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The Pleistocene colonization of northeastern Europe: a report on recent research

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Abstract

Recent studies have shown that northeastern Europe was occupied by humans significantly earlier than previously thought. Some traces of human presence in the European Arctic even date back to about 35–40 ka. This paper discusses the Middle and early Upper Palaeolithic (EUP) assemblages from this area within the local context of their environmental characteristics, as well as their implications for our views on the occupational history of northern environments.

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Introduction

Exactly when and how humans colonized the different parts of the world has been a key focus of Palaeolithic archaeology from its very beginnings in the 19th century. Models explaining the various phases of colonization were, and for the earlier periods necessarily still are, very coarse (e.g., Antón et al., 2002; Bocquet-Appel and Demars, 2000; Mithen and Reed, 2002; Roebroeks, 2003).

However, recent years have witnessed a more fine-grained approach to the colonization of new areas, especially for the late glacial periods (Housley et al., 1997; Blockley et al., 2000; Blackwell and Buck, 2003; Steele et al., 1998). A main task has been to develop space–time models aiming at a better understanding of the spreading of humans in time and space and how new areas became occupied. Parallel to this work, the processes of adaptations to new environments in the very recent past have likewise become the topic of specialist research (e.g., Rockman and Steele, 2003).

Here we report on the results of recent archaeological and geological fieldwork carried out during the last decade in the northeast of

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European Russia, along the western flank of the Ural Mountains. Our working area is situated between 58–68° N and 50–60° E, and includes the northeastern Russian plain, the basins of Northern Dvina, Mezen, and Pechora rivers, and the Kama reservoir in the Perm region (Fig. 1). Large river valleys with wide lowland plains are characteristic of the region, which was the domain of hunter-gatherers up until the Iron Age in the south (upper Kama) of this area. In the north, Ugric hunter-gatherers roamed the Pechora basin until the 19th century, specializing in reindeer, beaver, and moose.

The beginning of Palaeolithic research of the southern part of this area (Perm region) dates back to 1938 when the late Upper Palaeolithic (LUP) Talitsky site was discovered in the downstream part of the Chusovaya River (Talitsky, 1940, 1946). In the northern part of the region, the Palaeolithic sites Mevezhia Peshera (late Upper Palaeolithic, or LUP) and Byzovaya (early Upper Palaeolithic, or EUP) were discovered in 1962 (Guslitser and Kanivets, 1965) and 1963 (Kanivets, 1976), respectively. Then, after a long interval with little Palaeolithic research activities in this region, archaeological field work was resumed by the first author in 1982.

The region is in a remote corner of the classical Palaeolithic world, which most readers will be familiar with (but was only superficially mentioned in a recent major survey of the eastern European Palaeolithic [Hoffecker, 2002]). For example, the southernmost EUP site from our region lies approximately 1400 km northeast of the famous site of Sungir (Bader, 1984; Alexeeva and Bader, 2000), located on the Great Russian Plain about 200 km east of Moscow (often mentioned in textbooks as an archetypical example of adaptation to the cold Ice Age environmental settings of European Russia). The northernmost EUP site in the area, Mamontovaya Kurya, is located at the Arctic Circle, nearly 1000 km further to the north (see below, and Fig. 1).

As we hope to show here, this northeastern part of Europe is an area of very high relevance to the issue of how humans came to colonize large parts of the northern hemisphere in general, and the northern parts of Europe in particular. Its

scientific relevance derives from at least four points, to be subsequently detailed below:

- 1) The large environmental variations through time and space make this region a good “laboratory” to test various models of Pleistocene ebb and flow of human occupation.
- 2) The surprisingly early presence of humans and the apparent rapid colonization of even Arctic habitats.
- 3) The richness of the area in terms of the number of sites and the good preservation of traces of former human presence underneath thick sequences of aeolian (loessic) sediments.
- 4) The discovery of a new “cultural facies” dating from the transitional period between the Middle and Upper Palaeolithic.

Geography

Stretching from approximately 58–68° N, our working region is a huge area in northern Europe, encompassing a southern taiga type of vegetation in the south, up to the shrub tundra in the Arctic north. Presently, the area is characterized by a continental climate, with long, cold winters and short summer growing seasons. The climatic differences between the southern and northern parts are rather significant: the duration of the snow season is 210–220 days in the north (Pechora lowlands) and 170–185 days in the south, near Perm. The city of Perm has an average winter temperature of -16°C , and an average summer temperature 17°C , against average winter temperature of -19°C , and an average summer temperature of 14°C for the city of Pechora (Komar and Chikishev, 1968). Most of the Palaeolithic sites discussed in this paper are located near the western foothills (300–400 m a.s.l) of the Urals, in a transitional zone between the mountain chain in the east and the wide loess plains to the west. In the south, the Kama River is the largest, with a total length of 2032 km and with a catchment area of 522,000 km². The upper part of the river was dammed in the 1950s, creating the present day Kama Reservoir, which has a water volume of 11.4 km³ and a surface area of 1845 km². The main

