STRONG. 1989. "Studies of bone technology and taphonomy, Old Crow Basin, Yukon Territory," in *Bone modification*. Edited by R. Bonnichsen and M. H. Sorg. Orono, Maine: Center for the Study of the First Americans.
JENNESS, DIAMOND. 1932. *The Indians of Canada*. National Museum of Canada Bulletin 65.
KOENIGSWALD, G. H. R. VON. 1981. "Davidson Black, Peking man, and the Chinese dragon," in Homo erectus: *Papers in honor of Davidson Black*. Edited by B. A. Sigmon and J. S. Cybulski. Toronto: University of Toronto Press.
MAC NEISH, R. S. 1949. Prehistoric relationships between the cultures of the Southeastern United States of Mexico in light of an archaeological survey of the State of Tamaulipas, Mexico. Ph.D. diss., University of Chicago, Chicago, Ill.
———. 1952. *Iroquois pottery types: A technique for the study of Iroquois prehistory*. National Museum of Canada Bulletin 124.
———. 1954. *An early archaeological site near Panuco, Vera Cruz*. Philadelphia: American Philosophical Society.
———. 1967–75. *The prehistory of the Tehuacán Valley*. 5 vols. Austin: University of Texas Press.
———. 1978. *The science of archaeology*? North Scituate, Mass.: Duxbury Press.
———. 1992. *The origins of agriculture and settled life*. Norman and London: University of Oklahoma Press.
MARTIN, P. S. 1973. The discovery of America. *Science* 179: 969–1074.
MIRAMBELL, L. 1973. El hombre en Tlapacoya desde hace unos 20 mil anos. *Boletín INAH* 4:11–14.
PRESTON, D. 1996. The lost man. *New Yorker*, June 16.
RINDOS, DAVID. 1980. Symbiosis, instability, and the origins and spread of agriculture: A new model. CURRENT ANTHROPOLOGY 21:751–72.
———. 1984. *The origins of agriculture: An evolutionary perspective*. New York: Academic Press.
SATO, Y-I. 1996. The DNA origin of rice. Paper presented at the Kyoto Conference, Kyoto, Japan.
STEWARD, J. 1955. *The theory of culture change*. Urbana: University of Illinois Press.
TAYLOR, W. W. 1948. *A study of archaeology*. American Anthropologist Association Memoir 69.
YOUNG, T. C., PHILIP E. L. SMITH, AND PEDER MORTENSEN. Editors. 1982. *The hilly flanks and beyond*. Chicago: Oriental Institute.

The Initial Upper Paleolithic in Northeast Asia[1]

P. JEFFREY BRANTINGHAM,
ANDREI I. KRIVOSHAPKIN, LI JINZENG,
AND YA. TSERENDAGVA
Santa Fe Institute, 1399 Hyde Park Rd., Santa Fe, N.M. 87501, U.S.A. (*pjb@santafe.edu*) (Brantingham)/ *Institute of Archaeology and Ethnography, Siberian Branch, Russian Academy of Sciences, Novosibirsk, Russia 630090* (Krivoshapkin)/*Ningxia Institute of Archaeology, 113 Li Ming St., Yinchuan, Ningxia Hui Autonomous Region 750001. People's Republic of China* (Li)/*Institute of History, Mongolian Academy of Sciences, Jukov Ave. 77, Ulaanbataar 51, Mongolia 210351* (Tserendagva). 23 V 01

The period between roughly 45,000 and 30,000 years ago witnessed several critical events in human evolutionary history, among them the appearance and elaboration of Upper Paleolithic technologies, the disappearance of archaic hominid species, and the apparent ascendance of anatomically modern humans. Among the many novel features of the Upper Paleolithic, it is the sudden ubiquity of blade technologies beginning approximately 45,000 years ago that appears to signal significant behavioral change (Bar-Yosef and Kuhn 1999:333). This increasing reliance on blade technologies is now commonly referred to as the Initial Upper Paleolithic (Bar-Yosef and Kuhn 1999, Kuhn, Stiner, and Güleç 1999). Throughout western Eurasia there appear to be common technological trends defining this phase, including (1) blade production from cores combining elements of both Middle and Upper Paleolithic technologies, (2) high frequencies of retouched blade tools, (3) blade blanks with faceted platforms, and (4) elongate Levallois points (Kuhn, Stiner, and Güleç 1999:506). Assemblages are dominated by tool forms traditionally considered characteristic of the Upper Paleolithic, namely, end scrapers, burins, and truncations. Other tool forms, including side scrapers, denticulates, and occasionally points, may also occur in high frequencies.

There is ample evidence to suggest that genuine Initial

1. This research was supported in part by U.S. National Science Foundation grant #972999, the Wenner-Gren Foundation, the L. S. B. Leakey Foundation, the National Geographic Society, the University of Arizona, the Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences, and private and corporate sponsors. We thank in particular A. P. Derevianko, D. Tseveendorj, J. W. Olsen, V. T. Petrin, D. B. Madsen, R. G. Elston, R. L. Bettinger, Xu Cheng, Wang Huiming, and Yang Rui for their valuable contributions to various parts of this project. We also thank K. W. Kerry for preparing the illustrations and S. L. Kuhn, M. C. Stiner, and several anonymous referees for helpful comments on earlier versions of this paper.

Upper Paleolithic variants are found in certain areas of Northeast Asia. Like its Western counterparts, the Northeast Asian Initial Upper Paleolithic is characterized by the elaboration of blade technologies showing both Middle and Upper Paleolithic characteristics. The best-known of the Northeast Asian Initial Upper Paleolithic sites, Kara Bom, in the Altai region of southern Siberia, has been dated as early as 43,000 years ago (Derevianko, Petrin, and Rybin 2000, Goebel, Derevianko, and Petrin 1993). This paper presents detailed comparisons between the Middle and Upper Paleolithic assemblages from Kara Bom and Late Pleistocene blade-based assemblages from the Mongolian Gobi and Northwest China in an attempt to outline the characteristics of the Initial Upper Paleolithic in Northeast Asia and assess its coherence as a technological phenomenon. In addition, we provide geochronological background for the primary sites discussed, much of which has not appeared in the English-language literature. The sample of sites examined here, though not geographically exhaustive, was analyzed in sufficient detail to allow rigorous quantitative comparisons between sites.

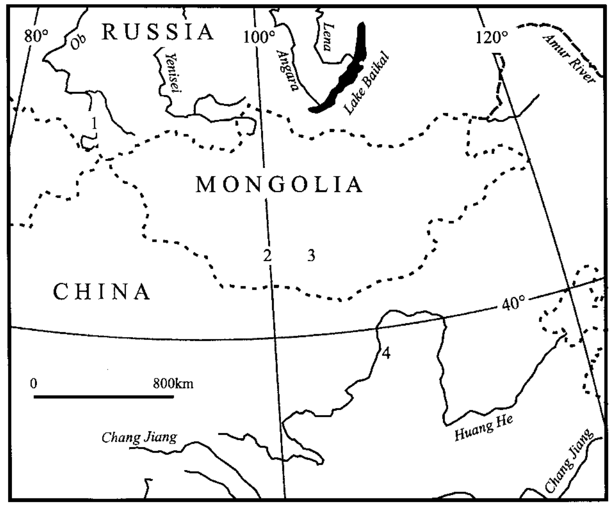

FIG. 1. *Northeast Asia, showing the location of the sites compared in this study.* 1, *Kara Bom;* 2, *Chikhen Agui;* 3, *Tsagaan Agui; and* 4, *Shuidonggou.*

SITES AND SAMPLES

Kara Bom is an open-air site in the Siberian Altai (fig. 1) (50°43′N, 85°42′E; 1,120 m above sea level). First excavated by Okladnikov, it consists of 11 lithological units divided into three main depositional phases (fig. 2) (Derevianko, Petrin, and Rybin 2000; Derevianko, Shimkin, and Powers 1998:103–4; Goebel, Derevianko, and Petrin 1993; Okladnikov 1983). At the base of the section, strata 11 and 10 are thought to correlate with the Zyr'ansk glaciation (δ^{18}O stage 4). Stratum 11 yielded a single ESR age of 72,200 years B.P. (calendric, uptake model unspecified). Strata 9–5 are correlated with the early part of the Karginsk interstadial (δ^{18}O stage 3). An ESR age of 62,200 years B.P. (calendric, uptake model unspecified) was obtained from stratum 9, while stratum 6 yielded AMS radiocarbon ages of 43,200 ± 1,500 B.P. and 43,300 ± 1,500 B.P. (Goebel, Derevianko, and Petrin 1993). The overlying units are correlated with the later part of the Karginsk interstadial and have produced ages of 34,180 ± 640 B.P. and 33,780 ± 510 B.P. (stratum 5b), 30,990 ± 460 B.P. (stratum 5a), and 38,080 ± 910 B.P. (stratum 4) (Goebel, Derevianko, and Petrin 1993:456). The Middle Paleolithic collections derive from strata 9–7 and thus have an expected age of approximately 62,200 years B.P. (calendric). The Upper Paleolithic collections derive from stratum 6 and have a corresponding radiocarbon age of 43,000 B.P. Additional Upper Paleolithic assemblages were excavated from strata 5–3 but are not discussed here. The analyses presented below are based on a study of the Kara Bom collections (n specimens = 2,085) undertaken in 1998.

