

# THE CHARACTERISTICS OF THE ALTAI (RUSSIA) MIDDLE PALEOLITHIC IN REGIONAL CONTEXT

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## ABSTRACT

*The Altai is located in southern Siberia, Russia. Virtually all Altai Middle Paleolithic industries represent a single cultural tradition, within which two principal technological variants have been established – Denisova and Kara-Bom. Among the key features of the Denisova variant (Denisova and Okladnikov cave sites and the open-air Tiimechin-1 site) are the predominance of parallel and radial flaking, a large share of tools on medium-sized and short flakes, various racloirs, including diagonal and canted scrapers, and distinctly Levallois tools. The techno-typological characteristics of the Kara-Bom variant (the sites of Kara-Bom, Ust-Karakol-1, Anui-3, Ust-Kan Cave) are somewhat different. Here, primary reduction was based on the Levallois technique, mostly resulting in blades. The predominant tools are Levallois points and elongated Levallois flakes along with various notched-denticulate forms and Upper Paleolithic types. The likely technological precursors of the Altai Middle Paleolithic were Lower Paleolithic industries of the adjacent regions, characterized by advanced techniques of parallel and Levallois knapping and the manufacturing of standardized tools on a large scale. A wide distribution of Levallois-like Lower Paleolithic industries in territories bordering the Altai stimulated the autochthonous evolution of the Altai Middle Paleolithic as one of the Central Asian Paleolithic traditions.*

## INTRODUCTION

On the archaeological map of Eurasia, experts give special attention to regions located on the boundary between large geographical areas. One of these regions joining together the territories of Northern and Central Asia is the Mountainous Altai in southern Siberia, Russia (Figure 1). The occupation of the Altai by early humans was most likely connected with a northern migration wave of *Homo erectus* who expanded beyond the boundaries of the African continent and reached Asia. According to the dates that have recently been generated from loess and soil samples of the Kuldara, Khonako-2, and Obi-Mazar-6 sites in Tajikistan, *H. erectus* arrived in Central Asia in

the range of 600,000 to 900,000 years ago (Ranov 2001; Ranov and Schäfer 2000). The most archaic pebble tools that probably correspond to roughly the same time have been reported from the northeastern piedmonts of Karatau in Kazakhstan (the Borykazgan, Tanirkazgan, and Akkol sites) (Alpysbayev 1979) and from the northern portion of the Valley of Lakes in Mongolia (Nariyn-Gol-17) (Derevianko *et al.* 2000a). These industries are characterized by irregular orthogonal cores, ‘citron’ spalls, massive tools reminiscent of *racloirs*, and large cutting tools resembling chopper/chopping tools.

Until recently, archaeological materials from the Ulalinka site have been the only evidence of human occupation of the Altai during the Lower Paleolithic. Stone tools made of split quartzite pebbles were recovered from multicoloured soft sediments, which have been dated to the Middle Pleistocene and Upper Pliocene (Derevianko *et al.* 1998a). An abundant collection of quartzite rocks recovered from the lowermost layers of Ulalinka comprise such indisputable artifacts as pebbles bearing evidence of core preparation and negative scars of irregular detachment of amorphous flakes. Furthermore, massive pebbles trimmed along the long axes to form chopper/chopping tools, scraper-like tools worked on flat pebbles with a natural back and the cutting edge formed through stepped re-touch, and pebble tools with a spur-like ovoid protruding part were recovered (Okladnikov 1972).

The available palaeomagnetic and radiothermoluminescence (RTL) dates suggest attribution of the lowermost layers at Ulalinka to a wide chronological range of c. 300 - 400 ka to 1.5 mya (Okladnikov *et al.* 1985). The lower chronological boundary seems doubtful, whereas the upper boundary is reliable, supporting the age estimates of the Ulalinka site as older than 300 ka.

