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THE LITHIC INDUSTRIES OF STAROSELE (CRIMEA, UKRAINE)

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INTRODUCTION

Starosele is located in southwestern Crimea (Ukraine) on the eastern edge of the city of Bakhchisarai, in the Kanly-Dere Valley; a small north-west trending box canyon on the southern bank of the Churuksu River. The site was discovered in 1952 and was excavated over the following four years by Alexander Formozov who found abundant archaeological remains in an excavation area of some 250 m^2 and up to 4 meters in depth. The cultural material was attributed by him to a single, late Mousterian occupation of the site (Formozov 1958). The intact southern portion of Starosele was excavated in 1993-1995 as part of the joint Ukrainian-American Middle Paleolithic of the Crimea project.

GEOLOGIC SETTING AND STRATIGRAPHIC CONTEXT

Although Starosele has frequently been described as a rockshelter, the shelter on the northern edge of the site is a modern formation, containing only post-Pleistocene materials, and none of the deposits within the excavation area show evidence of being formed in a rockshelter. The site itself is composed of cultural and artifactual materials on a bedrock bench about 13 meters above the ravine floor, at the foot of the eastern gorge wall, which rises another 50 meters. The bench is 16 meters wide and extends about 40 m north-south, giving the site a surface area of about 400 m^2.

Six horizontally bedded geological strata, spanning up to four meters in depth and incorporating four distinct occupational horizons, have been identified within the excavation area. The lowest 1 - 1/2 meters (strata F and E) are alluvially derived terra rosa soils from the upland slopes mixed with small to large boulders and a scatter of animal bones often showing weathering fractures. Cultural level 4 is found at the top of the sediments, with a minor concentration of fauna, lithic artifacts and ephemeral fireplaces.

The following geological layer, including cultural level 3 (stratum D), is dominated by boulders in a less clay-rich matrix. The cultural level is clearly discernible in the sediments, and consists of a dense concentration of artifacts, extensively processed animal remains and a few fireplaces. After deposition, there was a temporal break in sedimentation, followed by a major deposit of exfoliated limestone slabs (interpreted by Formozov as the collapsed roof of a rockshelter) and sandy sediments in which the ephemeral cultural level 2 occurs (stratum C).

The sediments above this appear to have been deposited relatively quickly, given the unweathered nature of the sediments and slabs immediately below. Cultural level 1 is found here in a complex of sedimentary facies and multiple zones of artifacts, bone and fireplaces. This layer indicates a flashy, fluvial environment, but of much lower energy than seen in the underlying levels. The most recent geological stratum (stratum A) consists of modern colluvium and anthrogenic accumulations of debris from pit/hearth construction and quarrying activities. A number of Level 1 artifacts were found mixed into these sediments, but the majority of cultural remains are eighteenth century ceramic sherds and domesticated fauna.

The stratigraphic sequence indicates that the sediments formed over a relatively long period of time: the lower strata F through D saw extensive weathering and flood activities, followed by the rapid deposition of the limestone slabs and stratum B alluvium, and then another period of extensive post-occupational weathering.

During the original excavations, A. Formozov, while recognizing different sedimentary facies, believed that the sediments had been built up rapidly by flood streams. As he discerned no differences among the lithic artifacts, all finds were combined and described as one, contemporaneous unit (Formozov 1958: 77).

LITHIC ARTIFACTS

The lithic artifacts recovered during the re-excavation of Starosele number close to 8,000 pieces from four distinct cultural levels. In two of these levels, 2 and 4, the samples are small and thus not of primary concern in the following description. There are significant differences, both technologically and typologically, between the 4 levels. Among the typological classes, this difference lies primarily within the frequency of bifacial tools, denticulates, and notches. Technologically, there is a significant difference in the type and intensity of core reduction, the morphology of the blanks, and the extent of retouch.