The dominant stone raw material used at Kara Bom is a fine-grained gray-black chert found in abundance in the channel of the Altairy River, 1–2 km from the site. More than 98% of the combined Middle and Upper Paleolithic collections is based on this one raw-material type. Levallois-like flat-faced cores are the dominant core form represented in the Middle Paleolithic collections (n = 20) (fig. 3, table 1). These cores are typically plano-convex in lateral cross section, restricting reduction to a single "face" of the core (see Boëda 1995). The striking platforms are commonly faceted and approach right angles with the primary reduction face. Additional core forms make up only a small part of the assemblage. Not surprisingly, Levallois end products constitute more than 20% (n = 78) of all of the recovered blanks from the Middle Paleolithic. Characteristically, such blanks are flat in both lateral and longitudinal profile and have steep (> 70°), faceted striking platforms. Only generalized flakes (n = 220, 59.9%) surpass Levallois end products in relative frequency. Perhaps more surprising, given Goebel, Derevianko, and Petrin's (1993:452) conclusion that "true blade cores and their removals" were absent from the Middle Paleolithic assemblage, is that blade end products, including Levallois and subprismatic blades, pointed blades, crested blades, and bladelets, make up nearly 15% (n = 52) of the Middle Paleolithic collections. Levallois blades are flat in cross section and have length-width ratios not exceeding 4:1, faceted platforms, parallel or subparallel dorsal scars, and somewhat irregular edges. In contrast, subprismatic blades tend to have straight lateral edges, trapezoidal or triangular cross sections, and more acute striking platforms. The manufacture of these blade end products is consistent with the morphology and reduction trajectories of the recovered cores. Combination tools (n = 15), displaying various mixtures of notched, denticulated, and scraper elements, dominate the Middle Paleolithic tool assemblage (table 2).

Subprismatic blade cores are the most common prepared core form in the Upper Paleolithic collections (n

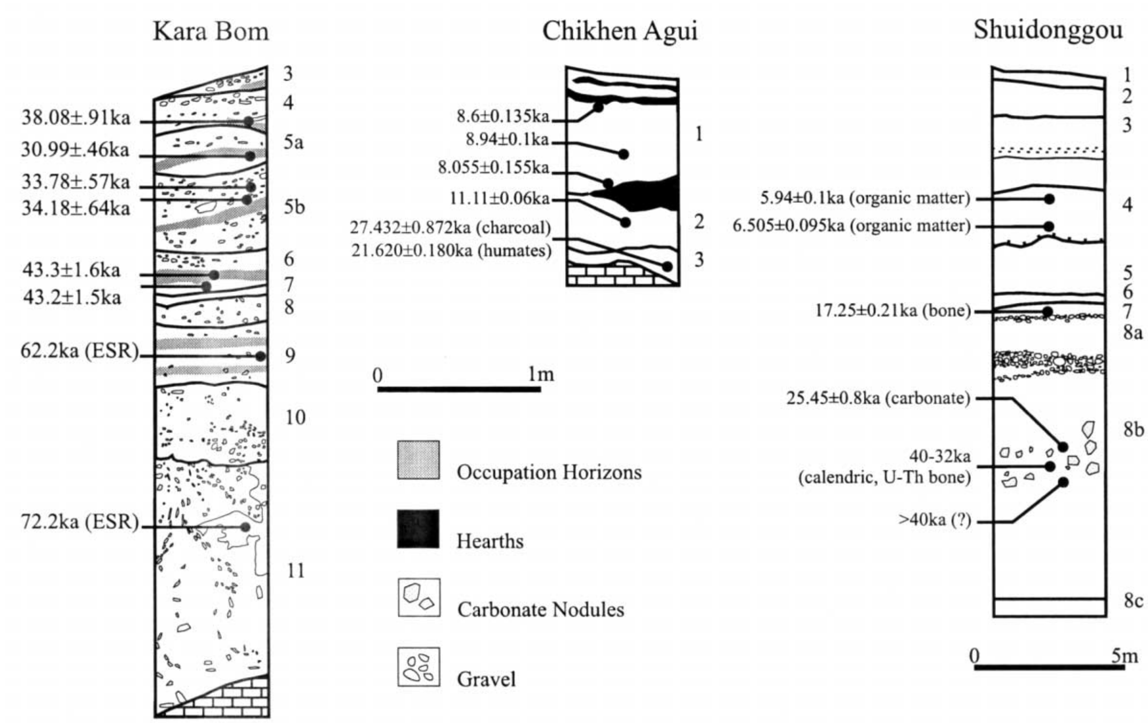

FIG. 2. *Cumulative stratigraphic profiles Kara Bom, Chikhen Agui, and Shuidonggou showing the positions of occupational horizons and hearths and principal radiometric dates.*

= 5), though cores with standard Levallois geometry occur in nearly equal frequencies ($n = 4$) (fig. 3, table 1). Subprismatic blade cores differ from Levallois-like flat-faced cores in extending reduction to as much as 200° of the core perimeter. Their striking platforms also tend to be more acute ($< 70°$), and platform faceting is less common. Blade end products are more than twice as common in the Upper Paleolithic horizons (42.4%, $n = 252$) as in the Middle Paleolithic. The majority of these are classified as subprismatic blades. Like their Levallois counterparts, subprismatic blades are very flat in longitudinal section and represent one end of a continuum of blade morphologies generated from both flat-faced and subprismatic cores. Flake-blades, which meet the metric definition of a blade but are unstandardized in one or more characteristics, represent the other end of this continuum. The small number of core tablets ($n = 2$) and the increased frequency of crested blades ($n = 11$) is consistent with a greater emphasis on blade technology in the Upper Paleolithic. Similarly, retouched tools on blades assume more importance (table 2).

Chikhen Agui (Ear Cave) is a small limestone rock shelter located in the central Gobi Desert of Mongolia (44°46′22.3″ N, 99°04′08.7″ E; 1,970 m above sea level) (fig. 1) (Derevianko et al. 2001*b*). Deposits reach a maximum thickness of about 75 cm, and the sequence is divided into three archaeological components (fig. 2). Strata 1 and 2 are exclusively microlithic and are not discussed here (Derevianko et al. 2000*b*). Stratum 3 contains a large blade industry resembling that from Kara Bom. A single AMS radiocarbon determination on hearth charcoal dates stratum 3 to 27,432 ± 872 B.P. (AA-26580), with the humate fraction dating to 21,620 ± 180 B.P. (AA-32207). A bone collagen date from an associated open-air component (locus 2) yielded an age of 30,550 ± 410 B.P. (AA-31870). The archaeological sample analyzed here derives from the 1996 excavations and consists of 167 specimens.

