8

# The Grass Is Greener on the Other Side

## A Study of Pastoral Mobility on the Eurasian Steppe of Southeastern Kazakhstan

CLAUDIA CHANG

The main objective of this chapter is to address the issue of pastoral mobility in the temperate grassland environments of the northern Tian Shan Mountains of southeastern Kazakhstan. In particular, ethnographic observations on contemporary Kazakh pastoral mobility are used to provide a set of working strategies and methods for reconstructing prehistoric pastoral lifeways from survey and excavation data collected by the Kazakh-American Talgar Project. I also evaluate some of the assumptions put forth by Soviet and post-Soviet archaeologists on the origins and development of nomadic steppe cultures. These archaeologists have characterized the formative stages for the evolution of pastoral nomadism in this region of the Eurasian steppe as the Bronze Age (1700 BC to 900 BC) and Iron Age (ca. 800 BC to AD 500) (Akishev 1990; Alexeev 1991).

I examine archaeological notions of pastoral mobility, how mobility can be found in the archaeological record, and the relationship between mobility and population density of pastoral adaptations. Indeed, the ethnographic and ethnoarchaeological observations on pastoral adaptations in this region of Eurasia suggest that certain forms of pastoral mobility should be extant in the archaeological record. Most notably, patterns of vertical transhumance—where herders managing sheep and goats, cattle, and horses move between the lowland steppe areas (ca. 1,100 to 550 m in elevation) for fall through spring grazing lands and the upland alpine meadows of the Tian Shan foothill regions (ca. 1,800 to 2,600 m in elevation) for summer grazing lands (July through September)—should be apparent in the archaeological record. Yet the models of pastoral mobility put forth by the Soviet scholars have been skewed toward documenting the distribution of burial kurgans and graves, while overlooking sites or places used as pastoral loci (such as habitations, campsites, herding facilities, and shrines).

The Andronovo culture of the Bronze Age has been described as a steppe-based nomadic pastoral adaptation that brought innovation and change to the agricultural settlements of the desert-oases of Central Asia proper (Hiebert 1994). The Saka, an early Iron Age nomadic culture, have been characterized as horse-riding populations who practiced nomadic, semisedentary, and sedentary ways of life, depending upon their adaptations to the diverse conditions of the desert-oases and outlying steppe regions (Yablonsky 1995: 229). These prehistoric reconstructions of pastoral nomadism have been based upon materials excavated from burial mounds.

Little is known about the general settlement patterns or lifeways of the "reputed nomadic" populations of the Bronze and Iron Ages of Southeastern Kazakhstan. Furthermore, answers to questions concerning the nature of mobility in these pastoral nomadic cultures are inferred rather than documented. Two central cultural historical questions have guided the archaeology of this region: (1) How did the pastoral nomads of this area contribute to large-scale migrations of cultural groups that reputedly took place in both periods? and (2) Were the Iron Age pastoral nomads such as the Saka and Wusun the catalysts for change and innovation over the vast grasslands of Eurasia? The goal of my research has been to question and reinvestigate these models of pastoral nomadism.

### The Study Area

The study area is 25 to 80 km east of Almaty, the largest city of the Republic of Kazakhstan, along the foothills and alluvial fan areas of the Zailiisky Alatau, a northern range of the Tian Shan Mountains. We specifically chose two distinct environmental zones for survey: (1) the Talgar fan, an alluvial fan or apron formed from the Talgar River that extends 10 to 15 km from the edge of the Talgar foothills; and (2) the Turgen/Asi upland valleys, a series of broad alpine river valleys nestled between the high glacier peaks of the Zailiisky Alatau.

The Talgar fan ranges in elevation from 550 m to 1,200 m and consists of grasslands, forested areas, cultivated cereal fields, orchards, and urban and rural housing development and infrastructure. The upper Turgen valley (known as Oi Jailau) and the Asi River valley range in elevation from 2,200 m to 2,600 m and are vegetated with meadows, steppe grasslands, and conifer forests on the northern exposures of the mountain slopes. These upland valleys are situated in a national forest and thus have been set aside for recreational and pastoral land use. Herd management has been collectivized since the 1930s; Kazakh herders keep mixed herds of sheep and goats, cattle, and horses in both environmental zones. Usually the contemporary herders practice short-distance vertical transhumance, moving between the upland pastures of Asi and Turgen (areas of summer pasture) and the alluvial fans (areas of winter pasture) of the Talgar, Issyk, Turgen, and Chilik Rivers.

## Contemporary Kazakh Pastoral Mobility

When the topic of mobility is addressed by Western archaeology, examples are usually drawn from contemporary hunter-gatherers or horticulturalists that continue to practice mobility (Kelly 1992; Hard and Merrill 1992). The models used for examining mobility generally rely upon Binford's (1980, 1982) distinctions between residential mobility and logistical mobility. For a clear illustration of these distinctions and their pertinence to hunter-gatherer populations, I quote Kelly (1992: 44):

> *Collectors* move residentially to key locations (e.g. water sources) and use long logistical forays to bring resources to camp. *Foragers* "map onto" a region's resource locations. In general, foragers do not store food; they make frequent residential moves and short logistical forays. Collectors store food; they make infrequent residential moves but long logistical forays.