The lithic analysis in both its typological and technological aspects indicates that Starosele was used as an ephemeral butchering-kill site during the occupation of all four levels. Primary core reduction occurred off site, while complete tools and blanks were imported into the site. The lithic processing sequence is represented by its final stages: tool fabrication, maintenance and rejuvenation, and the production of blanks for expedient use. Such site use is further supported by the randomized pattern of lithic artifact distribution across the living floors. There is no particular concentration of artifact types (cores, tools, debitage and chips) suggesting a partitioning of space into on-site production areas; rather the random distribution of types suggests that tool fabrication and maintenance occurred on an as-needed basis during the faunal processing activities.

RAW MATERIAL

Raw material used at Starosele, as is true of all Middle Palaeolithic sites in the area, is limited to flint; the third ridge of gently eroding chalk hills of the Crimean Mountain range

provide an ample source of varying qualities of this material. There are two sources of flint immediate to Starosele: within the Kanly-Dere canyon itself, small cobbles (50 - 80 mm in maximum dimension) of coarsely-grained, low quality, black speckled flint, and 1 km to the east, within the main Bakhchisaraiskaya Valley, is found a similar type of flint, only light brown in color. Sources which are more distant in use at Starosele include a fine-grained tobacco-colored flint from the Kacha Valley, 7 km to the south of Starosele, and a grey-blue flint, often covered by patina, found near Partizanskoe, 7 km to the east (Formozov 1958: 76-77). The grey and black flints of various qualities which make up most of the assemblages at Starosele have not been completely sourced, but the closest candidate appears to be from the Bodrak Valley, 11 km north-east of Starosele, where the flint is in the form of wide, but relatively thin, plaquettes.

Of the local sources, the poor quality black raw material was very infrequently used (5 - 7%), while the light brown flint was not utilized at all. Instead, sources more distant, especially those which were probably from the Bodruck Valley, make up the greater part of all the assemblages. Comparing the assemblages, it is evident that the sources used by the level 3 inhabitants are more diverse, utilizing sources located both in the immediate vicinity, as well as those farther away; while the inhabitants of the other three levels preferentially provisioned themselves from the distant sources. While all of the levels demonstrate a provisioning strategy which exploits a wide cachement area, probably linked to activity sites, that from Level 3 appears more casual and opportunistic.

Comparing the frequencies of tools and debitage in relation to the types of raw material, there are no significant differences between the two groups for either Level 1 or Level 3 (the samples from Levels 2 and 4 are too small to draw conclusions). This fact will be discussed in more detail below, in the comparison of reduction strategies among the levels.

LITHIC ASSEMBLAGES

Level 4 produced only a small sample of lithic artifacts, dominated by large, complex scrapers (Fig. 1, a-e). All of the tools are unifacial and heavily retouched. All of the formal tools in Level 4 are scrapers, and 80 % of these have 2 retouched edges. They appear to have been produced from discoidal cores with extensive platform preparation. Although the sample lacks bifacial tools, some of the debitage appears to be derived from bifacial shaping (e.g. Fig. 1, e). While the sample is too small to speak of standardization in the shape of the blanks, there is standardization in the size of retouched and unretouched flakes, which average about 5 cm in length.

Given the slope of the deposits, it is possible that a large portion of Formozov's sample is represented by our Level 4. This is borne out by the large size of the tools, the preponderance of trapezoidal pieces, and the fauna sample in which *Equus hydruntinus* represents about 90% of identifiable species, all of which were described by Formozov (1958).