The raw-material environment at Chikhen Agui differs dramatically from that at Kara Bom. Approximately 94% of the assemblage is made of high-quality opaque cherts of several different types imported from at least 5 km away. Quartzite, one potential local material, makes up only 3.6% of the assemblage. The majority of the prepared cores from Chikhen Agui are small, Levallois-like bidirectional blade cores with opposed striking platforms (fig. 4, table 1). Two specimens are classified as Levallois flake or point cores on the basis of the character of the final removal before core discard. Generalized flakes ($n = 41$) form the single largest category of debitage at Chikhen Agui. However, all of the blade products combined ($n = 42$), including Levallois blades and bladelets, reach equal frequency. There is no evidence to suggest that blade and bladelet blanks were produced by different reduction strategies. They are morphologically similar in all respects, and the core

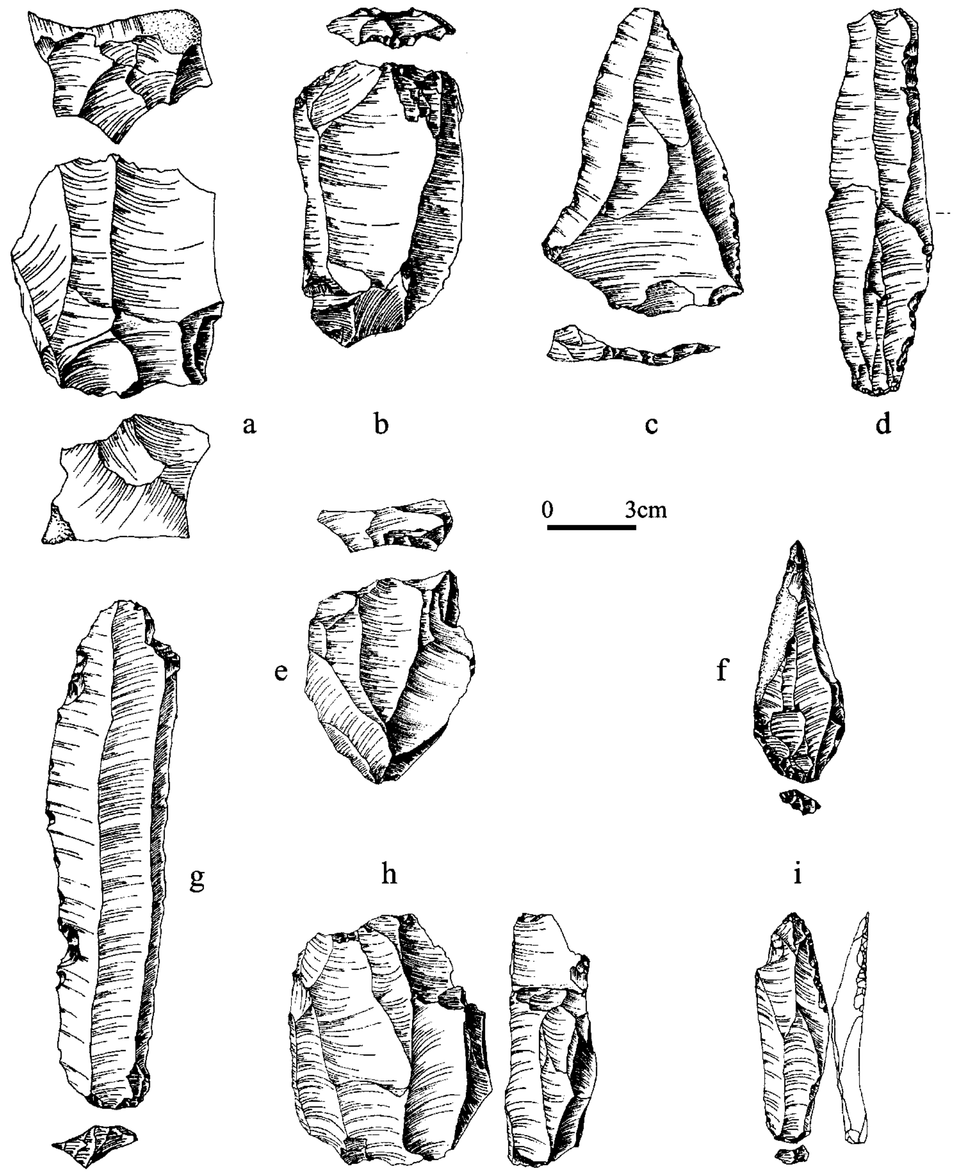

Fig. 3. *Cores, blanks, and tools from the Middle Paleolithic* (a–d) *and Initial Upper Paleolithic* (e–i) *levels at Kara Bom.* a, b, e, h, *flat-faced* (*"Levallois"*) *cores;* c, *Levallois-like point;* d, g, *Levallois blades;* f, i, *retouched pointed blades* (*redrawn after Derevianko, Shimkin, and Powers 1998*).

population is consistent metrically with the production of both blank types. A similar conclusion may also apply to the series of elements resembling Levantine Levallois points. Flat-faced blade cores display a tendency to evolve toward convergent reduction. Over its use-life, a flat-faced core may therefore generate products that are parallel, subparallel, and convergent in plan form, as well as metric blades and bladelets. The technical elements classified as "crested blades" are similar to classic Upper Paleolithic *lames à crêtes* (Inizan, Roche, and Tixier 1992). However, these preparations were apparently employed in shifting reduction from the primary face to the edge of the core in a manner somewhat consistent with *lames débordants*. Cores with lateral crests prepared late in the reduction sequence are common at other sites in Mongolia (Krivoshapkin 1998). Retouched tools constitute nearly 12% ($n = 20$) of the recovered artifacts from Chikhen Agui (table 2). No single tool form occurs with great frequency except for blades with one or two edges retouched.

Shuidonggou Locality 1 is located on the edge of the Ordos Desert in Ningxia Hui Autonomous Region,

TABLE 1
Raw Counts of Core and Debitage Types from Kara Bom, Chikhen Agui, and Shuidonggou

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shui-donggou
Tested pebble	3	2	1	7
Chopping tool	1	–	–	9
Chopper	–	–	–	10
Polyhedron	1	–	–	38
Discoid	–	–	–	11
Levallois flake core	19	2	1	5
Levallois point core	3	1	1	1
Levallois blade core	–	1	7	80
Subprismatic blade core	–	5	–	1
Pyramidal blade core	–	–	1	–
Change-of-orientation core	1	–	3	5
Pebble microblade core	–	–	1[c]	4[d]
Narrow-faced core	2	9	2	3
Broad-faced core	–	1	2	–
Other cores	–	–	2	2
Generalized flake	221	315	40	1,507
Levallois flake	32	5	–	11
Levallois point	22	8	4	15
Levallois blade	24	20	28	402
Subprismatic blade	14	156	–	–
Prismatic blade	–	–	–	7
Pointed blade	–	14	3	7
Bladelet	10	44	9	66
Pointed bladelet	2	7	1	–
Microblade	–	–	–	1
Core tab	–	2	1	7
Edge element	9	5	–	24
Other technical element	–	7	7	23
Bipolar flake	–	–	–	3
Kombewa	1	–	–	–
Crested blade	2	11	5	46
Flake blade	–	–	–	112
Total	367	615	119	2,407

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.
[c]Displaced from microlithic levels.
[d]Bipolar pebble cores.

China (38°17′55.0″ N, 106°30′6.2″ E; 1,220 m above sea level) (fig. 1). The site was excavated initially in 1923 by Emile Licent and Pierre Teilhard de Chardin and subsequently by Chinese teams in the early 1960s and again in 1980 (Boule et al. 1928, Jia, Gai, and Li 1964, Ningxia Museum 1987). Late Pleistocene sediments at Locality 1 occur within a fluvial cut-and-fill sequence (fig. 2). Stratum 4 is securely dated to the Holocene with radiocarbon assays on pond organic matter of 5,940 ± 100 and 6,505 ± 95 B.P. (Geng and Dan 1992:48; Ningxia Museum 1987). The underlying units have produced two finite radiocarbon dates of 17,250 ± 210 B.P. (bone collagen) and 25,450 ± 800 B.P. (pedogenic carbonate) from stratum 7 and 8b, respectively (CQRA 1987:37). Given the probable secondary context of the bone date from stratum 7, the depositional age of strata 7–5 is estimated to be less than 17,000 B.P. A third infinite radiocarbon date on unknown material underlying the archaeological horizons is difficult to evaluate (Geng and Dan 1992:49).

TABLE 2
Raw Counts of Retouched Tool Types from Kara Bom, Chikhen Agui, and Shuidonggou

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shui-donggou
Single side scraper	2	7	–	86
Double side scraper	3	2	2	22
Convergent scraper	1	–	–	16
Transverse scraper	–	2	–	28
Single end scraper	–	1	1	43
Double end scraper	–	–	–	1
End scraper on retouched blade	1	11	1	2
Fan-shaped end scraper	–	1	–	1
Circular scraper	–	–	–	5
Thumb-nail end scraper	–	–	1	2
Carinated end scraper	–	–	–	9
Nosed end scraper	1	2	–	1
Simple burin	–	1	2	5
Dihedral burin	–	–	–	2
Multiple burin	1	2	–	1
Borer	–	1	–	–
Backed knife	–	1	–	7
Backed fragment	–	1	–	–
Single notch	1	4	1	76
Multiple notches	–	3	–	18
Denticulate	3	8	–	18
Combination tool	15	29	1	59
Blade, one edge retouched	1	21	5	55
Blade, two edges retouched	2	16	3	17
Blade, retouched into point	–	1	–	3
Bladelet with abrupt retouch	–	–	1	–
Retouched flake	2	9	1	71
Flake retouched into point	–	1	–	–
Other	–	1	1	3
Total	33	125	20	551

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.