Does the distinction between "foraging" and "collecting" apply to pastoral adaptations? Kazakh herders, like all mobile herders, move their "food" or at least their livestock to them. In the "raw sense" of food-getting logistics, pastoral nomads are more like collectors than they are like foragers. Yet pastoral mobility is contingent upon moving the animals to adequate grazing territories and to available water as well as avoiding conflicts with other herders who also compete for the best grazing and water resources. Thus most animal husbandry systems require a kind of "mapping on" strategy, by which the herders lay claim to territories by moving from their camps (usually in a fixed place) on short logistical forays. Of course, the major difference between hunter-gatherers and pastoralists is that pastoralists always move with their food source but must maximize the general health and condition of their herds and flocks by establishing some means for claiming the best grazing lands and water sources for themselves. Transhumant herders in northern Greece lay claim to grazing areas by attempting "to pack their flocks" in a given territory marked by the location of their animal folds (Chang and Tourtellotte 1993). Herders in southern Greece, when confronted with an invader attempting to usurp grazing lands in the village communal lands, might resort to violence or fold burnings (Koster 1977).

My ethnographic observations of contemporary Kazakh herders (who maintain sheep and goats, cattle, and horses on the same landscapes as did their ancient predecessors) suggest that they employ a mobility strategy similar to Binford's "collectors." Contemporary Kazakh herders practice short-distance vertical transhumance (wintering in lowland areas and summering in upland areas) (Akishev 1990). Pastoral transhumance as I have observed it on the rural



landscapes of northern Greece and southeastern Kazakhstan usually involves two fixed residential places as well as a series of places to which herders travel on logistical forays, in search of grazing land and water. If herders travel far from their encampments, they settle at night with their herds at a corral or place that can be protected from wolves.

The single most important factor in choosing where to move a flock or herd is population pressure. The herder must consider carrying capacity—the number of animals that can be supported on a given area of grazing lands (Barth 1961). Too many animals on any given grazing territory result in degradation of the pastures and ultimately reduce the carrying capacity of the land. Most herders realize this, especially if they milk their animals, because the quality of milk declines as the forage quality declines (Koster 1977). The Kazakh keep cattle and horses that they milk in order to produce cheese or *kumiss* (mare's milk), so individual herders note the impact of poor forage on the quality and quantity of milk production.

Kazakh herders practice what Kelly (1992: 45) describes as *territorial* or *long-term mobility*. Building on Binford's (1982, 1983) definition, Kelly describes territorial or long-term mobility as cyclical movements of a group utilizing a set of territories over a long period, such as a decade. We have observed Kazakh herders who use the upland plateaus of Turgen and Asi, returning every summer to the same *jailau* (summer pasture) in June through August. The location of the upland grazing territories might occasionally shift, although such changes have consequences. Herders who attempt to stake out a new grazing territory (closer to the dirt track, for example) may discover that they are invading someone else's territory and must therefore compete with others for available pasture. In the summer of 2002, when rainfall was plentiful in the upland Asi Valley (ca. 2,200 m in elevation), several households shared a broad valley along the Asi River approximately 1 km long that had been previously occupied by a single household and its herd. The son of one of the "newcomers," a herd owner of over six hundred sheep and goats, cattle, and horses, informed us that his father intended to return to his previous territory the following year.

Although cyclical or long-term mobility is practiced, the more typical pattern of mobility involves territories that are fixed between two known points: the summer yurt and the winter residence in a small town, village, or collective. Importantly, however, summer pasture territories involve more flexible patterns of use-rights, because upland grazing areas are considered to be "open" territories or common pasture lands.

Usually the main facilities—the felt yurt, a corral for holding the animals during the night, and milking facilities—-mark the location of a herding household's grazing territory. The system of herding requires the separation of the mixed

herd into different grazing units by species. For example, twenty horses may be tended by one household member, forty cattle by another, and five hundred sheep by yet another. If the grazing territory is exceptionally rugged or inhabited by wolves, experienced herders are put in charge of the flock. The composition of the Kazakh herding household may fluctuate in the summer pasture area. In 1997 we met an older man who was spending his summer with his two daughters-in-law and their children and their herd of a thousand animals, while his sons cultivated their agricultural holdings in the lowlands. The following year the sons and father returned to the same territory with their herd, but without their wives. These ethnographic observations suggest the variations with regard to household labor, mobility patterns, and camp locations.

## Researching Mobility in the Archaeological Record

The current models of pastoral mobility adopted by the Soviet archaeologists are based upon two systems of pastoral movement on the Eurasian steppe. The first is a long-distance system of horizontal movement across the steppes, where summer pastures are located in the south and winter pastures are located in the north; distances can range from 100 km to 1,000 km. The second is a short-distance system of vertical movement from the mountains and foothills to the lowland valleys, where summer pastures are located in the uplands and winter pastures are located in the lowlands; distances between pastures can range from 50 km to 100 km (Akishev 1990).