The most recent discovery of archaic pebble tools from the Karama site corroborates the hypothesis of early occupation of the Altai territory by Lower Paleolithic humans. Karama is located in the Anyi valley 15 km downstream from Denisova Cave (Derevianko *et al.* 2001a, 2002). Two excavation trenches were established at 30 m and 60 m above the river surface. These excavation localities revealed red slope and alluvial sediments with several horizons bearing Paleolithic artifacts, which have been attributed to the Lower Paleolithic pebble

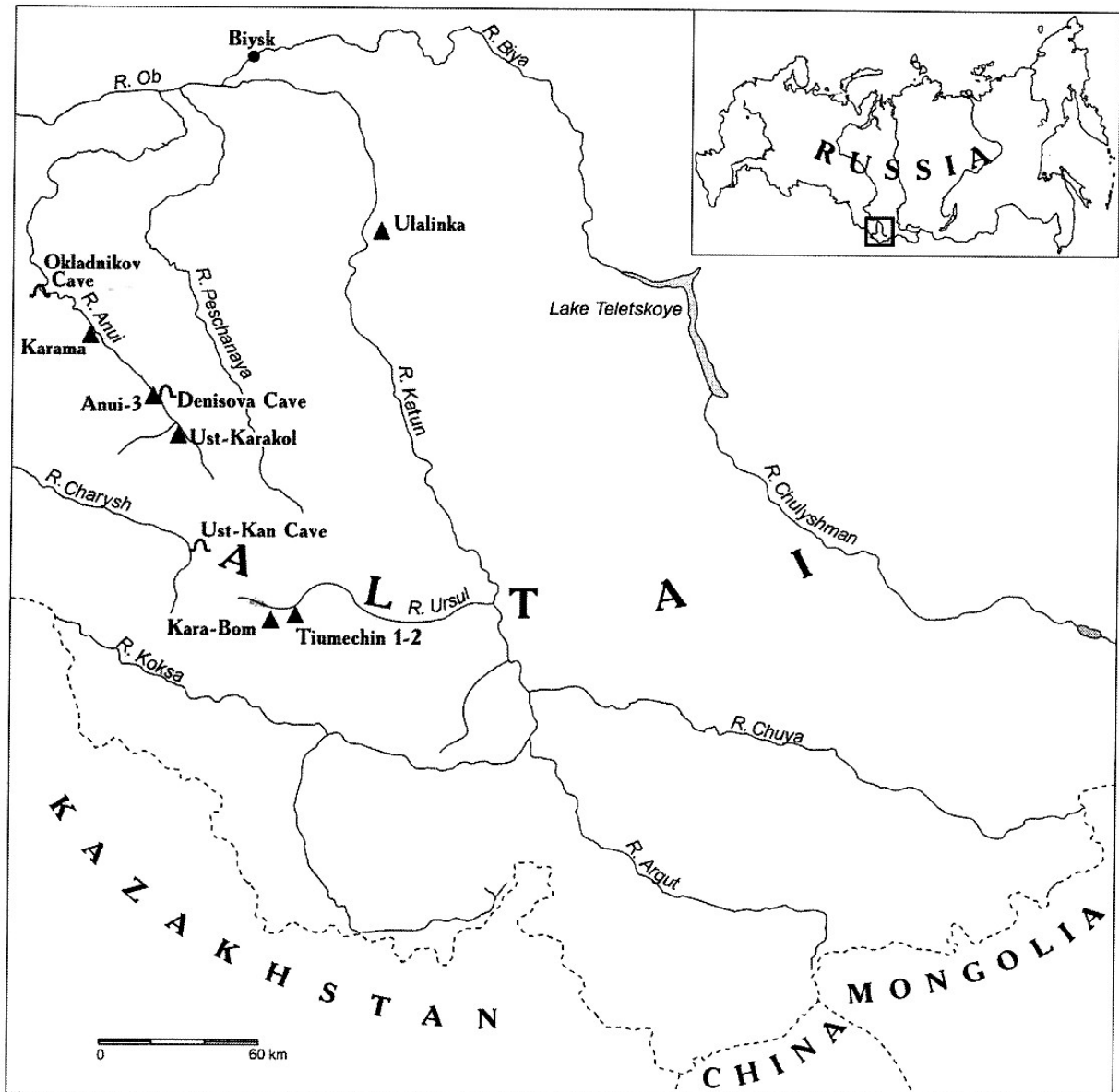


Figure 1: Middle Paleolithic sites in the Altai, southern Siberia

industry judging from the morphology of the finds. The assemblage of the products of primary reduction include pebbles showing signs of core preparation with plain striking platforms and negative scars of parallel detachments and short non-faceted spalls. The collection of typologically distinct tools includes longitudinal and transverse *racloirs*; denticulate and notch-denticulate tools fashioned on short spalls, and cutting tools of the chopper/chopping tool type with a convex flattened cutting edge and a trimmed massive back. Most pebble tools from Karama are characterized by archaic morphological features and a comparatively advanced technology of secondary treatment. The chronological estimates are based on RTL dates and palaeontological analysis of the red sediments of the Anui valley located at an approximate eleva-

tion of 30 - 60 m indicating that the sediments were formed during the Lower Pleistocene (Derevianko *et al.* 1992a, b). These red sediments yielded abundant mollusk shells. The established mollusk gender composition is typical for the Lower Pleistocene - Eo-Pleistocene of Southern Siberia (Derevianko *et al.* 1992a, b). Consequently, the minimum geological age of the Karama archaeological industry might be established as the final Lower Pleistocene.

#### Middle Paleolithic industries in the Altai

The next stage in the development of the Altai Paleolithic is illustrated by the Early Mousterian industries from the basal sediments at Denisova Cave (strata 22 and 21) and from the alluvial sediments of stratum 19 in the lowest