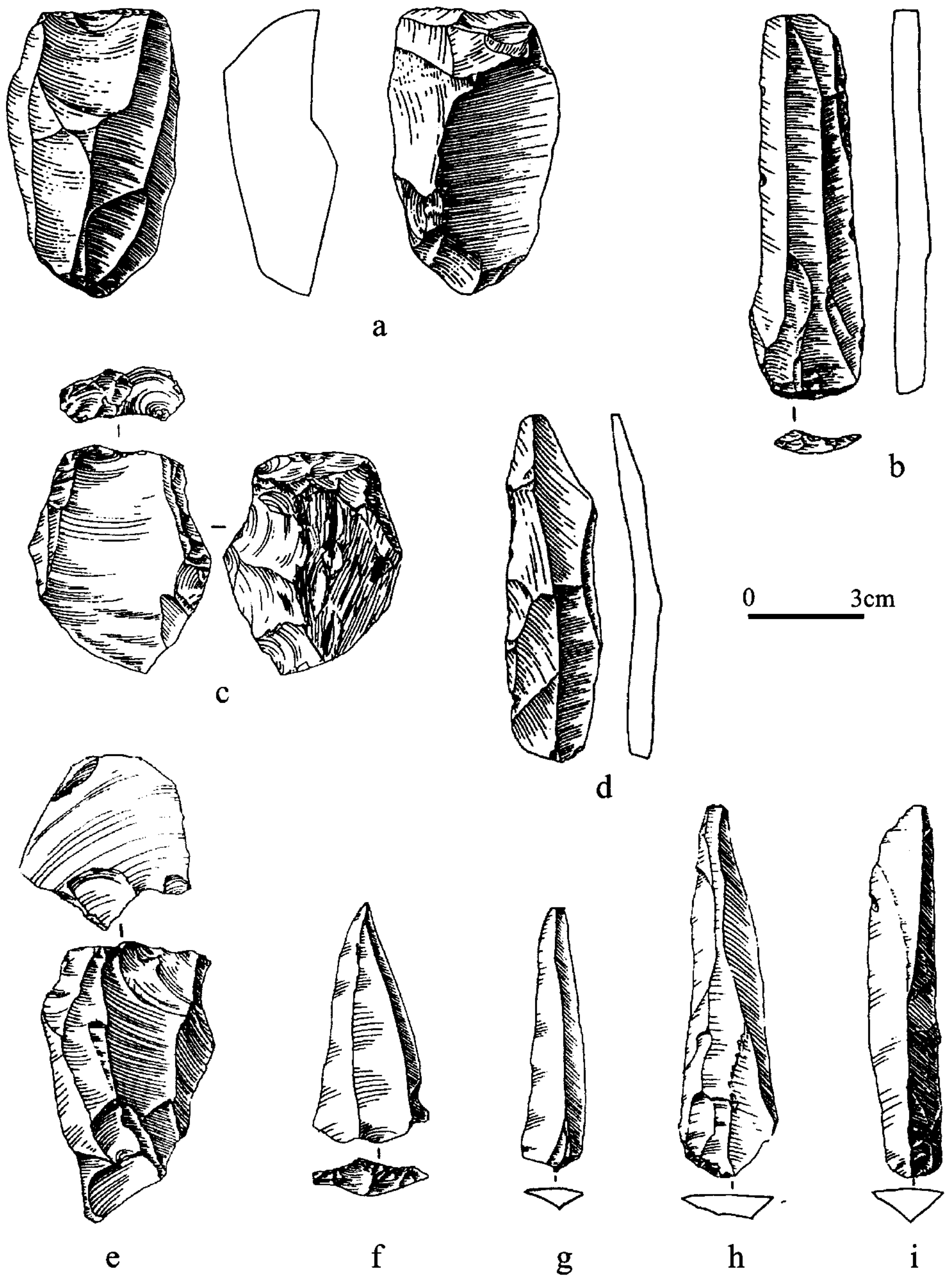

Fig. 4. *Cores and blanks from stratum 3 at Chikhen Agui.* a, c, e, *flat-faced ("Levallois") cores;* f, *Levallois point;* b, d, h, *Levallois blades;* g, i, *subprismatic blades.*

Finally, Chen and Yuan (1988) report on bone-derived U/Th ages from the "Lower Cultural Level" at Shuidonggou ranging from 40,000 to 32,000 years B.P. (calendric). Though not unreasonable given the character of the Shuidonggou industry, U/Th dating of bone has to be treated with extreme caution (Bischoff et al. 1988). Recent AMS radiocarbon dates from Shuidonggou Locality 2 strongly support a model of increasing occupation intensities between 26,000 and 25,000 B.P. (Madsen et al. n.d.). A total of 3,806 specimens excavated in 1980 were analyzed in 1998. The materials recovered from strata 6, 7, and 8b are identical in composition and are combined in all of the following presentations.

Shuidonggou is located in an area of abundant alluvial gravels. Derived from these local sources, the two most common raw materials used in core and tool reduction

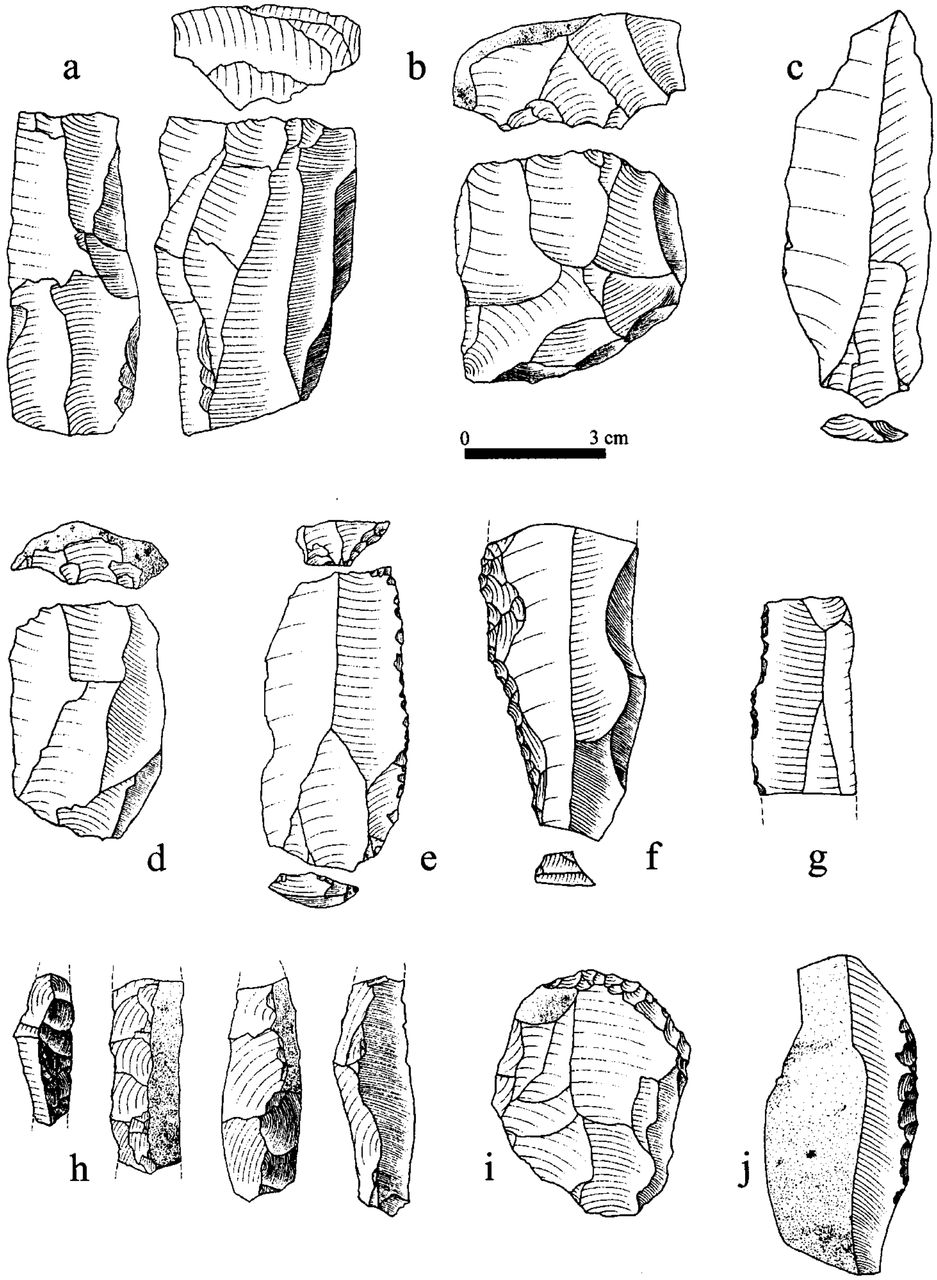

FIG. 5. *Cores, blanks, and tools from Shuidonggou.* a, b, d, *flat-faced ("Levallois") cores;* c, e–g, *Levallois blades;* h, *crested blades,* i, *retouched flake end scraper;* j, *side scraper.*