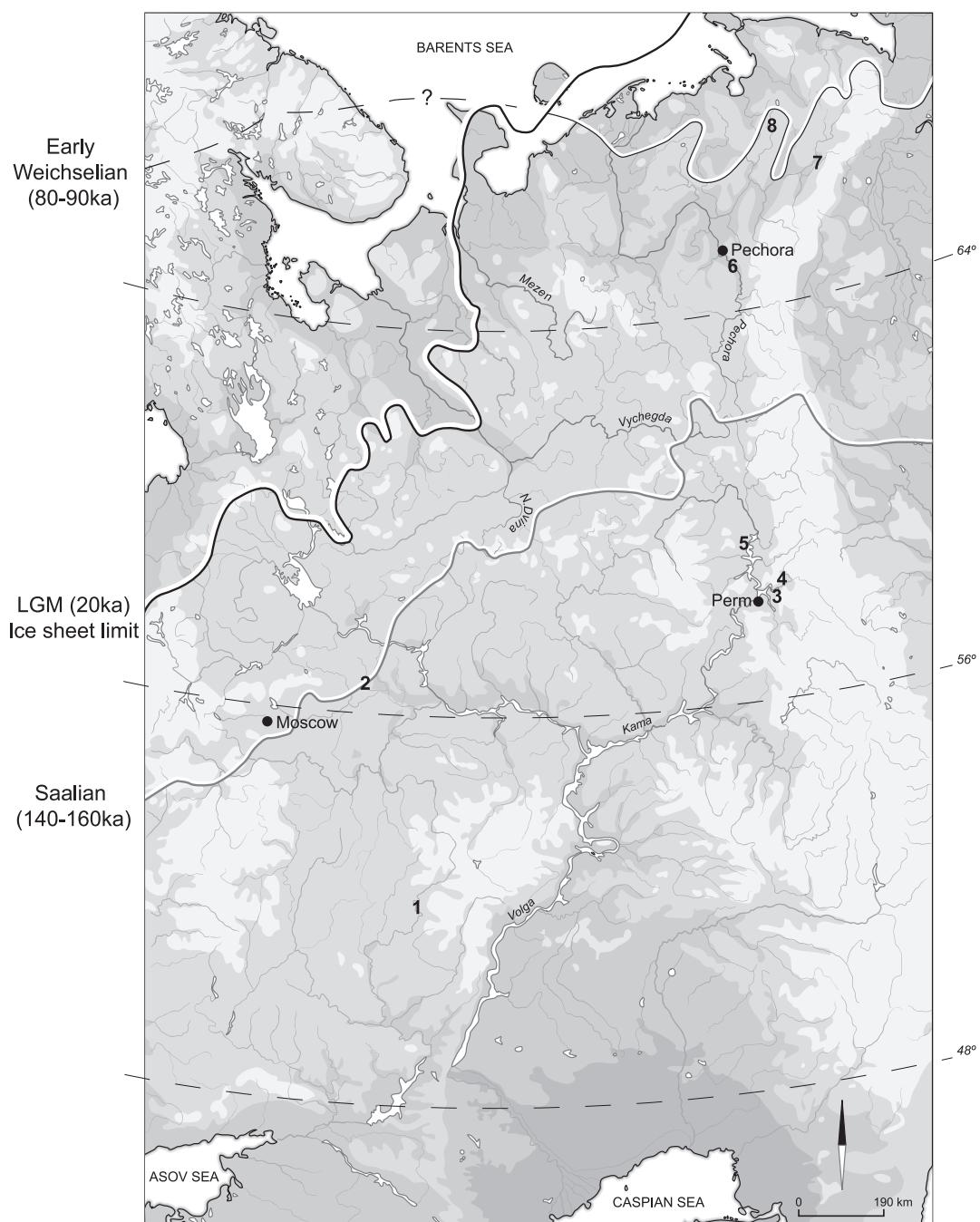


Fig. 1. Map showing the location of the sites mentioned in the text. 1: Kostenki; 2: Sungir; 3: Elniki; 4: Zaozer'e; 5: Garchi I; 6: Byzovaya; 7: Mammontovaya Kurya; 8: Pymva Shor. Reconstructed ice sheet limits for the Late Saalian (140–160 ka), Early Weichselian/Valdai (80–90 ka), and Late Weichselian/Valdai (20–18 ka) are indicated (from Svendsen et al., 2004a).

river in the northern part of the study area is the Pechora River, which is 1809 km long and has a drainage area of 322,000 km².

Changing ice age environments

The growth and decay of the former ice sheets centered over Scandinavia and the Barents–Kara Sea shelf had a profound impact on the environment in Eurasia and presumably also on the human colonization of the northern landscapes. At the peaks of the most extensive glaciations, which occurred during the early and middle Pleistocene, most of European Russia and a large portion of western Siberia were covered by huge ice sheet complexes that expanded southwards almost to the Black Sea (Astakhov, 2004; Velichko et al., 2004). For example, at the height of the penultimate glacial (oxygen isotope stage, or OIS, 6), around 150–130 ka (Moscow glaciation), the drainage basins of the rivers Pechora, Northern Dvina, and Mezen drainage were completely glaciated (Fig. 1). At this time, the southern margin of the Barents–Kara Ice Sheet was probably located close to the continental water divide, near the northern end of the present day Kama Reservoir, whereas the Scandinavian Ice Sheet margin expanded eastwards beyond Moscow. Thus, the Kama basin was located outside of the zone of continental glaciations but the environment in the periglacial zone was probably very harsh, unproductive, and presumably uninhabitable. The environmental conditions during the interglacials were not much different from the present, and during the Eemian/Mikulino (128–117 ka), the taiga expanded northwards to the Arctic coastline (Devyatova, 1982; Funder et al., 2002). The northern interglacial landscapes were densely forested, boggy, and most likely covered by relatively thick snow during the winter season. Glacial periods would have turned these areas into drier steppe landscapes rich in herbivores. It is possible that the environment at these times was more hospitable for hunter-gatherers, in spite of a colder climate.