Contemporary pastoral transhumance between the upland valleys of Turgen and Asi (ca. 2,200 to 2,600 m in elevation) and the lowland steppe of Talgar, Turgen, Issyk, and Chilik (ca. 1,100 to 550 m in elevation) suggests that the current models of pastoral mobility for the Bronze and Iron Age are inadequate and lack sufficient empirical evidence. Since 1994 the Kazakh-American Talgar Project has conducted surface surveys and excavations with the expectation that the economies and land-use strategies of the ancient nomads can be reconstructed from archaeological data. Our methods, although standard for Western archaeology, differ from the long tradition of Russian and Soviet period archaeological research on the Eurasian steppe, which has been based upon evidence drawn from ancient texts and from the archaeology of mortuary complexes. Our survey and excavations are "works in progress" that have their own limitations. In the following sections I discuss how we designed our research, the theoretical framework and methods we employed, and the preliminary results of this research.

Ideally, an archaeological project designed to research pastoralism—both as an economy and as a land-use strategy—would require fine-grained chronological sequences and full spatial coverage of the study area through the use of



sampling designs. Until the mid-1990s (when we introduced the practice of pedestrian surface survey) artifact scatters of ceramics, animal bones, and grinding stones found on the surface of plowed fields were overlooked and ignored. Even the preliminary reconnaissance surveys yielded information on artifact scatters that fall into the general chronological categories of the Bronze Age, Iron Age, or medieval period, based on ceramic typologies of the surface materials. The local archaeologists have been able to place the burial mounds into chronological periods on the basis of dimensions (height and diameter of burial mounds) and surface features (stone circles, slab-lined cists, stone or soil matrix of the mound). Some archaeological features such as the foundations of sod-houses known as *zimovki* (winter dwellings) have also been identified, as well as stone-coursed architecture from the Bronze and Iron Ages.

A definitive phase designation within broad chronological periods has yet to be constructed for the Bronze Age or Iron Age ceramic sherds of the Semirechye region. We can only make rough estimates that place artifact scatters or isolated ceramic finds into the following chronology: (1) Bronze Age (ca. 1700–900 BC); (2) Iron Age (ca. 700 BC–AD 500); (3) Turkic Period (ca. AD 600–900); (4) Medieval Islamic Period (ca. AD 800–1250); (5) Mongol Period (AD 1250–1500); and (6) historic Kazakh Period (ca. AD 1700 to present). Obviously the lack of a more precise chronological framework within these broad labels limits our ability to define subphases and subsequently to sort out palimpsests.

Archaeologists working in the western hemisphere have noted the methodological and theoretical problems with using surface survey data to infer ancient settlement patterns (Dewar 1991; Plog 1973; Rouse 1972). In particular, Robert Dewar (1991) has commented extensively on the fact that survey data have been misused in settlement-pattern analysis. He points out that settlement-pattern analysis often treats archaeological components within a single phase or period as contemporaneous, although sites within a given period or phase may not be contemporaneous or may even represent overlapping occupational periods. While archaeologists are fully aware that survey data represent remnants of past settlement-systems (Dewar 1991: 604), they still use such data to derive population estimates and the spatial distribution of settlements across given landscapes. In the case of our data, archaeological sites that conceivably span a thousand years but are placed within a single period (for example, the Iron Age) can hardly be considered suitable for detailed settlement-pattern analysis.

## Survey Methodology and Results

The Kazakh-American Talgar Project conducted pedestrian surveys from 1997 through 1999 on the Talgar alluvial fan, a broad delta formed by the north-

flowing Talgar River (approximately 150 sq km). We walked over 287 transects in plowed fields and along stream cuts. Our goal was to cover as broad an area of the fan as possible, using the Talgar River as a natural boundary and dividing the fan into eastern and western sections. We did so with a random sampling strategy.

From 1994 through 2002 the Kazakh-American Talgar Project also excavated four Iron Age sites on the Talgar alluvial fan and one Iron Age and one multicomponent Iron Age and Bronze Age site in the upland Turgen and Asi valleys. Most of the Iron Age sites show multiple occupation levels based upon *in situ* radiocarbon-dated contexts. These excavated sites usually have four to eight stratigraphic levels, indicating repeated occupations. Tuzusai (a small village hamlet) has evidence of at least six different horizons and four occupation levels. At Tseganka 8 six to eight occupational and building sequences have been documented for architectural features such as pit houses. The Taldy Bulak 2 site has six different occupational levels designated for different activity areas and features. The meaning of these sequences of site reoccupation is not entirely clear. They could represent (1) shifting locations of hamlets and small residential camps spanning a given occupational period; (2) repeated seasonal occupation by groups of mobile pastoralists or mixed herding-farming groups; or (3) abandonment and then reoccupation by sedentary groups.