are silicified limestone (n = 2,540, 66.7%) and quartzite (n = 698, 18.3%). Of the 176 cores recovered, formally prepared examples are numerically dominant (n = 94) and Levallois-like cores make up the majority (n = 86) (fig. 5, table 1). Six are classified as Levallois flake and point cores, while the remainder (n = 80) are Levallois-like unidirectional and bidirectional cores dedicated to the production of blade blanks. Other prepared core forms, including two unfinished pyramidal bladelet cores, are represented in low frequencies. The specimens classified as bipolar pebble cores superficially resemble microlithic technology, reflecting in part the constraints of using very small chalcedony pebbles (Madsen et al. n.d.). Generalized flakes constitute more than half (n = 1,507) of all the debitage at Shuidonggou. A portion of the generalized flakes are undoubtedly related to the initial working of prepared cores, though there are no clear attributes to distinguish these flakes from others devoted

TABLE 3
Prepared Core and Blank Reduction Patterns (Residuals in Parentheses)

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shuidonggou	Total
Prepared cores					
Unidirectional linear	16	5	2	36	59
Bidirectional linear	2	3	10	41	56
Unopposed/centripetal	5	3	3	15	26
Total	23	11	15	92	141
Standardized blanks					
Unidirectional linear	84 (1.0)	187 (0.2)	17 (−3.9)	461 (0.6)	749
Bidirectional linear	12 (−2.4)	59 (0.1)	32 (5.1)	135 (−0.6)	238
Unopposed/centripetal	8 (−1.4)	8 (−1.2)	9 (3.8)	24 (−1.0)	49
Total	104	254	58	620	1,036

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.

to a core-and-flake strategy. Blanks that are unequivocally related to prepared core reduction constitute 27.8% ($n = 620$) of the assemblage, and formal blades alone constitute 21.6% ($n = 482$). The majority of blades are classified as Levallois products ($n = 402$). Subprismatic blades are uncommon ($n = 7$) and flake-blades more abundant ($n = 112$) than in the Kara Bom Upper Paleolithic collections. The tool assemblage from Shuidonggou represents a substantial part of the excavated collections ($n = 544$, 15%) (table 2). Flake tools constitute 58.6% ($n = 319$) of the sample, while 26.1% ($n = 142$) are based on blades. Including flake-blades, nearly 37% ($n = 200$) of the retouched tool assemblage is based on elongate end products.

COHERENCE OF THE NORTHEAST ASIAN INITIAL UPPER PALEOLITHIC

As in western Eurasia, the Initial Upper Paleolithic emerges in Northeast Asia sometime after 45,000 years ago and is characterized by the elaboration of blade technologies showing a mixture of Middle and Upper Paleolithic characteristics. Beyond this general pattern, it is important to ask how coherent it is in terms of technology and typology. This question is addressed in a series of statistical comparisons of core, blank and tool populations.

Prepared core reduction patterns. Table 3 compares primary reduction patterns for prepared cores from the study assemblages. The category "unidirectional linear" includes cores with unidirectional convergent, subparallel, and parallel removal scars. The category "bidirectional linear" includes cores with opposed platforms and parallel-to-subparallel removal scars. The category "unopposed/centripetal" includes cores with bidirectional unopposed removals, usually from platforms located at right angles to one another, and those with centripetal removals. Linear reduction predominates in all of the assemblages. Unopposed/centripetal cores are exceedingly rare. Unidirectional cores are more abundant in the Kara Bom assemblages, while bidirectional cores are more abundant at Chikhen Agui and Shuidonggou. Sample sizes preclude a statistical assessment of these observations.

Blank reduction patterns. Table 3 conveys the same type of information for dorsal removal scars on standardized blanks. Generalized flakes and technical elements are not included in the analyses. The predominance of linear reduction patterns seen in the core populations is amplified in the blank populations. The general pattern is of an abundance of unidirectional blanks, with bidirectional and unopposed/centripetal blanks occurring in progressively lower frequencies. Standardized residuals provide a measure of the evenness of the reduction patterns across the four assemblages. Bidirectional blanks are apparently underrepresented in the Kara Bom Middle Paleolithic, with a greater than expected frequency of unopposed/centripetal blanks. Chikhen Agui appears to be an outlier in that bidirectional and unopposed/centripetal blanks are overrepresented. The Kara Bom Upper Paleolithic and Shuidonggou assemblages are strikingly similar to one another. Chikhen Agui is significantly different from the Kara Bom Middle Paleolithic ($\chi^2 = 44.088$, d.f. = 2, $p \ll 0.001$), the Kara Bom Upper Paleolithic ($\chi^2 = 43.955$, d.f. = 2, $p \ll 0.001$), and Shuidonggou ($\chi^2 = 54.063$, d.f. = 2, $p \ll 0.001$). Shuidonggou is significantly different from the Kara Bom Middle Paleolithic ($\chi^2 = 8.025$, d.f. = 2, $p < 0.02$) but is indistinguishable from the Kara Bom Upper Paleolithic ($\chi^2 = 0.441$, d.f. = 2, $p = .802$).

Platform preparation and maintenance. A similar level of agreement characterizes the frequencies of platform types across the assemblages (table 4). Here cortical platforms include blanks retaining all or part of the cor-

TABLE 4
Blank Platform Types (Residuals in Parentheses)

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shuidonggou	Total
Cortical	0 (−2.2)	1 (−3.2)	4 (0.8)	44 (2.7)	49
Simple	7 (−4.2)	47 (−3.1)	19 (0.5)	228 (3.6)	301
Complex/faceted	97 (3.4)	205 (2.9)	35 (−0.5)	348 (−3.1)	685
Total	104	253	58	620	1,025

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.

tex on the striking platform. Simple platforms include plain and dihedral types. Complex/faceted platforms include those with multiple flake scars, small facets, and large transverse facets. Overall, there is a clear emphasis on complex/faceted platform types, which indicates special attention to platform preparation and maintenance. At a fine scale, complex/faceted platform types are slightly underrepresented at Chikhen Agui and Shuidonggou, while simple and cortical platforms are underrepresented at Kara Bom. Indeed, statistical comparisons of simple and complex/faceted platform types (excluding cortical types) indicate that Shuidonggou and Chikhen Agui are indistinguishable ($\chi^2 = 0.384$, d.f. = 1, $p = 0.536$) and both are significantly different from the collections from Kara Bom.

Technical (core-trimming) elements. The importance of platform faceting in Northeast Asian prepared core technologies is further supported by the low frequency of platform tablets in all of the assemblages (table 5). Platform tablets are recognized as one distinctive method of platform rejuvenation, especially for Upper Paleolithic prismatic blade technologies, whereby platform shaping problems and prominent flaking errors are corrected by removal of the entire platform (Inizan, Roche, and Tixier 1992). This rejuvenation strategy was infrequently employed at all of the sites. We suggest, moreover, that the tablets identified at Chikhen Agui and Shuidonggou are reduction errors rather than intentional rejuvenation spalls. At Shuidonggou, where a target blade length appears to have driven the intensity of core reduction (Brantingham 1999), the use of platform tablets would tend to reduce expected core use-life by quickly shortening the long axis of the cores.