Recent studies have significantly modified our understanding of the paleogeography of the

northern part of the region during the last glacial cycle, the Weichselian/Valdai (117–11.5 ka). This long period appears to have been more variable than previously thought, with several rapid and dramatic climatic changes. During an early stage of the last Ice Age (Early Weichselian/Valdai), a major ice sheet formed over the continental shelves in the Barents and Kara seas and eventually it expanded well onto the Pechora lowland (Fig. 1) (Svendsen et al., 1999, 2004a,b). The advancing ice sheet blocked the north flowing rivers and huge ice-dammed lakes formed in the European part of Russia and in western Siberia around 90–80 ka (Mangerud et al., 2004). Modelling experiments indicate that these proglacial lakes, which covered an area more than twice the size of the Caspian Sea, caused a pronounced cooling (on the order of 8–10 °C) during the summer season across vast areas of northern Russia (Krinner et al., 2004). Soon after, the ice-dammed lakes drained catastrophically into the Barents and Kara seas, and there is evidence to suggest that the ice sheet melted away quickly, probably reflecting a pronounced climatic warming around 80–70 ka. Following a mild interlude, the ice sheets started to grow again, and around 60–50 ka the southern ice limit once again reached the Pechora and Mezen basins (Svendsen et al., 2004a). The Scandinavian Ice Sheet reached a sizeable dimension during this glaciation, but it did not reach the northeast Russian plain. Like the preceding glaciation, the ice sheet advance was apparently short-lived and the Barents–Kara Ice Sheet, along with much of the Scandinavian Ice Sheet, disintegrated within a few thousand years.

During the MIS 3 (Middle Weichselian/Valdai), Russia was entirely ice free, with the possible exception of some small mountain glaciers in the Urals (Svendsen et al., 2004a). Analyses of collected bones, mainly from archaeological sites (Byzovaya and Mamontovaya Kurya), indicate a species-rich fauna in the Pechora lowland during the later part of this period (Mangerud et al., 1999; Pavlov and Indrelid, 2000; Pavlov et al., 2001; Svendsen and Pavlov, 2003). From the EUP site of Byzovaya (29–28 ka), there is evidence of the presence of a productive “Mammoth steppe” environment (Guthrie, 1990), with mammoth

(*Mammuthus primigenius*), woolly rhinoceros (*Coe-lodonta antiquitatis*), muskox (*Ovibos moschatus*), bison (*Bison priscus*), brown bear (*Ursus arctos*), horse (*Equus caballus*), reindeer (*Rangifer tarandus*), hare (*Lepus* sp.), polar fox (*Alopex* sp.), and various rodents. Pollen analysis at the EUP site of Mamontovaya Kurya, located at the Usa River close to the Arctic circle (see below), indicates a treeless tundra–steppe environment with some willow scrub along the river at around 32–30 ka (Halvorsen, 2000). The EUP sites seem to date from a favorable period, perhaps during the relatively warm periods of MIS 3 (Middle Valdai/Weichselian)—the Grazhdansky (42.5–36 ka) and the Dunayovo (Bryansk) (32–24 ka) interstadials (Markova et al., 2002; Spiridonova, 1989; Velichko et al., 2004). From the occurrence of alluvial deposits at Mamontovaya Kurya during this period, it is inferred that relatively large rivers still existed during the MIS 3. This implies that the generally treeless tundra–steppe landscape was humid enough to support fairly fertile river valleys with water discharge almost comparable to the present one (Hubberten et al., 2004; Svendsen and Pavlov, 2003).

At around 25–24 ka, the scrub elements seem to have disappeared around the EUP Mamontovaya Kurya site, and the local vegetation became dominated by *Artemisia* and *Poaceae*, resembling a cold steppe environment (Pavlov et al., 2001).

During the MIS 2 (Late Weichselian/Valdai), a major ice sheet formed over Scandinavia and the Barents Sea shelf. The Barents–Kara Ice Sheet terminated at the continental shelf off the northern coastline, whereas the Scandinavian Ice Sheet reached its maximum position on the northeast Russian plains (Gataullin et al., 2001; Svendsen et al., 2004a). The periglacial environment at this time was characterized by a much wider permafrost distribution than today (Velichko et al., 1984; Astakhov, 2004). Furthermore, a widespread occurrence of aeolian surface deposits (loess and cover sand) on the Pechora lowland reflects a considerably drier and windier climate in this region than during the MIS 3 (Middle Weichselian) and Holocene periods (Mangerud et al., 1999, 2004). Most likely, the vegetation was a discontinuous steppe/tundra, with patches of snow

bed communities (Paus et al., 2003). It seems reasonable to assume that the general lack of bone finds from this interval reflects a decrease in the vegetation cover. Considering that there appears to be no fluvial deposits from the period between 24 and 13 ka, we believe the river discharge dropped considerably during the LGM (Hubberten et al., 2004).

A pronounced warming started around 13 ka, when much of the permafrost melted, forming the numerous lakes that characterize the present day landscape in the Arctic (Henriksen et al., 2003).

The distribution of Palaeolithic sites is consistent with the paleoenvironmental development outlined above. The earliest (late middle Pleistocene) sites are located in its southern part—in the drainage basin of the upper Kama River. The sites of the Upper Palaeolithic (middle and late Valdai) are known throughout the territory of northeastern Europe. However, there is a clear concentration of sites along the western foothills of the Urals. Further to the west, within the drainage basins of the rivers North Dvina and Mezen, Palaeolithic sites have not been found.

Early dates and speedy colonization?