What is particularly significant about the excavations at Tuzusai, Tseganka 8, and Taldy Bulak 2 (all Iron Age sites from the Talgar alluvial fan) is the overlapping radiocarbon sequence of Phases I–VI, spanning from 775 BC to AD 75 (Chang et al. 2002). All three sites appear to have overlapping periods of occupation in Phase V, spanning from 400 to 40 BC. These preliminary data suggest that the demographic expansion of the Iron Age, as represented by burial sites and settlement sites, might have taken place during Phase V. For the regional cultural history of Semirechye these two periods of occupation are of special interest, since the splendid Golden Warrior tomb, located in Issyk (about 20 km to the east of the Talgar fan) dates from 400 to 200 BC. If indeed Phase V does represent the peak of Iron Age settlement and demographic expansion, this suggests that it is also the formative period when the height of Saka wealth and status differentiation took place.

The single most important factor for testing these assumptions about demographic expansion and the evolution of hierarchy (as apparent from the archaeological remains of an extensive mortuary complex) is to develop a tight chronological framework with phase designations that can address the issues of (1) frequency of population relocation and (2) length of phases (Dewar 1991: 605). If our assumption that the Iron Age populations of the Talgar and Turgen/Asi area were mobile or at least semisedentary is correct, however, the

Table 8.1. Chronology of Tuzusai 1 (Excavated 1992–1996), Tseganka 8 (Excavated 1998–2000), and Taldy Bulak 2 (2001)

| Stratigraphic sequence | Radiometric date | Calibrated result (2 Sigma, 95%) |
|---|---|---|
| VIII | | |
| Tuzusai, Occupation 5, Unit V-11, Fire Pit 1 | 140±70 BP | Cal AD 1650 to 1950 |
| VII | | |
| Tuzusai, Burial 1, Animal bone collagen from sheep scapula | 650±50 BP* | Cal AD 1275 to 1410 |
| VI | | |
| Tuzusai, Pit 24 fill | 2020±40 BP* (Oxford) | Cal BC 100 to AD 75 |
| Tuzusai, Pit 17 fill | 2070±40 BP* (Oxford) | Cal BC 180 to AD 25 |
| VIa | | |
| Tseganka 8, Unit V-10, on subsoil | 2190±80 BP* | Cal BC 400 to 40 |
| V | | |
| Tuzusai, Pit 30 B | 2170±30 BP | Cal BC 335 to 290 and BC 230 to 115 |
| Tseganka 8, Pit 13 bottom | 2130±80 BP | Cal BC 350 to 300 and Cal BC 220 to 50 |
| Taldy Bulak 2, Fire Pit 2, Horizon 3 | 2280±40 BP* | Cal BC 400 to 350 and Cal BC 310 to 210 |
| Tuzusai, Pit 29 | 2230±30 BP | Cal BC 380 to 190 |
| Tuzusai, Unit V-13, ash deposit | 2170±60 BP | Cal BC 380 to 40 |
| Tseganka 8, Pithouse 2, Floor 2 | 2130±40 BP* | Cal BC 385 to 100 |
| IV | | |
| Tuzusai, Pit 22 | 2310±50 BP* (Oxford) | Cal BC 415 to 345 and BC 310 to 210 |
| Tuzusai, Pit 8—'92 | 2320±40 BP* (Groningen) | Cal BC 410 to 260 and Cal BC 230 to 115 |
| III | | |
| Tseganka 8, Pithouse 3, Floors 3a/b | 2390±70 BP | Cal BC 775 to 370 |
| Taldy Bulak 2, Unit D-8, Ash Pit, Horizon 4 | 2400±70 BP | Cal BC 780 to 370 |
| II | | |
| Tseganka 8, Pithouse 3, Floor 4 | 2190±40 BP | Cal BC 350 to 310 and Cal C 210 to 40 |
| I | | |
| Tseganka 8, Storage Pit '98 | 2300±80 BP* | Cal BC 740 to 710 and BC 535 to 80 |

*Note*: The radiometric dating and calibrations were done by Beta Analytic, Inc. (Stuiver 1998).
* AMS (Accelerated Mass Spectrometry) dates—obtained at Beta Analytic, Inc., unless specified.

problem of inferring settlement patterns from survey and excavation data will be even more serious. The paleoethnobotanical and faunal materials collected from Taldy Bulak 2, Tuzusai, and Tseganka 8 clearly demonstrate the presence of a mixed economy based upon cereal cultivation of wheat, millet, and barley and a herding system reliant upon sheep and goats, cattle, and horses (with very small percentages of camels) (Benecke 1999–2000; Rosen et al. 2000). Almost all of the Talgar fan Iron Age settlements currently excavated show multiple occupation levels, thus indicating that a single location was used, abandoned, and then reused over a period of six hundred or seven hundred years. Does this represent long-term pastoral mobility, seasonal mobility, or repeated sequences of use, abandonment, and reoccupation? Such questions can be posed but not answered by our data.