The broader pattern of occurrence of technical elements is indicative of the similarities in core technologies between sites. Crested blades are consistently the dominant technical element represented except in the Kara Bom Middle Paleolithic. These are followed by "other" technical elements (primarily *outrepassé* blades) and edge elements, or *éclats débordants*. Statistical comparisons indicate that Shuidonggou is indistinguishable from both Chikhen Agui ($\chi^2 = 5.383$, d.f. = 3, $p = 0.146$) and the Kara Bom Upper Paleolithic ($\chi^2 = 0.411$, d.f. = 3, $p = 0.938$). This provides perhaps the strongest evidence that cores were prepared, reduced, and maintained in essentially the same ways in the Kara Bom Upper Paleolithic and at Chikhen Agui and Shuidonggou. The sample from the Kara Bom Middle Paleolithic is too small to evaluate statistically. However, the high frequency of edge elements relative to crested blades hints at some differences in core reduction strategies across the Middle-to-Upper Paleolithic transition.

Retouched tools. The strong similarities in core reduction strategies seen across the sites are not carried over to the retouched tool populations (table 6). The three most common retouched tool types at Shuidonggou are (1) side scrapers, (2) notched-denticulate tools, and (3) retouched blades. In the Kara Bom Upper Paleolithic the three most common tool types are (1) retouched blades, (2) combination tools, and (3) end scrapers and notched-denticulate tools, which occur in equal frequencies. Previous studies identified a much higher frequency of burins in the Kara Bom Upper Paleolithic assemblage, approaching 11% of all retouched tools ($n = 20$) (Derevianko and Markin 1997). Goebel (1994) also recorded a greater number of burins than the current study ($n = 13$). Yet in both of these studies burins still fall behind notched-denticulate tools, retouched blades, side scrapers, and irregularly retouched flakes in overall frequency. Our conservative estimate does not differ

TABLE 5
Occurrence of Technical (Core-trimming) Elements

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shuidonggou	Total
Core tablet	–	2	1	7	10
Edge element	7	5	–	17	29
Crested blade	2	21	8	54	85
Other technical element	–	9	7	22	38
Total	9	37	16	100	162

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.

TABLE 6
Occurrence of Retouched Tools

	Kara Bom Middle Paleolithic[a]	Kara Bom Upper Paleolithic[b]	Chikhen Agui	Shui-donggou	Total
Side scraper	6	9	2	124	141
Notched/denticulate	4	15	1	112	132
Retouched blade	3	38	9	75	125
Retouched flake	2	10	1	71	84
End scraper	2	15	3	64	84
Combination tool	15	29	1	59	104
Transverse scraper	–	2	–	28	30
Other	–	4	1	10	15
Burin	1	3	2	8	14
Total	33	125	20	551	729

[a]Mousterian horizons 1 and 2 combined.
[b]Upper Paleolithic levels 6 and 5 combined.

qualitatively from these earlier studies. Retouched blades are the most prominent tool type at Chikhen Agui, with other tool types occurring in roughly similar frequencies. In the Kara Bom Middle Paleolithic, combination tools are two to three times more frequent than any other tool type. Combining Shuidonggou, Chikhen Agui, and the Kara Bom Upper Paleolithic, the three most common tool types are (1) side scrapers, (2) notched-denticulate tools, and (3) and retouched blades. Clearly, none of these sites falls within traditional typological classifications of the Upper Paleolithic, which emphasize end scrapers, burins, and truncations. Formal end scrapers are present in low frequencies, burins are extremely rare, and truncations are absent.

To satisfy a measure of typological curiosity, it is instructive to count combination tools with classic Upper Paleolithic working edges as discrete types. Counting those with end-scraper edges strictly as end scrapers produces some changes in the rank-order frequencies of tool types. At Shuidonggou, end scrapers jump to the third-most-frequent tool type, behind side scrapers and notched-denticulate tools and ahead of retouched blades and retouched flakes. The rank-order position at Chikhen Agui does not change. In the Kara Bom Upper Paleolithic, end scrapers rise to the second-most-common tool type behind retouched blades. In the Kara Bom Middle Paleolithic, end scrapers surpass notched-denticulate tools, retouched blades, and retouched flakes to become the second-most-common tool type. The same counting procedure for burin combination tools has less impact. The burin category rises to position eight at Shuidonggou, position two at Chikhen Agui, position five in the Kara Bom Upper Paleolithic, and position four in the Kara Bom Middle Paleolithic.

The Chikhen Agui and Kara Bom Upper Paleolithic tool assemblages are the most consistent with a typological definition of the Initial Upper Paleolithic. However, the small sample size of the Chikhen Agui assemblage must be taken into account. In addition, the typological relevance of retouched blade tools must be questioned; blank size and shape are perhaps the most important morphological determinants among this class of tools. Regardless of the counting procedure, Shuidonggou has a strong Middle Paleolithic typological signature.

DISCUSSION

The Kara Bom Upper Paleolithic, Chikhen Agui, and Shuidonggou assemblages show evidence of the common technological trends accepted for the Initial Upper Paleolithic in western Eurasia. Core technologies generally fall within the Levallois definition and are specialized toward blade production. These generalizations may also hold for other assemblages in Siberia, such as Ust Karakol-1, Kara Tenesh, Byika II, Tolbaga, Varvarina Gora, Khotyk (Unit 2) and Kamenka A (Derevianko, Shimkin, and Powers 1998, Derevianko and Markin 1997, Rezanov et al. 1999), and in Mongolia, such as Tsagaan Agui (White Cave) and the Arts Bogd, Orog Nur 1-2, and Tuin Gol localities (Derevianko et al. 2000*a*, *b*; Derevianko and Petrin 1995; Kozlowski 1971; Krivoshapkin 1998; Okladnikov 1965, 1978). Shidonggou remains the only site in North China known to exhibit these characteristics (Brantingham 1999, Lin 1996). The most striking parallels with western Eurasian sites are found with the "flat cores" and "cores with lateral crests" of the Bohunician (Svoboda and Svoboda 1985:511), as well as recently excavated Initial Upper Paleolithic assemblages in Turkey (Kuhn, Stiner, and Güleç 1999), Syria (Boëda and Muhesen 1993), and the Levant (Bar-Yosef 2000, Marks 1990).

Despite these clear technological parallels, the Northeast Asian assemblages examined here do not conform to western Eurasian typological expectations of the Initial Upper Paleolithic. The high frequencies of side scrapers and notched-denticulate tools are more consistent with Middle Paleolithic typological definitions. End scrapers and burins are present but in relatively low frequencies. Such typological distinctions—including those emphasizing the presence or absence of *fossiles directeurs* such as Emireh points—may at best have regional chrono-stratigraphic relevance, and they probably have little to do with the behavioral and evolutionary processes underlying the origin and elaboration of the Initial Upper Paleolithic. The only substantive difference between the Middle and the Initial Upper Paleolithic in Northeast Asia is a shift in emphasis toward the production and use of blades. Stone tool typology appears to vary independently of this shift, and classic Upper Paleolithic traits such as formal bone and antler technologies do not in fact become prevalent until much later (< 30,000 B.P.) (Derevianko, Shimkin, and Powers 1998).

Why shift to a greater emphasis on blades but retain Levallois core designs? Levallois core geometry is one way to maximize core productivity in terms of number of end products and cutting-edge length while minimizing reduction waste (Brantingham and Kuhn 2001). Far from incompatible, blade and Levallois technologies together may actually extend the broad benefits of Levallois core geometries by allowing for the continuous production of usable blanks, uninterrupted by preparation and maintenance. The behavioral implications of recurrent blade production are twofold. First, the ability to generate more usable blanks per unit volume of raw material may have allowed foraging groups to move farther from specific sources of raw material, and this may have contributed measurably to more flexible activity scheduling on a variety of time scales. Second, the ability to produce standardized blades may have translated into greater predictability in technological performance and greater control over potential foraging risks, particularly if large Initial Upper Paleolithic blades were used as insets in complex composite armatures (Bar-Yosef and Kuhn 1999, Elston and Brantingham 2000).

Such behavioral changes may be reflected in the appearance and spread of the Initial Upper Paleolithic into extreme Northeast Asian environments. For example, the ability to forage away from immediate sources of stone raw material may have facilitated the initial occupation of Chikhen Agui 30,000 to 27,000 years B.P. In contrast, initial occupation of Tsagaan Agui occurred much earlier because of the abundance of chert at the site (Brantingham et al. 2000, Derevianko et al. 2000*a*). Consistent with the above model, the appearance of Initial Upper Paleolithic technologies in the Tsagaan Agui sequence at 33,000 years B.P. is coincident with the first use of a range of high-quality cherts and chalcedonies not available in the vicinity of the site. As at Chikhen Agui, Initial Upper Paleolithic populations occupying Tsagaan Agui were apparently foraging over much greater distances and transporting high-quality stone in the process. A similar shift from short- to long-distance raw-material transport characterizes the Middle-to-Upper Paleolithic transition in the Siberian Altai (Postnov, Anoykin, and Kulik 2000).