part of Ust-Karakol-1, an open-air site located about 2 km from Denisova Cave. Various dating methods suggest that the age of these lithological strata lie in the range of 133 - 282 ka, which corresponds to the second half of the Middle Pleistocene (Derevianko *et al.* 1992c, 1998b).

The most ancient industries of the Denisova Cave demonstrate Levallois features in stone reduction and a preference for the use of flakes as blanks for tool manufacture. Various types of *racloirs* and notch-denticulate tools predominate in the tool kit. Most spalls identified within the Ust-Karakol-1 industry from stratum 19 show parallel edges on the dorsal face and a prepared platform. Categories such as *racloirs* with longitudinal and convergent edges, spur-like tools and notched tools with Clactonian and retouched *encoches* have been identified within the tool kit. A notable absence of tools made on complete pebbles and Acheulian bifaces, together with the features of parallel reduction and a set of typologically distinct implements made on standard blanks, all suggest a Middle Paleolithic attribution of the most ancient industries of Denisova and Ust-Karakol-1.

The chronological attribution of the Early Mousterian industries in the Altai to the Middle Pleistocene seems reasonable when comparing these to archaeological evidence from other Eurasian Paleolithic sites. Archaeological materials from Western and Central Europe have shown that pre- and Early Mousterian industries with flake tools but without Acheulian bifaces appeared along with typical Acheulian technocomplexes as early as the initial Riss period (Bosinski 1982; Roe 1982; Tuffreau 1982). It is known that *racloirs*, notches and denticulate tools were the most characteristic flake tools for certain Early Mousterian industries (Laville 1982). Recent geochronological estimates of the true Mousterian industries of the Tabun Cave in the Near East have suggested an age of 250,000 - 270,000 years ago (Bar-Yosef 1995; Mercier *et al.* 1995).