Some sites such as Tseganka 8 appear to be occupied in a confined locale, where repeated floors and occupation levels show dense concentrations of artifacts. Other sites such as Taldy Bulak 2 and Tuzusai are distributed over a large territory (up to 1 $km^2$). Does this suggest that Taldy Bulak 2 and Tuzusai were temporary encampments that were reoccupied year after year, in the same manner that the contemporary Kazakh yurts and encampments are reoccupied? We have noted that the Kazakh encampments might shift 10 to 100 m from season to season in the upland plateaus of Asi and Turgen. Low-density sites spread over large areas could represent seasonal temporary encampments with many different activity areas, while tightly packed pithouse sites with repeated occupations in a single confined locale represent hamlets occupied on a permanent, year-round basis. In Pithouse 3 at Tseganka 8 we noted the thick packing of one floor level over the next and recorded over six to eight different flooring layers, often with little or no fill levels between some of the floor levels (3a and 3b). Could these repeated floor layers represent episodes of continuous occupations or periodic remodeling of dwellings that were occupied on a permanent or semi-permanent basis?

Until we have excavated more sites and noted the variation in features, occupation episodes, and their palimpsest nature, we cannot determine the settlement patterns for these agro-pastoral populations. Yet the wide variety of features, artifact distributions, and densities at the three excavated Iron Age sites overlapping in time suggests a wide range of variation in the types of settlements and episodes of use in any give phase or subphase. Settlement packing (of both people and animals) must have been a problem during the height of the Iron Age occupation of the Talgar alluvial fan (Phases IV through VI). The majority of burial mounds in Talgar, Issyk, and Bes Shatyr also date to this period (ca. 400 BC–100 AD), often labeled the Saka-Wusun period by Soviet archaeologists (Moshkova 1992). Clearly the relationship between high numbers of mortuary



sites (burial mounds) and settlement sites during these phases should be indicative of the height of demographic expansion on the alluvial fans of Semirechye. It would also make sense that the increased population density found in these phases corresponds to increasing patterns of social stratification (noted from the inventories found at the burial mounds) and greater reliance upon agrarian food production (Akishev and Kushaev 1963; Chang and Tourtellotte 1998).

## The Problem of Site or Place Visibility in the Archaeological Record

Local archaeologists have conducted their own survey reconnaissance and have documented and inventoried known archaeological sites, plotting these locations on a 1:500,000 scale *Arheologiskaya Karta Kazakhstana* (Ageeva et al. 1960). Western-style archaeological surveys, however, have only been introduced since the mid-1990s by the Kazakh-American Talgar Project (Chang et al. 1999). Surface surveys were made by pedestrian walking in upland areas where site visibility (especially stone outlines of houses, burial mounds, and graves) is high and on the alluvial fan in plowed fields and along river and erosion cuts. Isolated finds of ceramics, grinding stones, and other artifacts were recorded, as well as artifact scatters and architectural features. Each cluster of artifacts or architectural features within a 100 $m^2$ area was recorded as a locus. The results of our survey have been reported elsewhere (Chang and Tourtellotte 2000). Here I provide data on our preliminary results from these surveys.

Table 8.2. Survey Results from the Talgar Alluvial Fan (1997–1999) and the Turgen-Asi (1997–2002) Surveys

| Locus category | Talgar alluvial fan | Turgen-Asi uplands |
|---|---|---|
| Iron Age sites | 59 | 7 |
| Probable Iron Age sites (sherd scatters) | 29 | |
| Iron Age kurgans | 182 | 60 |
| Loci with 1 sherd | 100 | |
| Loci with 2 sherds | 16 | |
| Loci with 3 sherds | 25 | |
| Loci with grinding stone | 16 | |
| Bronze Age sites | | 6 |
| Bronze Age kurgans | | 29 |
| Medieval sites | 2 | |
| Kurgans of unknown period | | 85 |
| Totals | 427 | 187 |

An area of approximately 150 km$^2$ in the Talgar alluvial fan yielded a total of 427 loci, a density of about 2.8 loci per km$^2$. About 270 of these loci (63%) were identified as probable Iron Age sites. The remaining were Bronze Age, medieval, or of indeterminate period. In an area of approximately 46 km$^2$ in the Turgen/Asi upland valleys, approximately 187 loci were recorded, a density of about 4.1 loci per km$^2$. About 35% of these loci are Iron Age, and about 19% are Bronze Age. Only six Bronze Age settlements and seven Iron Age settlements were found; the remaining loci are kurgans (burial mounds).