With regard to the reliability of Levallois blade technologies and the minimization of foraging risks, we can offer only a tentative conclusion. The heavy emphasis on blade production in the Northeast Asian Initial Upper Paleolithic may underscore the importance of complex composite tools used perhaps as projectiles. However, blades with clear hafting accommodations and bone armatures designed for stone insets are not known definitively in Northeast Asia until the Last Glacial Maximum (Derevianko, Shimkin, and Powers 1998:82, 152).

Turning to issues of chronology, Initial Upper Paleolithic sites in western Eurasia fall within the relatively restricted time range of 45,000–40,000 B.P. (Bar-Yosef 2000; Kuhn, Stiner, and Güleç 1999:507), although certain Bohunician sites may date as young as 36,000 B.P. (Svoboda, Lozek, and Vlcek 1996:107). Initial Upper Paleolithic assemblages are found stratigraphically between Middle and later Upper Paleolithic assemblages at only a handful of sites, among them Ksar Akil (Ohnuma and Bergman 1990). It remains to be determined, therefore, whether they coexisted with distinctive Middle and later Upper Paleolithic industries or consistently occupied an intermediate stratigraphic and chronological position. In Northeast Asia the chrono-stratigraphic situation is no less complex. Initial Upper Paleolithic assemblages occur stratigraphically above Middle Paleolithic industries at Kara Bom and at Tsagaan Agui (Derevianko et al. 2000*a*), but it appears that they do not replace those industries. At Kara Bom there is substantial continuity in core reduction strategies across the Middle-to-Upper Paleolithic boundary (contra Goebel, Derevianko, and Petrin 1993), and indeed the many similarities between Middle and Initial Upper Paleolithic core technologies preclude any simple notion of "replacement." In addition, a number of "classic Mousterian" industries from Siberia (e.g., Okladnikov Cave, Strashnaya Cave, and Ustkanskaya) date as young as 35,000–28,000 years, persisting alongside other Siberian Initial Upper Paleolithic assemblages (e.g., Kara Tenesh, Ust Karakol-1, Kamenka A) that date between 42,000 and 31,000 years (Derevianko, Shimkin, and Powers 1998). The implications of this chronological overlap require further investigation.

Current evidence suggests that Initial Upper Paleolithic industries first appeared in southern Siberia around 43,000 years ago, in the Mongolian Gobi (Tsagaan Agui and Chikhen Agui, respectively) between 33,000 and 27,000 years ago, and in northwestern China at Shuidonggou by 25,000 years ago. Taken together, it appears that the expansion of the Initial Upper Paleolithic was gradual, lasting more than 10,000 years. The Initial Upper Paleolithic may document a revolution in human ecology and behavior, though it arguably occurred on an evolutionary time scale. It is important to emphasize, moreover, that there is as yet *no* fossil evidence to link these assemblages to the spread of any one hominid population, and we lack a comprehensive theory integrating population dynamics, biogeography, and behavioral ecology in such a way as to permit untangling the complex relationships between archaic and modern human populations solely from archaeological data. Though it is tempting to speculate that anatomically modern humans were responsible for the Northeast Asian Initial Upper Paleolithic, any such conclusions must await further theoretical and empirical developments.

Conclusions

We include the Kara Bom Upper Paleolithic, Chikhen Agui, and Shuidonggou assemblages in the Initial Upper Paleolithic, emphasizing both the striking technological coherence between these assemblages and the technological parallels with accepted Initial Upper Paleolithic assemblages from western Eurasia. Moreover, we hold that there is strong continuity between the regional Middle and Initial Upper Paleolithic. The primary technological features of the Northeast Asian Initial Upper Paleolithic include (1) expanded patterns of raw-material exploitation and transport, (2) emphasis on blade production from Levallois-like prepared cores, (3) high frequencies of retouched blades, (4) occasional classic and elongate Levallois points, and (5) Middle Paleolithic retouched tool types, especially side scrapers, notches, and denticulates. The assemblages discussed here fit the general chronological profile for the origin and elaboration of the Initial Upper Paleolithic, but the ages for the Initial Upper Paleolithic in Mongolia and North China are apparently younger than those documented in western Eurasia.

References Cited

BAR-YOSEF, OFER. 2000. "The Middle and Early Upper Paleolithic in Southwest Asia and neighboring regions," in *The geography of Neanderthals and modern humans in Europe and the Greater Mediterranean*. Edited by O. Bar-Yosef and D. Pilbeam, pp. 107–56. Cambridge: Peabody Museum of Archaeology and Ethnology.

BAR-YOSEF, OFER, AND STEVEN L. KUHN. 1999. The big deal about blades: Laminar technologies and human evolution. *American Anthropologist* 101:322–38.

BISCHOFF, JAMES L., ROBERT J. ROSENBAUER, ANDRE TAVOSO, AND HENRY DE LUMLEY. 1988. A test of uranium-series dating of fossil tooth enamel: Results from Tournal Cave, France. *Applied Geochemistry* 3:145–51.

BOËDA, ERIC. 1995. "Levallois: A volumetric construction, methods, a technique," in *The definition and interpretation of Levallois technology*. Edited by H. L. Dibble and O. Bar-Yosef, pp. 41–68. Madison: Prehistory Press.

BOËDA, ERIC, AND S. MUHESEN. 1993. Umm el Tlel (el Kowm, Syrie): Etude préliminaire des industries lithiques du Paléolithique moyen et supérieur. *Cahiers de l'Euphrate* 7: 47–91.

BOULE, MARCELIN, HENRI BREUIL, EMILE LICENT, AND PIERRE TEILHARD DE CHARDIN. 1928. *Le Paléolithique de la Chine*. Paris: Archives de l'Institut de Paléontologie Humaine.

BRANTINGHAM, P. JEFFREY. 1999. Astride the Movius Line: Late Pleistocene lithic technological variability in Northeast Asia. Ph.D. diss., University of Arizona, Tucson, Ariz.

BRANTINGHAM, P. JEFFREY, AND STEVEN L. KUHN. 2001. Constraints on Levallois core technology: A mathematical model. *Journal of Archaeological Science*. In press.

BRANTINGHAM, P. JEFFREY, JOHN W. OLSEN, JASON A. RECH, AND ANDREI I. KRIVOSHAPKIN. 2000. Raw material quality and prepared core technologies in Northeast Asia. *Journal of Archaeological Science* 27:525–71.

CHEN TIEMEI AND YUAN SIXUN. 1988. Uranium-series dating of bones and teeth from Chinese Paleolithic sites. *Archaeometry* 30:59–76.

CQRA (CHINESE QUATERNARY RESEARCH ASSOCIATION). 1987. *Special issue on ^{14}C dating* (in Chinese). Contributions to Quaternary Glaciology and Geology.

DEREVIANKO, A. P., AND S. V. MARKIN. Editors. 1997. *The problems of paleoecology, geology, and archaeology of the Paleolithic of the Altai* (in Russian). Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

DEREVIANKO, A. P., J. W. OLSEN, D. TSEVEENDORJ, A. I. KRIVOSHAPKIN, V. T. PETRIN, AND P. J. BRANTINGHAM. 2000*a*. The stratified cave site of Tsagaan Agui in the Gobi Altai (Mongolia). *Archaeology, Ethnology, and Anthropology of Eurasia* 1(1):23–36.

DEREVIANKO, A. P., J. W. OLSEN, D. TSEVEENDORJ, V. T. PETRIN, S. A. GLADUSHEV, A. N. ZENIN, V. P. MYLNIKOV, A. I. KRIVOSHAPKIN, R. W. REEVES, P. J. BRANTINGHAM, B. GUNCHINSUREN, AND YA. TSERENDAGVA. 2000*b*. *Archaeological studies carried out by the Joint Russian-Mongolian-American Expedition in Mongolia in 1997–98*. Novosibirsk: Institute of Archaeology and Ethnology, Siberian Branch of the Russian Academy of Sciences.

DEREVIANKO, A. P., AND V. T. PETRIN. 1995. "The Levallois of Mongolia," in *The definition and interpretation of Levallois technology*. Edited by H. L. Dibble and O. Bar-Yosef, pp. 455–71. Madison: Prehistory Press.