Finding traces of human presence in a given area does not necessarily imply that this presence was a “successful” one, entailing a semi-continuous or a substantial period of human occupation. Continuity of occupation is difficult (if not impossible) to see in the archaeological record of the Palaeolithic, and this is a problem that needs to be considered explicitly when discussing the colonization of new biogeographic areas (see Dennell, 2003; Roebroeks, 2001; and various papers in Tuffreau and Roebroeks, 2002, for discussion of these issues in the Lower and Middle Palaeolithic). Moreover, as noted above, conditions in the south were different from those in the northern part of the area, and the south may have been the source area for the northward expansions. However, one can safely assume that traces of a Pleistocene human presence in the area indicate that people were capable of adapting at least partly to the severity of the Pleistocene climate in the European

northeast. Traces of such presence may, therefore, be important proxies for the environmental resilience of their adaptations. Hence, it is worthwhile to stress that the southern (upper Kama) part of the area has yielded evidence for an earlier (pre-EUP) Palaeolithic hominid presence. This evidence consists of a few artifacts from Elniki II, which were found in a loess sequence below the last interglacial soil, and thus must be older than OIS5e, i.e., older than 125 ka (Guslitser and Pavlov, 1993). The find layer is covered by approximately 15 m of loess, and further fieldwork is extremely difficult given the working conditions in this area. Currently, we are investigating other exposures that may yield more pertinent data on a Middle Palaeolithic presence in the region. The most promising of these is Garchi I, where three unambiguous—but typologically undiagnostic—artifacts have been uncovered from a stratum that is older than ca. 60 ka. A stratigraphically consistent series of TL dates for the 5 m of loessic sediments *overlying* the find-bearing deposits (performed in the 1990s by N. Debenham, Quaternary TL Surveys, UK) suggests that the lower find layer is more than 66.6 ± 9.6 kyr old. This find layer may have been the source of a few dozen of the stone artifacts of Middle Palaeolithic character that have been found on the shore of the Kama reservoir, at the foot of the section with the find-bearing strata. Both the raw material and the calcite coating of the *in situ* finds are identical to the artifacts from known stratigraphical context. Bifacial pieces and some Levallois flakes, including one transformed into a typical *racloir déjeté*, are present in this eastern Micoquian-type assemblage (Figs. 2 and 3). We are now clarifying the chronological context of this assemblage with further studies of the section in the field and through laboratory studies, including optically stimulated luminescence (OSL) analysis of the sedimentary sequence.

While Elniki II and Garchi I seem to be the oldest traces of a hominid activity this far north worldwide, the few finds recently reported from Mamontovaya Kurya (66° N) testify to a human presence in the European Arctic by at least 35–40 ka (Pavlov et al., 2001; Svendsen and Pavlov, 2003). A rich faunal assemblage and a few

stone artifacts, including a bifacial tool, were recovered during excavations of the basal layers of a 12–13 m high river bluff cut into a terrace along a bend in the Usa River. The site has been well dated by direct C14 dating of a worked mammoth tusk with incision marks and several other bones from the find-bearing unit, suggesting an age in the range of 34–38 ka (Pavlov et al., 2001). These dates have recently been confirmed by a redating of the worked tusk, whereas new OSL dates from the find bearing strata suggest a slightly older age, as might be expected (Svendsen and Pavlov, 2003). It is unclear whether modern humans or Neandertals were responsible for the two stone tools and the pronounced marks on the mammoth tusk recovered from the channel infill at the site. If modern humans were the authors, this would suggest a very fast northward spread of *Homo sapiens sapiens*, whose earliest European remains are dated to the 34–36 ka (Trinkaus et al., 2003). In the case of Neandertal authorship, this would indicate that these populations expanded farther north than previously thought. Only the recovery of diagnostic physical remains of the tool-makers will elucidate which populations possessed the dispersal capabilities suggested by the Mamontovaya finds.

Stray finds and primary context sites

Given the vastness of the area, its low population density, and the fact that the archaeological survey has only scratched the surface, it is no surprise that the number of Palaeolithic sites is small, numbering only a few dozen. Most of these sites were discovered during a small-scale survey in the southern part of the area (the upper Kama River). In the latter region, erosion along the shoreline of the artificial lake created by the dam in the Kama River created exposures that facilitated discovery of buried Palaeolithic sites. It is probably only a matter of time (and a lot more fieldwork) before more sampling points will be uncovered between these Kama basin sites and Mamontovaya Kurya. Most of the sites only yielded stray finds from sections. Thus far, only a few locations have received proper archaeological attention. To some