Site visibility was a far greater problem on the Talgar alluvial fan than in the upland valleys of Turgen and Asi. We occasionally found Iron Age artifacts in the profile cuts of streambeds but not on the plowed surfaces, so it is clear that sites on the Talgar fan were often deeply buried under the wind-blown and river-deposited loess soils. The loci that yielded the highest number of surface artifacts (sherds, grinding stones, and bones) were often the most disturbed and destroyed by modern-day agricultural activities. We also discovered that the relationship between surface finds and subsurface remains was skewed, as noted by Jack Nance and Bruce Ball (1986) when developing test pit sampling strategies for the discovery of buried sites. Nance and Ball (1986) conclude that sites with more surface artifacts probably represent a higher density of buried artifacts. These sites are more likely to be recovered by using test pit sampling than by surface surveying. In our surface surveys, it may indeed be the case that both low-density sites (surface and subsurface) and high-density sites are present, but deeply buried sites will be invisible and therefore not found on surface surveys (Shott 1995; Wandsnider and Camilli 1992). Many of our surface surveys on the Talgar fan were done on plowed fields, already indicating the skewed nature of these artifact scatters.

Michael Shott (1995: 478) notes: "But surface documents [artifact scatters] are not merely limited and slightly skewed samples of underlying records [buried artifact deposits]. They also can contain a strong random element, such that successive episodes of cultivation do not necessarily expose similar numbers, distributions, or kinds of artifacts."

Our ethnographic observations of Kazakh corrals and campsites in the upland valleys of Asi and Turgen indicate that the pastoral nomadic camps, especially summer camps, have a low artifact density and would probably not be visible after abandonment. A prime pastoral location used successively over many years, however, should yield a higher artifact density over time. But these repeated occupations might show up as low-density surface remains over a large area (as at Taldy Bulak 2) rather than as dense concentrations of artifacts within a confined area (as at Tseganka 8). The most distinguishing element of the pastoral site is the corral (marked by an architectural feature and deposits of animal dung), a feature that might not preserve well in the archaeological record. Ironically, the Bronze and Iron Age mortuary sites in the uplands are more visible, because the surface topography and geomorphology of the uplands contribute to high site visibility. We may have been unable to find many settlement sites in the uplands because the artifact scatters associated with such buried sites are invisible in these upland grasslands. Bronze Age burials include cist-lined graves and ossuaries placed inside rectangular stone wall structures, while graves from the Iron Age through the Turkic and medieval periods are marked by burial mounds. The Iron Age to medieval burial mounds could conceivably be used as indications of population density, particularly because it was the custom to place only one or two burials in each mound.



In contrast, the alluvial fan areas north of the Tian Shan Mountains have been exposed to processes of rapid soil deposition by wind or water. The small village and hamlet sites of the Iron Age are deeply buried, usually under 0.5 to 1.0 m of loess. Deep plowing and bulldozing of prime agricultural land since the 1960s have exposed many archaeological sites in the Talgar alluvial fan. We continue to be puzzled, however, by the lack of Bronze Age materials found there. Is this due to the geomorphology of the alluvial fan (Bronze Age sites could be covered by 1 m or more of loess), or does it represent the lack of Bronze Age settlement on the lowland steppe areas?

## Insights into Pastoral Mobility on the Eurasian Steppe

From this preliminary research, it appears that the Bronze Age populations of Semirechye were pastoral nomads, while the Iron Age populations were semisedentary agro-pastoralists. First, the locations of the Bronze Age settlements and mortuary complexes in the upland plateaus of Asi and Kurgen but not in the fertile lowlands suggest that the populations of that period were practicing some kind of vertical transhumance. The contemporary climate (rainfall and temperature) statistics show that Asi and Turgen are located in areas without enough frost-free days to sustain the cultivation of crops. The contemporary Kazakh herders who pasture their animals during July through September in these upland valleys certainly do not practice any form of cultivation. Whether present-day climatic conditions are a good indicator of the existing climate during the Bronze Age clearly needs further investigation.

The number of lowland settlements and burial mounds and their overall density on the Talgar alluvial fan indicate a demographic expansion of populations in the thousand-year period of the Iron Age on the fertile alluvial fan. The paleoethnobotanical data at Tuzusai, Tseganka 8, and Taldy Bulak 2 all indicate the presence of cultivated species of millet, wheat, barley, and possibly rice

(Arlene Rosen, personal communication). Yet these data may be a product of the limitations of our survey methods and results. We have yet to locate Bronze Age deposits on the Talgar alluvial fan. It is probable that agro-pastoralists or nomadic pastoralists of the Andronovo period settled or utilized these alluvial fans, which would have provided good grassland environments for pastures or for foraging and for incipient agriculture.

Our current paleoethnobotanical and zooarchaeological research on the excavated Iron age sites of Tuzusai, Tseganka 8, and Taldy Bulak 2 indicates a mixed cereal economy of millet, wheat, barley, and possibly rice and a herding component of sheep and goats, cattle, horses, and camels. The upland Bronze Age sites of Asi 1 and Asi 2 (occupied in the early Andronovo period, ca. 1600 to 1400 BC) show no evidence of cultivated plants but do contain evidence for the herding of sheep, goats, and cattle. The Iron Age site of Kizil Bulak 3 in the Turgen Valley is a seasonal site with over 12 different periods of occupation that shows evidence of sheep, goats, cattle, and horses and wild species of plants. Some grinding stones found at Kizil Bulak 3 also indicate processing of gathered plants or agricultural grains brought from the lowland agricultural areas.