DEREVIANKO, A. P., V. T. PETRIN, AND E. P. RYBIN. 2000. The Kara-Bom site and the characteristics of the Middle-Upper Paleolithic transition in the Altai. *Archaeology, Ethnology, and Anthropology of Eurasia* 2(2):33–52.

DEREVIANKO, A. P., D. B. SHIMKIN, AND W. R. POWERS. Editors. 1998. *The Paleolithic of Siberia: New discoveries and interpretations*. Chicago: University of Illinois Press.

ELSTON, ROBERT G., AND P. JEFFREY BRANTINGHAM. 2000. "Microlithic technology in Northeast Asia: A risk minimizing strategy of the Late Paleolithic and Early Holocene," in *Thinking small: A global perspective on microlithic technology*. Edited by S. L. Kuhn and R. G. Elston. Archaeological Papers of the American Anthropological Association. In press.

GENG KAN AND DAN PENFEI. 1992. *The Yinchuan area: Past, present, and future—Processes of Late Quaternary environmental evolution* (in Chinese). Beijing: Cartographic Publishing House.

GOEBEL, T. 1994. The Middle to Upper Paleolithic transition in Siberia. Ph.D. diss., University of Alaska Fairbanks, Fairbanks, Alaska.

GOEBEL, T., A. P. DEREVIANKO, AND V. T. PETRIN. 1993. Dating the Middle-to-Upper-Paleolithic transition at Kara-Bom. CURRENT ANTHROPOLOGY 34:452–58.

INIZAN, M. L., H. ROCHE, AND J. TIXIER. 1992. *Technology of knapped stone*. Meudon: CREP.

JIA LANPO, GAI PEI, AND LI YANXIAN. 1964. New materials from the Paleolithic site of Shuidonggou (in Chinese). *Vertebrata Palasiatica* 8:75–86.

KOZLOWSKI, J. K. 1971. The problem of the so-called Ordos culture in the light of the Paleolithic finds from northern China and southern Mongolia. *Folia Quaternaria* 39:63–99.

KRIVOSHAPKIN, A. I. 1998. *Paleolithic complexes from north-eastern slope of Arts-Bogd (southern Mongolia)* (in Russian). Novosibirsk: Institute of Archaeology and Ethnology, Siberian Branch of the Russian Academy of Sciences.

KUHN, S. L., M. C. STINER, AND E. GÜLEÇ. 1999. Initial

Upper Paleolithic in south-central Turkey and its regional context: A preliminary report. *Antiquity* 73:505–17.
LIN SHENGLONG. 1996. Comparisons of Chinese and western Paleolithic technological modes (in Chinese). *Acta Anthropologica Sinica* 15:1–20.
MADSEN, D. B., LI JINGZEN, P. J. BRANTINGHAM, R. G. ELSTON, AND R. L. BETTINGER. n.d. Dating Shuidonggou and the Upper Paleolithic blade industry in North China. MS.
MARKS, A. E. 1990. "The Middle and Upper Paleolithic of the Near East and the Nile Valley: The problem of cultural transformations," in *The emergence of modern humans: An archaeological perspective*. Edited by P. Mellars, pp. 56–80. Edinburgh: Edinburgh University Press.
NINGXIA MUSEUM. 1987. A report on the 1980 excavations at Shuidonggou (in Chinese). *Kaogu* 10:439–49.
OHNUMA, K., AND C. A. BERGMAN. 1990. "A technological analysis of the Upper Paleolithic levels (XXV–VI) of Ksar Akil, Lebanon," in *The emergence of modern humans: An archaeological perspective*. Edited by P. Mellars, pp. 91–138. Edinburgh: Edinburgh University Press.
OKLADNIKOV, A. P. 1965. Paleolithic finds in the region of Lake Orok-nor. *Arctic Anthropology* 3(1):142–45.
———. 1978. "The Paleolithic of Mongolia," in *Early Paleolithic in South and East Asia*. Edited by F. Ikawa-Smith, pp. 317–25. The Hague: Mouton.
———. 1983. "The Paleolithic site of Kara Bom in the Gornyy Altai (according to the materials of the excavations of 1980)" (in Russian), in *Paleolit Sibiri*, pp. 5–20. Novosibirsk.
POSTNOV, A. V., A. A. ANOYKIN, AND N. A. KULIK. 2000. Criteria for the selection of raw materials in Paleolithic industries of the Anui River basin (Gorny Altai). *Archaeology, Ethnology, and Anthropology of Eurasia* 1(3):18–30.
REZANOV, I. N., V. L. KOLOMIETS, L. V. LBOVA, A. V. PEREVALOV, AND V. P. REZANOVA. 1999. "Lithic industries of at the Khotyk Paleolithic site" (in Russian) in *Human paleoecology in Baikalian Asia*, pp. 18–36. Ulan-Ude.
SVOBODA, J., V. LOZEK, AND E. VLCEK. 1996. *Hunters between East and West: The Paleolithic of Moravia*. New York: Plenum.
SVOBODA, J., AND H. SVOBODA. 1985. Les industries de type Bohunice dans leurs cadre stratigraphique et écologique. *L'Anthropologie* 89:505–14.

New Directions in Paleolithic Archaeology: Asia and the Middle Pleistocene in Global Perspective

SARI MILLER-ANTONIO, LYNNE A. SCHEPARTZ, AND DEBORAH BAKKEN
Department of Anthropology/Geography, California State University, Stanislaus, Turlock, Calif. 95382 (sarima@athena.csustan.edu)/Department of Anthropology, University of Cincinnati, Cincinnati, Ohio 45221/Field Museum of Natural History, Chicago, Ill. 60605, U.S.A. 1 VI 01

The conference "Asia and the Middle Pleistocene in Global Perspective" was held at the East-West Center in Honolulu March 14–17, 2001.[1] Organized by the Panxian Dadong Collaborative Project,[2] a Sino-American team excavating the late Middle Pleistocene cave of Dadong in China's Guizhou Province, the conference focused on East Asian human cultural innovation and environmental adaptations in comparison with other world regions. Twenty-seven scholars[3] from the United States, China, Korea, Israel, England, France, and Canada came together to present research results and exchange ideas about their work in East, Central, South, and Southwest Asia, Europe, and sub-Saharan Africa. The papers and discus-

1. Funding and sponsorship were provided by the Henry Luce Foundation, the Wenner-Gren Foundation for Anthropological Research, and the East-West Center, Honolulu. We especially thank Deborah Olszewski of the Bishop Museum, Miriam Stark, Bion Griffin, and Michael Graves of the Department of Anthropology, University of Hawai'i, Manoa, and Betty Buck, Roger Ames, and Grant Otoshi of the East-West Center.

2. The conference organizers from the Panxian Dadong Collaborative Project team were Sari Miller-Antonio (California State University, Stanislaus), Lynne Schepartz (University of Cincinnati), Deborah Bakken (Field Museum of Natural History), and Huang Weiwen and Hou Yamei (Institute of Vertebrate Paleontology and Paleoanthropology [IVPP], Beijing).

3. Conference participants, in alphabetical order, were Deborah Bakken (Field Museum of Natural History), Alison Brooks (George Washington University), Mou-chang Choi (Kon-kuk University Museum, Seoul), Robin Dennell (University of Sheffield), John E. Dockall (Bishop Museum), Gao Xing (IVPP), Naama Goren-Inbar (Hebrew University), Hou Yamei (IVPP), Erella Hovers (Hebrew University), Huang Wanbo (IVPP), Huang Weiwen (IVPP), Fumiko Ikawa-Smith (McGill University), Susan G. Keates (Oxford University), Lee Yung-jo (Chungbuk National University, Cheonju), Leng Jian (Washington University), Liu Jun (Liupanshui Cultural Relics Bureau), Sari Miller-Antonio (California State University, Stanislaus), Anne-Marie Moigne (Centre Européen de Recherches Préhistoriques de Tautavel), Lewis K. Napton (Californian State University, Stanislaus), John W. Olsen (University of Arizona), Richard Potts (Smithsonian Institution), Nicolas Rolland (Prehistoric Anthropology Research Canada), Lynne A. Schepartz (University of Cincinnati), Shen Chen (Royal Ontario Museum), Si Xinqiang (Liupanshui Cultural Relics Bureau), Paola Villa (University of Colorado Museum), Wang Wei (Nanning Natural History Museum).