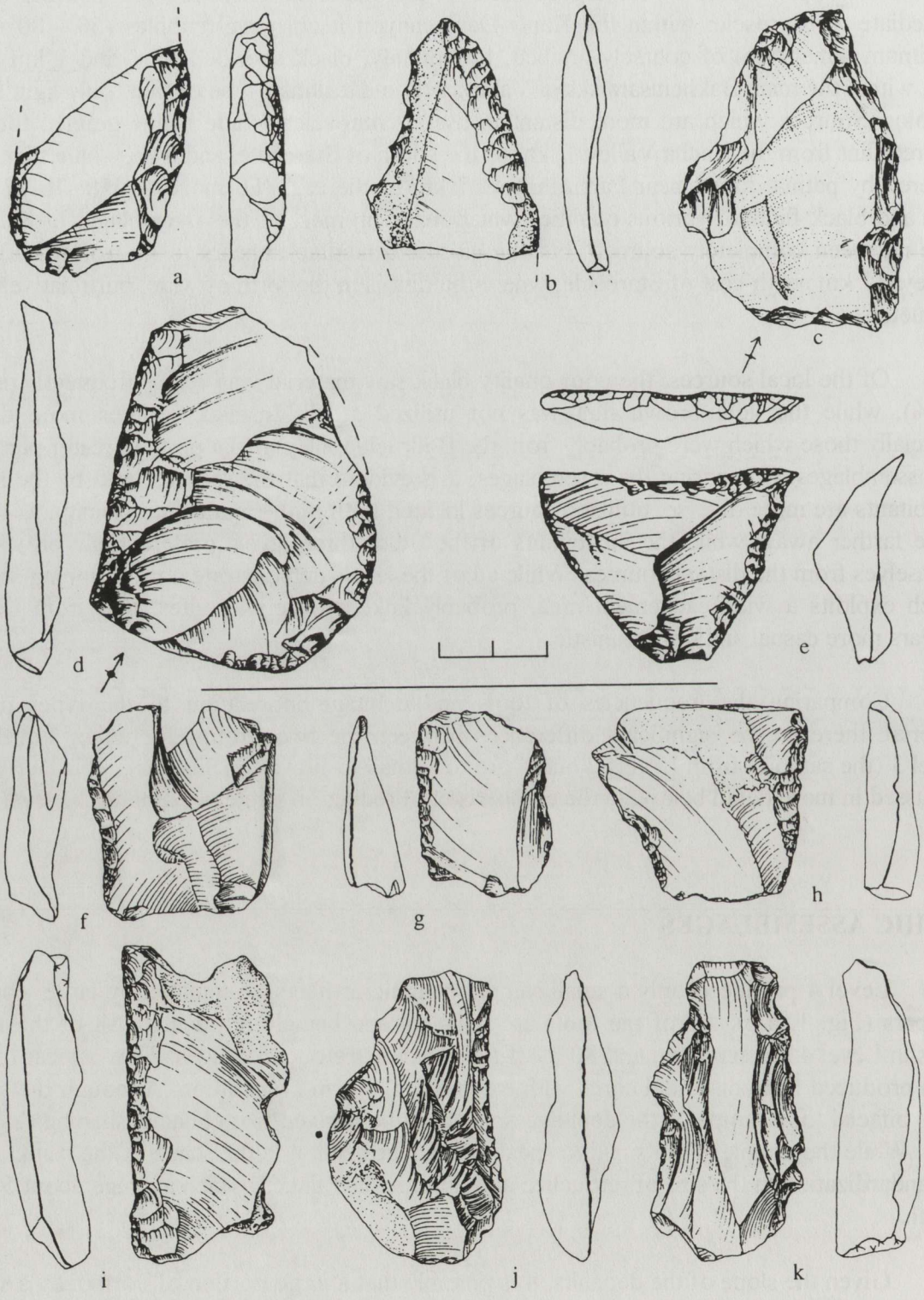

Fig. 1. Starosele, Levels 4 (a-e) and 3 (f-k). Double sidescraper (a), simple convex scraper (b), semi-crescent sidescraper (c), straight-convex sidescraper (d), sub-trapezoidal scraper (e), simple sidescrapers (f-h), inverse scraper (i), retouched piece (j), denticulate (k).

The lithic assemblage in cultural level 3 is unifacial, with few well retouched scrapers, and dominated by heavily retouched denticulates and notches. Blanks are small and thick with large, unprepared platforms, average 3.3 cm in length, and were produced by discoidal and unpatterned reduction strategies. There are no significant metrical differences between the tools and unretouched blanks, there is a low degree of standardization in overall flake morphology and there is no preferential blank selection for tools. The low proportions of cortical elements and other first stage manufacturing debris suggests that preformed cores and in some instances, ready-made hafted tools were imported into the site.

The tools of level 3 are considerably less complex than those of the other levels (Fig. 1, f-k). Discontinuous and marginally retouched pieces make up nearly half of the tool kit. Sidescrapers tend to have only one, poorly retouched edge. The group IV index is highest here among all the levels (28%). Although the tools were fashioned from thick blanks, retouch is light and non-invasive.