From such data we can infer that the upland valleys of Turgen and Asi were best suited for seasonal transhumance, most likely during the summer months. That does not necessarily mean, though, that the Bronze Age populations of Semirechye did not practice agriculture in other areas. It suggests that we have found the place where agriculture would have been most productive in both the Bronze and Iron Ages: on the alluvial fans and in the lowlands. The Iron Age steppe sites represent a mixed cereal and animal husbandry economy and a settlement-pattern that indicates a year-round or seasonal occupation during the summer when agrarian activities took place. The Iron Age sites found in the uplands were not agricultural sites; the paleoethnobotanical data show only evidence of wild plants (Rosen, personal communication). Such sites represent the use of the uplands for pastoral activities during the summer months.

The Bronze Age excavations at Asi 2 suggest the existence of a nomadic pastoral economy. Whether the Bronze Age nomadic pastoral populations practiced agriculture is still unclear. If Bronze Age settlements could be identified on the Talgar alluvial fan, we might be able to test this. Still, beyond these generalizations, neither the excavations nor the surveys of the Talgar alluvial fan or the Turgen/Asi upland valleys are sufficient to produce an accurate reconstruction of mobility patterns during the Bronze Age or Iron Age in Semirechye.

The following questions should guide future research in the Semirechye region of southeastern Kazakhstan.

(a) What types of species were predominantly herded by the early Bronze Age populations?





(b) Were these species herded over sets of territories in a system of short-distance vertical transhumance (radius of 50 km or less) or in a system of long-distance horizontal transhumance (radius of 50 to 500 km or more)?
(c) What was the system of spatial organization used by agro-pastoralists in exploiting the Talgar alluvial fan?
(d) Did the agro-pastoralists spend the whole year at a given village or hamlet, or did they circulate seasonally or yearly over a set of territories?
(e) Do the repeated occupations at the Iron Age settlement sites of Talgar represent abandonment and reuse over a long period or within short-term phases?

As more surveys and excavations are conducted on the Talgar alluvial fan and in the upland Turgen and Asi Valleys, the issue of pastoral mobility needs to be considered. A larger, regional coverage of both areas may allow us to posit the existence of a system of either long-distance horizontal or short-distance vertical transhumance. We must look for broad patterns of spatial organization and indicators of seasonality at sites found in both environmental zones. For example, if short-distance vertical transhumance was practiced during the Iron Age of Semirechye, then there should be evidence for winter occupation on the Talgar alluvial fan and summer occupation in the upland Turgen and Asi Valleys. In the same vein, if semisedentary agro-pastoralism was practiced in the Iron Age, permanent year-round villages and hamlets should be found on the Talgar alluvial fan, while temporary campsites or house structures should be found in the upland Turgen and Asi Valleys. Such inferences must be drawn from a comparison of the excavated materials found at Iron Age sites in both the upland and lowland zones in conjunction with surface surveys. Indicators such as shared ceramic styles, seasonal usage, and tool assemblages of sites in both zones might then allow comparative analysis of settlement patterns and overcome some of the problems created by site visibility and palimpsests.

Perhaps the greatest single stumbling block for the archaeology of this region is the assumption that pastoral nomadism was the sole economic base of the Bronze Age and Iron Age populations. The concept of pastoral mobility became a means by which the Soviet period archaeologists could avoid conducting settlement pattern-analysis. I agree wholeheartedly with Dewar (1991) and others who question settlement-pattern analysis when length of occupations at given sites is not considered adequately. But a necessary first step of any study on pastoral nomadism in prehistory is detailed analysis of the distribution of sites across a physical space, especially space that can be demarcated into different environmental zones. We know from the many studies of pastoral nomadism, semisedentary pastoralism, and sedentary agro-pastoral groups that there is tremendous variation in the spatial organization of places in a given landscape utilized by people who spend some portion of their lives herding and husbanding

animals (see Chang 1992). Thus it seems mandatory that archaeologists consider the spatial distribution of archaeological loci across these landscapes, even if the sites themselves represent at best remnants of the past settlement-system.

## Acknowledgments

The Kazakh-American Talgar Project has been generously funded by the Wenner-Gren Foundation for Anthropological Research and the National Geographic Society from 1994 to 1996. Field research from 1994 through 2002 was funded by the National Science Foundation Archaeology Program Grant SBR-9603361, "The Social Evolution of Steppe Communities in Southeastern Kazakhstan and the Rise of Civilization." K. M. Baipakov, F. P. Grigoriev, and A. N. Mariashev, all of the Republic of Kazakhstan, were of invaluable assistance during the fieldwork. P. A. Tourtellotte directed the surveys described in this chapter and provided the maps and photographs. I wish to thank Pei-Lin Yu, Frédréic Sellet, and Russell Greaves for inviting me to participate in the symposium where this work was first presented. I welcomed the comments of the two anonymous reviewers who read this manuscript, who urged me to consider the problem of mobility within both the ethnoarchaeological and archaeological contexts of nomadic pastoral societies.