The development of the Altai Middle Paleolithic industries continued into the Upper Pleistocene. The available Paleolithic evidence from the Altai testifies to the fact that the majority of Mousterian sites exhibit common features that evolved within a single Middle Paleolithic culture. However, various Altai technocomplexes reveal varying proportions of the major techno-typological indices within this single cultural tradition. On the basis of these variations, two major types of industries have been established for the Altai Mousterian sites: industries with predominantly Mousterian technology and industries with distinct Levallois tools.<sup>1</sup>

The Mousterian group of industries includes collections recovered from Denisova and Okladnikov caves and the open-air Tiimechin-1 site, although the artifacts found at the latter locality include those bearing features reminiscent of the Levallois-Mousterian trajectory. The primary reduction strategy is predominantly parallel and radial. Levallois reduction is apparent on only a few artifacts, especially within the Tiimechin-1 collection. In general, the impact of the Levallois technique on the technological process seems insignificant. The majority of

tools were produced on medium-sized, short spalls. The collection of typologically distinct tools is dominated by Mousterian and notch-denticulate tools. Levallois implements are morphologically distinct but scarce. Various *racloirs* including 'Charentien', diagonal, and *déjeté* varieties, are most numerous. On the basis of the common techno-typological features, we propose categorizing these collections as the Denisova variant of the Altai Mousterian (Derevianko *et al.* 2003).

The Altai Middle Paleolithic industries included in the Levallois group have the most distinct techno-typological features. This group includes the sites of Kara-Bom, Ust-Karakol-1, Anui-3, and Ust-Kan Cave. These industries are characterized by the predominance of Levallois reduction, a developed technique of blade detachment, comparatively large numbers of tools fashioned on blades and Levallois spalls, a rather small variety of tool types where blades and non-retouched Levallois points are most numerous, and relatively few Mousterian forms. According to the specific characteristics of the Altai Levallois-Mousterian industries, they are designated as the Kara-Bom variant of the Altai Middle Paleolithic (Derevianko *et al.* 2000b).

The Middle Paleolithic industries from the multilayered sites of Anui-3 and Ust-Karakol-1 demonstrate a well-developed Levallois technology of tool production and bifacial working. Within the Kara-Bom technical variant, materials included in these Levallois-Mousterian collections form a specific industrial type with distinct foliate bifaces (Derevianko and Shunkov 2002).

The evidence available has not yet provided reliable grounds for associating the technological variants of the Altai Middle Paleolithic with distinct prehistoric human populations bearing independent cultural traditions. There is also currently insufficient evidence for considering the industrial variability of the Altai Middle Paleolithic as a purely chronological phenomenon. The chronostratigraphy of the Altai Paleolithic testifies to the long-term parallel development of two major industrial variants throughout the so-called Mousterian Würm chron. Age estimates of the sediments at Denisova Cave, Okladnikov Cave and at the open-air sites of Ust-Karakol-1 and Kara-Bom are based on a series of RTL and radiocarbon dates (Derevianko 2001). The initial stage of development of true Mousterian industries (e.g. Denisova Cave, stratum 22) is estimated as falling within the Middle Pleistocene, while its final stages (e.g. Okladnikov Cave) are associated with an absolute date range of 33 - 44 ka. The age estimates for Ust-Karakol-1 (stratum 18) and Kara-Bom (Mousterian horizon 1) indicate that Levallois-Mousterian industries are within the chronometric range of 100 to 44 ka. The current state of our knowledge allows us to hypothesize that the differentiation of lithic industries occurred within a single Middle Paleolithic culture as the result of various adaptive strategies to different environmental, seasonal, economic, tool manufacture, and raw material factors, among others.

The specificity of the tool manufacturing and economic activities of ancient populations at long-term and