The range of fauna in level 3 includes *Equus, Bos*, saiga and bird. Processing appears to be the major focus of activities here; there are few points, use wear shows a predominance of cutting tools (see M. Kay, this volume), and residue analysis has found starch grains, plant tissue, hair and feathers on both tools and debitage (B. Hardy, pers. comm.).

Cultural level 2 was found in a discontinuous zone among the exfoliated limestone slabs and is represented by only a small sample which is similar in most aspects to level 1. Levels 1 and 2 are quite different from the underlying assemblages: they are characterized by bifacial tools, heavily retouched points and a range of simple and complex scrapers (Fig. 2).

Two systems of blank manufacture were used in levels 1 and 2: discoidal core reduction and bifacial shaping. The discoidal core reduction produced flakes with thick, wide platforms, simple scar patterns and triangular cross-sections. These make up a minor part of the assemblage, however, and appear to be wholly opportunistic.

Far more important in terms of both technology and typology in Starosele levels 1 and 2 was bifacial reduction. Bifacial tools account for about 14% of the toolkit (level 1) and are the most significant part of the chaîne opératoire. Not only were the preforms or the finished products themselves being imported into the site, they produced the blanks on which over 60% of the other tool types were made. The bifacial tools also show evidence of hafting, significant reworking and resharpening, all indicating a considerable degree of curation and forethought.

The bifacial tools are mostly plano-convex foliates, which are typologically grouped as points, but which were used as points and then recycled as knives. All show evidence of hafting (Kay 1997). They were made on rather large flakes or tabular flint and followed a specific reduction sequence: first the ventral surface was thinned through the removal of small flat flakes, then the dorsal surface was flaked from the lateral edges and the base, giving it an arched profile. While no hammerstones were found in this level, there are numerous bone retouchers which were obviously used in the bifacial reduction process, and which give a specific set of characteristics to the flakes derived from such reduction. It is these two steps which produced most of the blanks for tools--they are easily recognisable by their delicate,