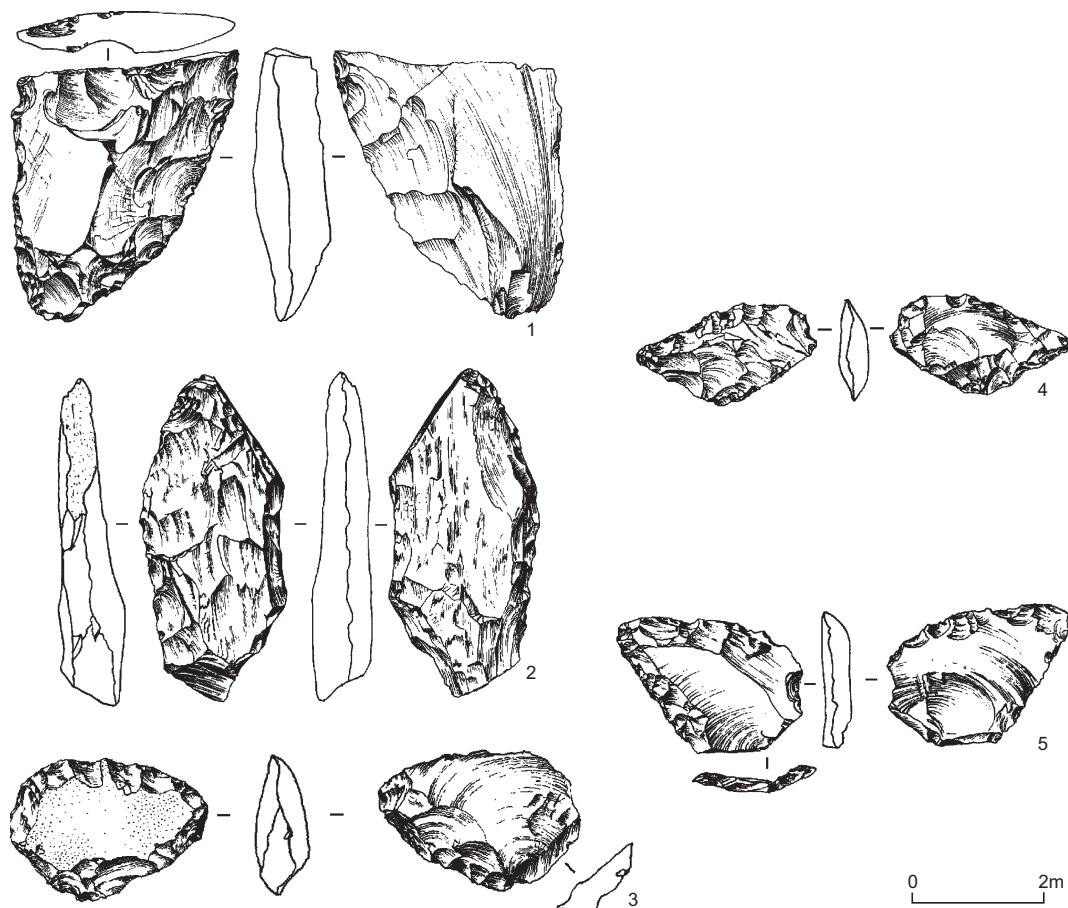


Fig. 2. Middle Palaeolithic (?) stone artifacts from Garchi I, lower level (scale 1:2). 1–2: backed biface; 3–5 *déjeté* side scraper.

degree, this is due to the fact that at most sites the find bearing strata are covered by thick sequences of aeolian sediments that need to be removed before the sites can be excavated. Sites that have been given more detailed archaeological attention include Mamontovaya Kurya, Byzovaya, Garchi I (upper layer) and, especially in the 2002–2003 fieldwork, Zaozer'e.

The site of Byzovaya (Fig. 1), situated at 65° N on the right bank of Pechora river, 300 km southeast of Mamontovaya Kurya, has been known and investigated since 1963, and more than 4000 mammal bones—in which mammoth remains are dominant—and nearly 300 stone artifacts were recovered during excavations of the coarse-grained find-bearing deposits (Kanivets, 1976; Pavlov,

1986, 1992; Mangerud et al., 1999). A series of approximately twenty-four radiocarbon dates on bones yielded ages in the range of 26–29 ka, with a mean of approximately 28 ka (Mangerud et al., 1999). The stone assemblage can be divided into two groups. Artifacts of generally large size were produced from local quartzite boulders. Some of these flakes, which are very large in some cases, were transformed into scrapers and knives, including Micoquian types. Another component consists of more fine-grained material, flint, most of which was imported from the Chernyshova Ridge (40–60 km to the southeast). These artifacts include some scrapers on blades, backed knives, and some bifacial tools—“Eastern Micoquian knives” and leaf points. The industry has