seasonal occupation sites may be regarded as one of the reasons for the variability noted in these archaeological assemblages. The pattern of lithic artifact distribution by stratum at the sites of Ust-Karakol-1 and Anui-3 suggests regular, though relatively short-term occupation by human ancestors. On the other hand, the diverse composition of tool kits does not allow us to regard these sites as merely short-term encampments. Practically all occupation horizons at these sites yielded lithic collections illustrating the entire technological sequence of raw material utilization. Thus, these collections include instruments for primary stone working, principal products of stone reduction, and a typologically diverse tool kit. The specificity of the tool kits, correlated with the structure of the sediments in which they were found, indicates that these multilayered sites should be classified as sequences of episodic, seasonal occupation sites. This hypothesis is well supported by the topography of Ust-Karakol-1 and Anui-3. Both sites are located in areas of a river valley, which are most favourable for establishing seasonal hunting camps. The available evidence suggests that these Middle Paleolithic industries were primarily aimed at producing hunting equipment, such as Levallois points and foliate bifaces. Refitting analyses of the lithic artifacts from Ust-Karakol-1 (Postnov 1999) and petrographic analysis of knapped stone from Anui-3 (Kulik and Shunkov 2000) indicate that the tools were produced on-site, rather than having been brought in from elsewhere.

The Mousterian collections associated with long-term occupation cave sites also include bifacially worked tools and classic Levallois implements. Generally, bifacial and Levallois traditions in stone reduction are less visible in the collections than would be expected from presumed long-term occupation sites. This may be explained by the fact that some typologically distinct products are not as apparent in the non-homogeneous concentration of waste accumulated at long-term sites. Most likely, distinct technical and typological characteristics became less distinct in the homogeneous industrial context of long-term occupation sites.

## REGIONAL COMPARISONS

Lower Paleolithic pebble-tool technocomplexes, which have recently been discovered in the Altai, may hardly be considered as a basis for the development of Middle Paleolithic industries in this region. Sources for the development of such industries are likely to be discovered in contiguous regions of North and Central Asia. Acheulian industries, which are characterized by tools produced on strategically planned, shaped spalls detached from well-prepared nuclei, i.e. technocomplexes exhibiting parallel (proto-prismatic) reduction strategies and Levallois flaking, may be considered as candidates for the Lower Paleolithic genesis of their development. These cultural traditions may have originated in Acheulian industries of Western Asia: the Caucasus, the Levant, and southern Arabia (Hours 1975; Amirkhanov 1991; Bar-Yosef 1994; Liubin 1998).

Kazakhstan, situated adjacent to the Altai, has produced the most distinctive Acheulian-like technocomplexes from sites located in the northwestern piedmont of the Mugodjari Mountains (Derevianko *et al.* 2001b). The Lower Paleolithic sites of Mugodjari-3 - 6 represent concentrations of heavily to moderately abraded artifacts occurring on the surfaces of gentle slopes and on hill tops (the colluvial banks of the valley) and on the crests of hills in the vicinity of quartz sandstone outcrops which were exploited as sources of raw material for tool production. These assemblages contain distinct foliate, ovoid, and cordiform bifaces of the Acheulian type as well as nuclei exhibiting morphological features of Levallois reduction and various *racloirs* and notch-denticulate tools.

Industries identified as truly Acheulian have also been reported from other regions of Kazakhstan. This area includes sites on the Mangyshlak Peninsula (Medoyev 1982); the Bale localities and Semizbugu, Locus 2 in the northern Lake Balkhash area (Medoyev 1970; Derevianko *et al.* 1993); Zhaman-Aibat-4 and Vishnevka-3 in the southwestern and northeastern parts of the Kazakh hummocky topographic area (Klapchuk 1976; Voloshin 1988); and Kudaikol in the western central Irtysh Basin, near Pavlodar (Medoyev 1968). Among these collections various types of bifacial tools together with Levallois reduction products, various *racloirs*, and notch-denticulate tools have been found.

Archaeological materials recovered from the Koshkurgan-1 site, located in the southwestern Karatau Mountain range, southern Kazakhstan (Derevianko *et al.* 2000c), define a peculiar type of Lower Paleolithic industry. Lithic artifacts were recovered from a stratified context deposited in association with animal bones of the Koshkurgan (Tyraspol, QI) faunal complex in subaquatic travertine sediments. The age of the Lower Pleistocene fauna has been estimated by electron-spin-resonance (ESR) as falling within the range of 400 - 500 ka. Archaeological materials recovered from the Koshkurgan-1 site have been classified as a microlithic pebble industry, which is to say that the tools were mostly made on small pebbles (average length is 4 - 5 cm) derived from various kinds of stone. Levallois and single platform cores, short, non-faceted spalls, single longitudinal and double *racloirs*, and notch-denticulate tools represent the most numerous categories within the Koshkurgan-1 lithic collection.