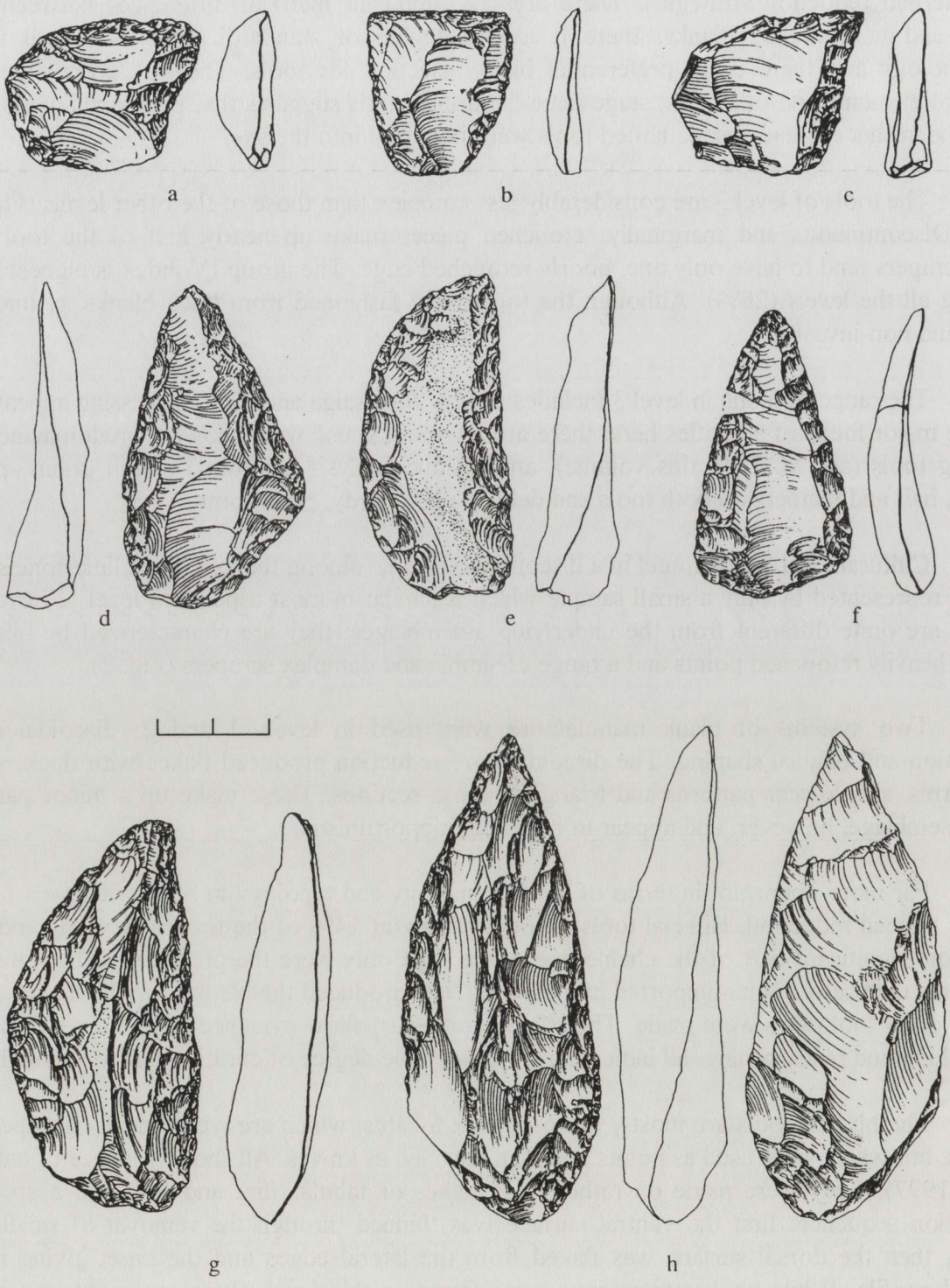

Fig. 2. Starosele, Level 1. Sub-trapezoidal sidescraper (a), trapezoidal sidescraper (b), semi-trapezoidal point (c), elongated sub-trapezoidal point (d), sub-crescent sidescrapers (e, g), sub-triangular point (f).

often incurvate and twisting profile, their expanding shape, distinct scar patterns, and the acute, often lipped platforms.

The vast majority (36%) of tools in Level 1 are unifacial sidescrapers; while many of these are simple forms, nearly half have more than one retouched edge. The high percentage of double, triple and even quadruple retouched edges cannot be taken as evidence for intensive site occupation, however--retouch is flat and non-invasive, the high percentage of transversal and déjeté forms are the result of the typical shape of bifacial reduction flakes rather than of successive shortening, and the morphology of the blanks does not permit extensive resharpening. The tendency to retouch more than one edge, therefore, must be seen as a cultural choice. This is reflected in the typological system used in Crimean Palaeolithic studies where, for instance, rather than combining all forms as déjeté scrapers, trapezoidal sidescrapers with 2, 3, and 4 retouched edges are distinguished (Chabai and Demidenko n.d.).

The third type of tool found in Starosele Level 1 are unifacial points (6%). These have the same basic shapes as the convergent sidescrapers--elongated trapezoidal and triangular--but differ mainly in their pointiness and gracility of the distal tip. While these may be typologically points, functionally they appear to have been used both as points and knives. Many of them also demonstrate evidence of hafting.

Tools with heavier retouch--some of the sidescrapers and many of the unifacial points--are made on flakes derived from regular core reduction processes and tend to be larger and more robust. These are by far the minority in the assemblage, however, and given their large size in comparison to the cores, were obviously imported into the site.

The significant differences in size between retouched and unretouched pieces, and a high proportion of tools to debitage suggest that tools were imported to the site during the occupations of levels 1 and 2. The high frequency of small bifacial thinning flakes, frequent complex platforms, few large, unworked blanks, and use-wear evidence for frequent tool maintenance and recycling indicate that the end of the reduction sequence is present in Level 1: final tool production, rejuvenation and reworking. The use wear evidence for woodworking also suggests that hafts were manufactured and repaired on site.