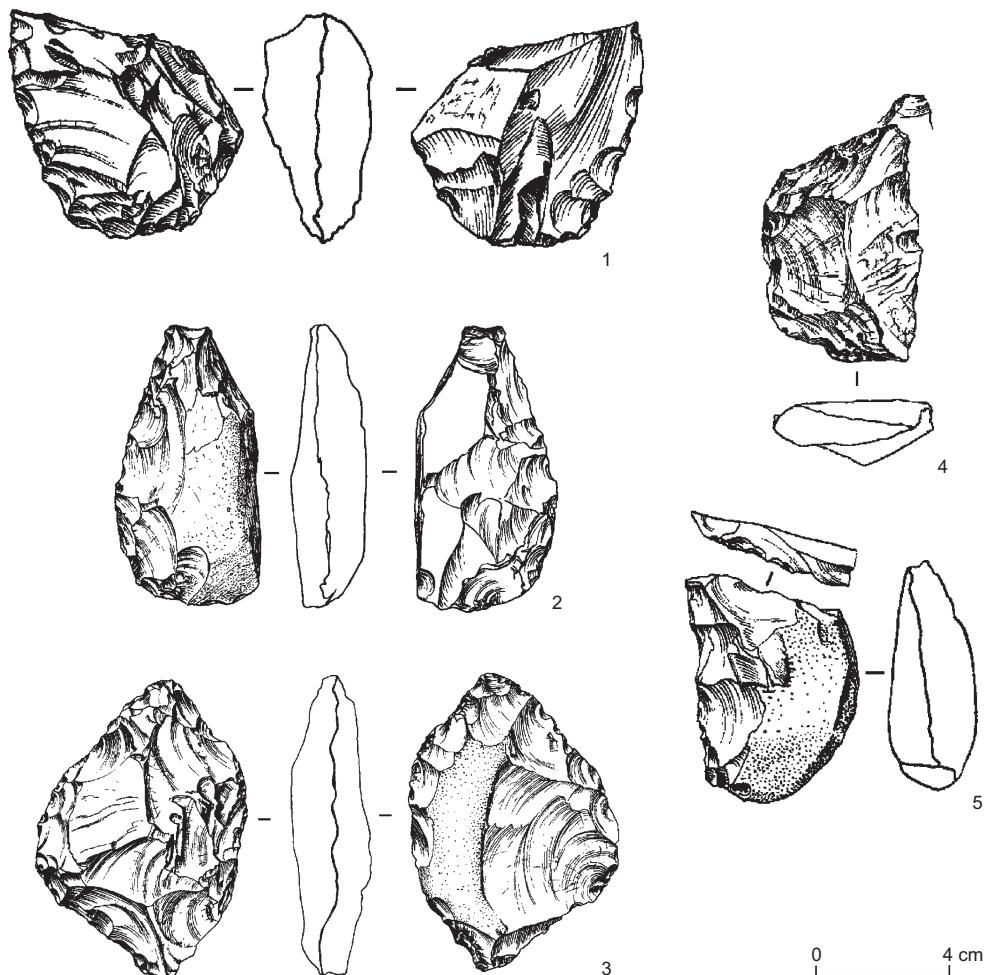


Fig. 3. Middle Palaeolithic (?) stone artifacts from Garchi I, lower level (scale 1:2). 1,4–5: knives; 2: backed biface; 3: biface.

previously been classified as eastern Szeletian with Aurignacian traits (Pavlov, 2002), but the excavations at Zaozer'e have put this typological exercise in a new perspective (see below).

Byzovaya displays certain distinguishing features in the composition of the stone artifact assemblage and the fauna, as well as its topographical position. First, there is a significant number of tools in the assemblage—45% of all pieces, mainly knives and scrapers, with almost no projectile points (cf. Kozlowski, 1980). Second, among the 4000+ (mostly complete) bones, mammoth remains dominate, with 97.5% of the identified bones belonging to this species. Finally,

the topographical position of the site is also of some interest. The site is situated in a steep bend in the Pechora River and the find layer is partly exposed along an erosional cliff. The strata with bones and artifacts occur at the bottom of a paleoravine that led to the adjacent river. The large number of mammoth bones that have been unearthed may derive from a mammoth cemetery (cf. Chubur, 1998), or they may represent the remains of accidental deaths of animals over time. Some may even have been hunted, though the skeletal remains do not exhibit evidence of this.

Mamontovaya Kurya and Byzovaya are sites of high relevance, as they testify to surprisingly early

human adaptations to the environments of the far north. However, we are dealing with archaeological material mostly in a secondary context, which is clearly not the case at Garchi I and Zaozer'e, further to the south, close to Perm (Fig. 1). Here, a thick accumulation of loess has preserved a wide range of traces of human activities in a primary context, especially at the Zaozer'e site.

Garchi I (upper layer) (59° N) was excavated over approximately 80 m^2 , and has yielded a large amount of finds—approximately 6000 stone artifacts, including approximately 200 tools, and some poorly preserved faunal remains of horse and reindeer. Most of these finds were concentrated over an area of roughly $3 \times 8 \text{ m}$, with two clear fireplaces in the middle. In the central part of the concentration, the find-bearing layer was thick, consisting of up to 20 cm of cultural debris. The elongated concentration was surrounded by a few large stones, and has been interpreted as the remains of a dwelling structure (Pavlov, 2002). The many refits established in the lithic material suggest that the assemblage was recovered in primary archaeological context.

The primary flaking technique is characterized by flat parallel cores. Flakes form the dominant type of blank; there are virtually no tools on blades. Scrapers dominate the tools. Sub-triangular scrapers with ventral retouch are numerous, as are circular ones with retouch along the perimeter of the blank. The presence of carinated forms is remarkable. A little less numerous are bifacial triangle projectiles with both concave and straight bases (of Streletskaya/Sungirian type). The rest of the tools are side-scrapers, points, and a few burin-like pieces. The stone artifact assemblage represents a typical Kostenki/Streletskaya, or Sungirian, complex (Pavlov, 2002). This attribution fits well with the one radiocarbon date from the Garchi I site, which places the assemblage around 29 ka.

Whereas the cultural material is very concentrated at Garchi I, the find distribution is more scattered at Zaozer'e, an EUP site on the left bank of the river Chusovaya, approximately 40 km east of Perm, at 58° N. Situated on a slope on the concave site of a large meander, the site dominates with about 25 m the 1.5 km wide floodplain, now submerged by the waters of the Kama reservoir.

Table 1

Radiocarbon dates for the Zaozer'e Upper Palaeolithic site. The GIN-dates are conventional C14 dates produced at the Geological Institute of the Russian Academy of Sciences (GIN). The others are AMS-dates from the laboratories in Groningen (The Netherlands) and Poznan (Poland)

Material	Date in years BP	Laboratory reference
Bone	$31,500 \pm 500$	GIN-11497
Bone	$31,000 \pm 400$	GIN-11499
Bone	$31,000 \pm 500$	GIN-11500
Bone	$31,000 \pm 700$	GIN-11501
Charcoal	$30,140 \pm 190$	GrA-22751
Horse tooth	$30,700 \pm 400$	Poz-5124
Bone	$33,150 \pm 410$	Poz-5075
Bone	$33,450 \pm 420$	Poz-5076

The radiocarbon dates of utilized bones have provided ages around 30–33 ka (Table 1). Further dating work, both C14 and OSL, is in progress.

The Zaozer'e find-bearing layer corresponds with a paleosol and is covered by 3–4 m of loess. We estimate the cultural layer to have an extension of about 2500 m^2 . In four field seasons, 93 m^2 were excavated, which comprise only circa 4% of the total area of the site. The excavations have yielded a rich assemblage consisting of ca. 1350 stone artefacts (including 71 tools, their fragments, and unfinished implements), four bone and antler tools, two pendants made of freshwater shell (*Unio* sp.), five small polished pieces of mammoth tusk (bead blanks?), pieces of ochre, and ca. 1000 faunal remains. The primary flaking technique is represented by 3 preforms and 2 fragments of prismatic cores. Preliminary conjoining studies of the lithic assemblage already yielded dozens of refits.