In Mongolia, Acheulian-like bifaces were first reported occurring within the surface collections at such open-air sites as Bottom-of-the-Gobi and in the vicinity of Mount Yarkh (Okladnikov 1983, 1986). Amygdaloid, ovoid, and sub-triangular bifaces together with discoidal, proto-Levallois, and Levallois cores comprise the earliest component of these diachronic surface collections.

Recent investigations in the southeastern Gobi Altai have provided new information supporting a model of the dissemination of Acheulian elements over Mongolia in the Paleolithic. Bifacially worked tools associated with Levallois products have been identified within the series of artifacts exhibiting heavy surficial aeolian abrasion at

Tsakhiurtyn Hondii or 'Flint Valley' (Derevianko *et al.* 1996), in the Trans-Altai Gobi (Derevianko *et al.* 2000d), in collections associated with the lower stratigraphic levels in Tsagaan Agui Cave (Derevianko *et al.* 2000e), and from a workshop locality in the vicinity of the cave (Derevianko *et al.* 2000f). Age estimates for the Tsagaan Agui sediments, based on a series of RTL dates, suggest a Lower Pleistocene origin for the local Levallois-Acheulian traditions.

The majority of the Mongolian Lower Paleolithic industries bears features characteristic of pebble tool traditions (Derevianko *et al.* 1990, 2000a). Numerous sites located in the northern part of the Valley of Lakes (Nuuruudin Hondii) and in the Mongolian Altai have yielded rich collections of aeolian abraded artifacts including large multiplatform, orthogonal (polyhedral) cores, Levallois and parallel nuclei with one flaking surface, 'citron' spalls, various types of *raclairs*, notch-denticulate tools, and choppers. Nearly all the early industries of Mongolia exhibit Levallois technical methods in stone reduction.

The Torgalyk A Lower Paleolithic site located in the Tuva region (Sayan Mountains, east of the Altai) has yielded Acheulian artifacts (Astakhov 1998). Its geomorphological setting and the heavily aeolized state of the artifacts' surfaces allow age estimates of no later than the Middle Pleistocene. Among other heavily abraded artifacts, cores exhibiting elements of Levallois reduction, longitudinal *raclairs*, massive points and *grattoirs*, notched and denticulate tools have also been identified. In addition, the collection includes archaic bifaces in a variety of forms including *limandes* and proto-*limandes* as well as amygdaloid and ovoid bifaces.

Bifacial stone tool reduction strategy has also been recorded at the Lower Paleolithic sites of the upper stream of the Angara river region, northeast of the Altai. Heavily abraded artifacts made on quartzite have been found exposed on high terrace surfaces on the right bank of the Angara and on the banks of the Angara Dam. Similar finds have also been reported from redeposited contexts in the lowermost portion of the Murukta Glacial Period (Oxygen Isotope Stage 4) sediments (Medvedev 1983; Medvedev and Vorobieva 1998). Judging from the relative stratigraphic position of these artifacts and the state of aeolian abrasion apparent on their surfaces, they cannot be younger than the Taz Glacial Period (Oxygen Isotope Stage 6). The collection of archaic quartzite tools includes ovoid cores exhibiting radial flaking, Levallois cores with fan-like and parallel flaking patterns, longitudinal, transverse, and *déjeté raclairs*, points and *grattoirs* on massive flakes, and so-called chopper/chopping tools with straight and triangular cutting edges. All of the southern Angara lithic collections may be subdivided into one of two traditions: Tarakhaiski and Olonski. The Tarakhaiski group comprises industries with well-developed pebble tool technology. Primary reduction is based on the 'citron' flaking strategy and chopper/chopping tools constitute a considerable proportion of the tool kit. The Olonski assemblages are more similar to Acheulian-type industries. This variant is characterized by bifacially radially flaked

core-like implements, occasional pebble tools, and quartzite micro-bifaces, with the latter found only in the Olonski assemblages.