Starosele appears to have been used during all four occupational levels as a hunting/butchery stand which saw little intensive occupation. The horizontal artifact distributions are randomized without coherent activity areas, suggesting that tool fabrication and maintenance occurred informally and opportunistically during faunal processing activities. In all levels the toolkit is geared towards hunting and butchery activities, but they varied in emphasis: level 1 saw more hunting, while processing occurs more frequently in level 3. Also, although the activities were similar, the tool kits of the four levels look very different.

ATTRIBUTION OF THE STAROSELE LITHIC ASSEMBLAGES

Formozov described the assemblage at Starosele as an evolved, late Mousterian, similar to that found at Shaitan Koba, Kholodnaya Balka (Ukraine), and Il'Skaya (Northern Caucasus)

(Formozov 1958: 110). The Staroselian's attribution, based on the 1952-1956 collection, has been problematic: Western European archaeologists tend to consider it as a late facies of the Eastern European Micoquian (Allsworth-Jones 1986; Bosinski 1967; Gábori 1976), while Gladilin originally referred to it as a Levalloiso-Mousterian of Acheulian Tradition (1970). The Staroselian has also been referred to as a Bifacial Mousterian similar to that found in other Crimean sites at Ak-Kaya, Volchi Grot (lower level), Chokurcha I, and Adji-Koba (Kolosov 1986: 117, 1988). F. C. Howell and R. G. Klein, the first to apply the Bordian method to the assemblage, remarked upon its Charentian character (Howell 1959:38; Klein 1965, 1969). Gladilin later placed this industry into the Eastern European Micoquian, along with such sites as Zutomir, Rihkta, Antonowka I and II, and Alexandrovka, from northern and eastern Ukraine. This last designation has been rejected based upon re-examination of the original material by Ukrainian scholars who prefer to designate it as a separate industry (Kolosov *et al.* 1993, Chabai and Yevtushenko, in press).

The Staroselian industry has also been recognized at Kabazi V, Units I-III; Kabazi II, Units I and III; and at GABO, upper and lower layers. These assemblages are typologically similar, and are characterized by a high proportion of scrapers, especially convergent, obversely retouched scrapers, a group IV index of about 15%, and bifacial foliates which range from 2 to 12% of the toolkit. Based on technological differences among the assemblages, however, the Staroselian has been subdivided into Early and Late stages; The Early Staroselian is found at Kabazi II, Unit III; GABO, upper and lower layers; Kabazi V, layers I-III; and, possibly, Starosele level 4, 1993-95 excavations. The Later Staroselian is identified at Kabazi II, Unit I; Starosele upper and lower units of Formozov's 1955-56 excavations; and Levels 1 and 2 of the 1993-95 excavations. In the early phase, true core reduction and bifacial reduction took place on site, there is a much lower facetting index, a much lower laminar index, and the tools tend to be larger (>5 cm). The differences for the earlier and later phases are partially the result of raw material exploitation--the earlier phase sites are on a source--and differential site use: core reduction and tool production occurred on-site in the early phase, whereas in the later phase tools are frequently imported into the site. Some of the early phase sites also show evidence for intense occupation, with fireplaces and immense numbers of lithics (V. Chabai, pers. comm.).

The assemblage in level 3 at Starosele has no known counterpart in the Crimea, where four lithic industries are recognized: the Staroselian, Ak-Kaya, Kiik-Koba and the Western Crimean Mousterian. Only the Western Crimean Mousterian has no bifacial component, yet in all other aspects it is quite different from Starosele Level 3. For the moment then, this cultural level has no attribution.

CONCLUSIONS

Starosele was re-excavated with the intention of clarifying a number of issues raised by Formozov's excavations (see Marks *et al.* 1997; Demidenko n.d.). A verification of the stratigraphic context of the cultural levels and the associated lithic artifacts became essential with the discovery of other Staroselian sites. The recent excavations at the eponymous site, the

discovery of four distinct occupational horizons, and three distinct lithic industries, have contradicted Formozov's conclusions, but have greatly contributed to our understanding of the Middle Palaeolithic of Crimea.

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