In the 2002 field season, on the eastern side of the find concentration a fireplace was uncovered, represented by a concentration of charcoal, burnt flint, and bones. Various find categories, e.g., the bones, specific types of tools, and burnt materials, have different distribution patterns within the concentration area, strongly suggestive of an organized use of space.

Most of the faunal remains are equid (*Equus cf. latus*), with at least 4 individuals represented (mainly in the form of bones from the legs). Except for the metapodials and the astragali, all horse remains are very fragmented. Furthermore

remains of woolly rhinoceros (*Coelodonta antiquitatis*), reindeer (*Rangifer tarandus*), hare (*Lepus tanaiticus*), bird (?), and fragments of a mammoth tusk were uncovered.

Palynological analysis of the matrix of the assemblage indicates forested environments with birch (*Betula alba*, *Betula humilis* and *Betula nana*), spruce (*Picea abies*), pine (*Pinus silvestris* and *Pinus sibirica*) and alder (*Alnus incana*), making up 40% of pollen spectra. Herbs and shrubs (33%) are represented by genera *Artemisia*, *Cichoriaceae*, *Onagraceae*, *Lamiaceae*, spores (27%) by *Pteridium aquilinum*, *Polypodium vulgare*, *Botrychium boreale*. The pollen indicate that the site was situated on the floodplain or on the low terrace of Chusovaya river.

As mentioned above, we estimate that traces of human occupation are distributed over an area of ca. 2500 m² at Zaozer'e. Together with the nature of the archaeological evidence recovered thus far (thin cultural layer with scattered finds), the size of the site suggests that we are dealing with a location that was visited several (?) times by EUP hunter-gatherers, most likely during a restricted time period.

The site's position on the banks of the Chusovaya River, the only one that crosscuts the Urals (at approximately 100 km to the east), suggests that these EUP hunter-gatherers may have followed its course to arrive at the monotonous low lying, and probably boggy, plains of western Siberia far earlier than the archaeological record of that area presently indicates (Goebel, 2000; but see below).

Zaozer'e: a new cultural facies?

It should come as no surprise that this area, far removed from some of the “classical” centers of Palaeolithic archaeology (or rather, typology) has a few signals of its own to add to the diversity of Palaeolithic industries. However, only three of the assemblages are large enough to warrant comparisons with other well studied lithic complexes. The Garchi I (upper layer) assemblage, with its typical Streletskaya/Sungirian points, fits very well with what we know from the type site itself, located 1400 km to the southwest, an observation which, once more, indicates the large areas over which the social systems of these plain hunters operated.

However, the assemblages from Byzovaya and Zaozer'e confront us with a typological puzzle.

As noted, the Zaozer'e assemblage was recovered in primary context from one single find layer sealed in by loess soon after deposition. The assemblage (Fig. 4) can be divided into two groups. A first one was mainly—but not exclusively—made on imported flint coming from limestone outcrop sources that we have not yet been able to locate. This group is dominated by small bifacial tools, including typical “Eastern Micoquian” knives, most of which would fit well into late Middle Palaeolithic assemblages from western and central Europe, as well as from southeastern Europe. The second group was predominantly (but not exclusively) produced out of locally occurring siliceous slate of a quality and size that allowed the production of larger flakes and blades. The forms produced out of this material include Chatelperronian-like backed knives, blades with a steep retouch (somewhat reminiscent of Aurignacian retouch), and a few retouched and simple burins on truncations or breaks. At ca. 30–33 ka, the Middle Palaeolithic character of the assemblage is striking.

The Byzovaya assemblage provides the closest analogue for the Zaozer'e stone artifacts both in the structure of the stone assemblage and in the specific types of tools, although the Chatelperronian-like backed knives are absent. It is probably not by chance that the best analogue is the nearest one in both time and space, even though 3000 to 5000 C14-years and 1000 km separate the two sites.

It should be noted that this type of industry has no direct analogues among known European EUP or Siberian assemblages. In our opinion, the characteristic features of Zaozer'e—Byzovaya assemblages indicate a European origin. Analogues of this industry (in terms of the structure of the assemblage and the presence of plano-convex bifacial tools) can be found within late Mousterian eastern Micoquian assemblages from the southern Russian plain sites (Kolesnik, 2003), as well as those located in the foothills of the northern Caucasus (Golovanova and Hoffecker, 2000).

In view of the chronological position of the Zaozer'e assemblage, one might be tempted to call this a “transitional” industry, but we present two arguments against doing so at present.



Fig. 4. EUP stone artifacts from Zaozer'e (scale 1:2). 1–3: retouched blades; 4–6: points; 7: burin on truncation; 8–10: scrapers; 11–12: bifacial tools (12: eastern Micoquian knife).

First and foremost, a transition entails a situation at Time 1 and a different one at Time 2, and we have no indications of a continuous or semi-continuous presence of humans prior to Zaozer'e in this region, or for that matter for any period during the late Pleistocene. Although continuity of occupation is very hard, if not impossible, to detect in the archaeological record, the situation is

clearly much better for discussions about transitions in western and central Europe, where sampling points are significantly denser in time and space than in this new area.