Eastwards, bifaces reminiscent of western Acheulian specimens have been reported from North China.<sup>2</sup> Single occurrences of Middle Pleistocene bifacially worked tools classified as handaxes (for example, at the Gongwangling locality in the Lantian area, Shaanxi province, and at Kehe, Shanxi province) and a cleaver (Zhoukoudian Locality 13, near Beijing) were recovered from the loess plateau and the Huanghe Basin (Teilhard de Chardin 1935; Pei 1937; Yi and Clark 1983; Jia and Huang 1991). However, reliable evidence illustrating Levallois technology in Paleolithic industries has not yet been reported from China (Gao 2000). The notable absence of developed, standard Levallois technologies in East Asian industries serves as a major argument supporting the hypothetical western origin of the technical and typological bases of the Lower Paleolithic in Central Asia.

## CONCLUSIONS

In summary, this brief review of known Lower Paleolithic technocomplexes reported from regions geographically contiguous with the Altai has shown that the majority of industries producing Acheulian-like bifaces are characterized by developed methods of parallel and Levallois reduction and, consequently, by the production of tools on intentional blanks of standard size. The features noted support our hypothesis regarding the original development of the Altai Middle Paleolithic on the basis of local Lower Paleolithic cultural traditions bearing the Levallois reduction strategy.

The original development of the majority of the Altai Middle Paleolithic industries does not exclude close relationships with contiguous territories. In particular, such a supposition is supported by similarities noted in the characteristics of the Mousterian industries of the Altai and Central Asia. Most Central Asian Mousterian technocomplexes and the Gorny Altai Middle Paleolithic industries can be subdivided into two major technical variants: the true Mousterian (Montane Mousterian) and the Levallois-Mousterian (Ranov and Nesmeianov 1973).<sup>3</sup>

The major technical features of the Central Asian Levallois-Mousterian industries, like those from Obi-Rakhmat, Khodjakent, and Khudji, include the parallel reduction strategy for cores with prepared platforms and large numbers of laminar blanks and tools fashioned on large blades. Similar features are also characteristic of the Kara-Bom variant of the Altai Middle Paleolithic. Predominantly radial and parallel cores, a small number of blades, and a typologically diverse series of *raclairs* typify the industries associated with long-term occupation cave sites like Teshik-Tash and Ogzi-Kichik. Such technical features are also noted within the Denisova variant industries of the Altai Mousterian.

Previously identified variants of the Altai Middle Paleolithic also show features analogous with Paleolithic industries recorded in the Eastern Mediterranean. For instance, Levallois-Mousterian archaeological materials

of the Kara-Bom type resemble the Tabun D Early Mousterian assemblages from the Levant (Bar-Yosef and Meignen 1992; Marks 1992). The high level of development of Levallois technology focused on parallel flaking in order to produce elongated spalls, including large blades and Levallois points, is the major characteristic feature shared by these industries. The resemblance of the Mousterian materials recovered from Okladnikov Cave in the Altai to the Yabrudian complexes recovered from Tabun Cave, Yabrud I rockshelter, and other Paleolithic sites in the Levant is also noteworthy (Rust 1950; Jelinek 1981, 1982). These industries include many similar tool types, especially the numerous *déjeté* scrapers.

The analogous techno-typological features noted in the Middle Paleolithic technocomplexes of the Altai, Central Asia, and Near East, suggest their attribution to a single cultural domain. In this respect, western Central Asian sites seem to provide links between Middle Eastern and Central Asian industries. On the other hand, western Central Asian sites could hardly have been centres from which Mousterian traditions were transmitted eastward (Ranov 1990; Ranov and Laukhin 2000), because the Altai Middle Paleolithic technocomplexes are considerably earlier than Mousterian sites currently reported from western Central Asia (Ranov *et al.* 2002).

