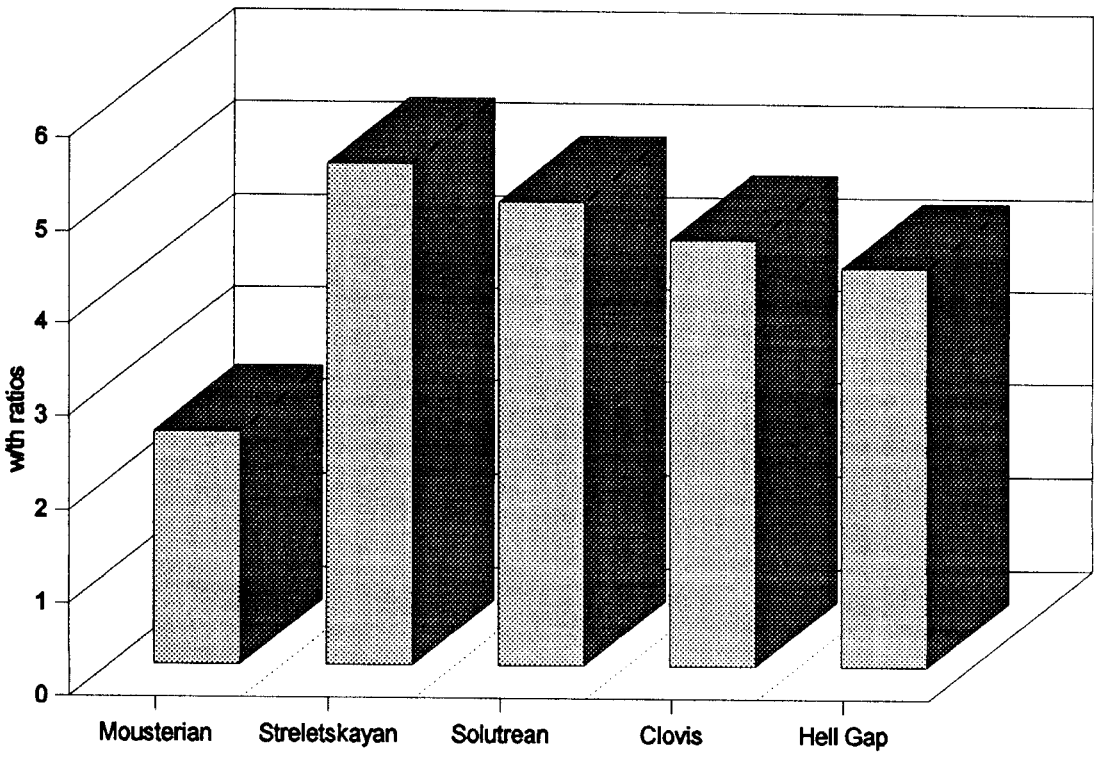

FIGURE 10. *Chart showing relative thinness of bifaces from some North American, Streletskayan, and Mousterian assemblages.*

als. It is also advantageous to have high-quality raw material that fractures evenly but maintains strength and flexibility.

Conclusions

Typologically and chronologically the Streletskayan derives directly from Middle Palaeolithic archaeological cultures in eastern European Russia and through its approximately 10,000 years of development, slowly takes on characteristics of Upper Palaeolithic assemblages. Of particular interest is the presence of a sophisticated biface thinning technology that persisted throughout the Streletskayan. Although it is probably derived from an earlier Middle Palaeolithic biface technology, the development of thinning methods clearly sets it apart. The use of carefully prepared platforms (including grinding and isolation) along with the possible pressure flaking and intentional heat treating of raw materials (observed only at Kostenki 1, Layer V) in the Early Upper Palaeolithic of Eastern Europe, indicates this specialized technology was developed well before the much better known Solutrean technology of southwestern Europe. This may help shed some light on the origin of Solutrean biface technologies.

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