Second, due to the nature of our classificatory schemes, it is difficult to assign assemblages that display both Middle and Upper Palaeolithic characteristics in technology (bifacial tools and

blades) and typology (scrapers and endscrapers/burins) unambiguously to either the Middle or the Upper Palaeolithic. Furthermore, the structure of assemblages like the one from Zaozer'e (a mixture of "Middle Palaeolithic" elements with Upper Palaeolithic-type tools made on blades) is to some degree comparable to what large-scale excavations of open air sites have revealed in northwestern Europe over the last decade. Here, such complexes are well-known from the beginning of the last glacial, and recent excavations in northern France have pushed the age of assemblages containing "classic" Middle Palaeolithic elements and tools made on blades back to the beginning of OIS6, i.e., ca. 200 ka (J.L. Locht, pers. comm., 2002). Although there are many differences between the western European assemblages and Zaozer'e, this just serves to underline that, in some cases, "transitional" is a label that is applied to industries just because they are close in time to the age of the Middle–Upper Palaeolithic transition in western and central Europe.

Notwithstanding these caveats, the Zaozer'e assemblage clearly adds a new branch to the already bushy tree of EUP lithic diversity.

Discussion

The studies conducted thus far, small-scale as they necessarily are, have shown the potential of this area for improving our understanding of the Pleistocene colonization of the European northeast. At the very least, it is apparent that northward expansion of Middle Palaeolithic human populations occurred far earlier west of the Urals than it did east of the Urals, where occupation remained tied to the diverse environments of southern Siberia during the period considered here (Goebel, 2000). The earlier northward expansion west of the Urals may have been related to the diversity of the environment there, displaying over relatively short distances a combination of the plains in the west, gently undulating foothills crossed by large rivers in the middle, and the Urals in the east. Such a diverse environment must have been highly attractive to the various species of

herd animals of the mammoth steppe and hence to their hunters, both in the Middle, as well as in the Upper, Palaeolithic. In the cold climatic conditions of Pleistocene northeastern Europe, environmental diversity must have provided good insurance against crashes in environmental productivity, which must have occurred frequently during the late Pleistocene. It is against this background that the data available thus far have to be understood. Colonization of the plains proper, away from the relative diversity offered by the rolling foothills of the Urals, occurred during the middle Upper Palaeolithic (MUP; cf. Roebroeks et al., 2000), with the site of Sungir, and to a lesser degree the slightly older site Garchi I (upper layer), being a good example of such a "plains" adaptation.

The number of sampling points from our area is currently small, and thus one cannot expect a good estimate of the underlying space–time pattern. However, even at this early stage it is notable that one can begin to make some inferences about how and through which "routes" European Russia became occupied in the period 35–25 ka. A key observation in this context is that the middle and lower reaches of the Volga (south of its confluence with the Kama River) have not yielded any sites from this period, despite intensive surveys carried out in the 1950s (some Middle Palaeolithic, probably OIS 5 traces are known [Kuznetsova, 1993]). In the southern Urals, much attention has been paid to the karstic settings, but no EUP traces have been recovered. River deposits, however, have received relatively little attention. The available data show only one MUP site, but numerous LUP occurrences. This would suggest that the geographical origin of the EUP sites of Zaozer'e–Byzovaya and Mamontovaya Kurya are to be sought in the southern part of the Russian plain. In this case human movements would have followed a route roughly along the Don–Oka–Upper Volga–Kama river valleys, where the Kostenki site complex has yielded traces of occupation from the 32–36 ka range (Sinitsyn et al., 1997), up into the Pechora Basin. The absence of traces along the lower Volga also becomes understandable against the background of the observations of this paper: today the lower

Volga area is a very dry one, basically a steppelike environment, and the increased levels of aridity in the EUP and MUP may have confronted the first settlers with environments that were far less hospitable than the ones in the river valleys where their presence has been documented.

The studies carried out thus far have unambiguously demonstrated the huge archaeological potential of the area. The small number of sites discovered thus far probably indicates that dozens of sites must be present beneath the thick aeolian and fluvial sequences in this area. However, as limited as the surveys in the southern part of the region have been, the northern area has hardly received any systematic archaeological survey. Future work will incorporate a systematic survey of the Pechora exposures, extending the survey into the Arctic. This will enable us to relate the isolated sites known in the far north to the recent discoveries in the Kama Basin reported here. Establishing the character of these industries is of crucial importance to the generation of data and the development of models of dispersals into and colonizations of the northern areas. The presence of EUP sites over this vast area of northeastern Russia might suggest that we are not looking at the remains of short-lived dispersals into northern territories during periods of more hospitable environmental settings, but that we are actually picking up the signals of a successful colonization that lasted several thousands of years. The recently reported evidence from the Yana River, Siberia (Pitulko et al., 2004) at 71° N from ca. 27 ka suggests that the northward expansion of humans around the end of OIS 3 also took place in Siberia, and that we are dealing with a Eurasian scale phenomenon, possibly related to the mild climate intervals around that time.

Current mainstream theorizing on differences between Middle and Upper Palaeolithic adaptations would suggest that Upper Palaeolithic societies would have left a stronger archaeological signal in these extreme areas than those of the Middle Palaeolithic. While we have good evidence that the areas around 59° N saw some Middle Palaeolithic activities—by itself a surprising result of the current project—we interpret this presence as representing the margins of Middle Palaeolithic ecological tolerance. Hence, our expectation is that the

current Pechora Basin area was *off limits* to Middle Palaeolithic groups, and we predict finding only Upper Palaeolithic assemblages in the far north. Falsifying this prediction would constitute a major breakthrough in our thinking about Middle compared to Upper Palaeolithic adaptations. Finally, it is worthwhile to note that the EUP presence in our area also may have been at the margins of tolerance: only EUP sites are known, and at the end of the Middle Weichselian, modern humans seem to have left the area, as indicated by a complete absence of sites in the 27–18 ka range.

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