Mousterian traditions dispersed over Asia to include the territory of Mongolia. The available materials provide evidence for similar tendencies in the formation and development of Middle Paleolithic industries in Mongolia. Thus, the Mousterian industry identified at the important cave site of Tsagaan Agui (Derevianko *et al.* 2000d), is characterized by parallel reduction of Levallois, proto-prismatic, and narrow-face nuclei. Massive *racloirs*, notch-denticulates, and spurred tools represent major tool categories within the Tsagaan Agui tool kit. Similar technical and typological features were noted within the collection of moderately abraded artifacts at Khoit-Tsenker-Gol-2 in the Mongolian Altai (Derevianko *et al.* 1990). In the Russian Altai, the industries of the Denisova variant of the Middle Paleolithic represent the closest analogue to these Mongolian materials.

The alternative variant of the Mongolian Middle Paleolithic is represented by Levallois industries. The Barla-giin-Gol-1 site (specifically, the series of moderately abraded artifacts) located in the southeastern Mongolian Altai (Derevianko and Petrin 1987) and the Orkhon-1 stratified site in the southern Hangayn Mountains (Petrin 1991), have yielded archaeological collections which demonstrate high indices of the Levallois technique in tool production. Levallois tools, including cores, points, blades, and flakes, represent the most numerous categories in these tool kits. The Orkhon-1 archaeological materials indicate the contemporaneous existence of Levallois and Mousterian industries in the Mongolian Paleolithic. The Levallois technocomplexes of Mongolia particularly resemble the Kara-Bom variant of the Altai Middle Paleolithic. It has been noted that both technical traditions evolved within the Mongolian Paleolithic. Both developmental trends are illustrated by the available archaeologi-

cal materials attributable to the transitional period from the final Middle to the Initial Upper Paleolithic. The true Mousterian variant is illustrated by the archaeological collection associated with deposits from the third sedimentation cycle in the Tsagaan Agui Cave, while the Levallois-Mousterian variant has been identified in materials recovered from the Orok-Nuur-1 and 2 sites, located in the northern Valley of Lakes or Nuuruudin Hondii (Derevianko *et al.* 2000b).

The cultural continuity apparent in the development of the Mongolian Paleolithic suggests the formation of Mousterian traits on the basis of a local Lower Paleolithic tradition with Levallois technology. The analogous features of the major Mousterian variants allow us to include Mongolia, primarily the Mongolian and Gobi Altai regions, and the Russian Altai in a single geographic unit representing the development of a distinctive Middle Paleolithic culture.

#### NOTES

1. Archaeological materials from Tiimechin-2 are unique among the other Mousterian industries in the Altai. The Tiimechin-2 artifacts do not bear any signs of Levallois reduction. Notch-denticulate tools predominate in the tool kits; the proportion of large pebble chopping-like tools is considerable (Shunkov 1990).

2. The bifaces from Chongokni, South Korea, whose age has been provisionally estimated as Upper Pleistocene (Yi 1992), are not referred to in the present paper, nor are the bifaces from the Bose Basin, South China (Hou *et al.* 2000; Huang *et al.* 2001), for which Lower Paleolithic attribution needs additional support.

3. Archaeological materials from the Kara-Bura (Mousterian-Soanian variant) (Ranov 1965) and the Kulbulak (denticulate Mousterian) (Kasymov 1972) form a specific industrial variant within the range of Central Asian Paleolithic collections. The Kara-Bura industry with abundant large pebble tools has not found exact analogues in the Altai Middle Paleolithic. However, the Tiimechin-2 collection includes numerous pebble tools (Shunkov 1990). At the same time, notch-denticulate tools represent the specific feature of the Tiimechin-2 industry, suggesting analogues with the materials recovered from the Kulbulak multilayered site.

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