## References

Ageeva, E. I., K. A. Akishev, G. A. Kushaev, A. G. Maksimova, and T. N. Senigova (compilers)
1960 *Arheologicheskaya Karta Kazakhstana*. Alma-Ata: Izdatel'stvo Akademenni Nauk Kazakhskoi SSR.

Akishev, K. A.
1990 Les nomades à cheval du Kazakhstan Antique. In *Nomades et sédentaires en Asie Centrale: Apports de archéologie et de l'ethnologie*, edited by H.-P. Francfort, pp. 15–18. Éditions du Centre National de la Recherche Scientifique, Paris.

Akishev, K. A., and G. A. Kushaev
1963 *Drevnyaya Kul'tura Sakov n Usunei Dolini Reka Ili* (Ancient Saka and Wusun Culture of the Ili River Valley). Alma-Ata: Nauka.

Alexeev, V. P.
1991 A Brief Cultural History. Lectures given at Harvard University, transcribed by Geraldine Reinhardt-Waller. Chapter 7, Bronze Age in Eurasia, lectures 7 and 8, delivered July 17 and 29, 1991, and chapter 8, Iron Age in Eurasia, delivered August 5, 1991.

Barth, F.
1961 *Nomads of South Persia*. Little, Brown, Boston.



Benecke, N.
1999–2000 Unpublished Reports on the Faunal Remains from Iron Age Sites in the Talgar Alluvial Fan. On file in the Department of Anthropology and Sociology, Sweet Briar College.

Binford, L. R.
1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1): 4–20.
1982 The Archaeology of Place. *Journal of Anthropological Archaeology* 1: 5–31.
1983 *In Pursuit of the Past*. Thames and Hudson, London.

Chang, C.
1992 Archaeological Landscapes: The Ethnoarchaeology of Pastoral Land Use in the Grevena Province of Greece. In *Space, Time, and Archaeological Landscapes*, edited by J. Rossignol and L. Wandsnider, pp. 65–89. Plenum Press, New York and London.

Chang, C., and P. A. Tourtellotte
1993 The Ethnoarchaeological Survey of Pastoral Transhumance Sites. *Journal of Field Archaeology* (3): 249–264.
1998 The Role of Agro-pastoralism in the Evolution of Steppe Culture in the Semirechye Area of Southern Kazakhstan during the Saka/Wusun Period (600 BCE–400 CE). In *Bronze Age and Early Iron Age Peoples of Central Asia*, edited by Victor H. Mair, pp. 264–279. Institute of Man Press and the University of Pennsylvania Press, Washington, D.C., and Philadelphia.
2000 The Kazakh-American Talgar Project Archaeological Field Surveys in the Talgar and Turgen-Asi Areas of Southeastern Kazakhstan: 1997–1999. In *Kurgans, Ritual Sites, and Settlements: Eurasian Bronze and Iron Age*, edited by J. Davis-Kimball, E. M. Murphy, L. Koryakova, and L. T. Yablonsky, pp. 83–88. BAR (British Archaeological Reports) International Series 890.

Chang, C., P. A. Tourtellotte, K. M. Baipakov, and F. P. Grigoriev
1999 The Kazakh-American Talgar Archaeological Surveys in 1997 and 1998 in the Talgar Region. *Izvestia, obshestvennye nauk* (219): 168–184.
2002 The Evolution of Steppe Communities from the Bronze Age through Medieval Periods in Southeastern Kazakhstan (Zhetysu). A. Kh. Margulan Institute of Archaeology, Sweet Briar/Almaty.

Dewar, R. E.
1991 Incorporating Variation in Occupation Span into Settlement-Pattern Analysis. *American Antiquity* 56(4): 604–620.

Hard, R. J., and W. L. Merrill
1992 Mobile Agriculturalists and the Emergence of Sedentism: Perspectives from Northern Mexico. *American Anthropologist* n.s. 94(3): 601–620.

Hiebert, F. T.
1994 *Origins of the Bronze Age Oasis Civilization in Central Asia*. American School of

Prehistoric Research Bulletin 42. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Mass.

Kelly, R. L.
1992 Mobility/Sedentism: Concepts, Archaeological Measures, and Effects. *Annual Review of Anthropology* 21: 43–66.

Koster, H. A.
1977 The Ecology of Pastoralism in Relation to Changing Patterns of Land Use in the Northeast Peloponnese. Ph.D. dissertation. University of Pennsylvania.

Moshkova, M. G.
1992 *Stepnaya polosa Asiatskoi chasti SSSR v skifo-sarmatskoi vremi* (Steppe Region of the Asiatic Part of the SSSR in the Scythe-Sarmanti Time). Nauka Izdatel'stvo, Moscow.

Nance, J. D., and B. F. Ball
1986 No Surprises?: The Reliability and Validity of Test Pit Sampling. *American Antiquity* 51(3): 457–483.

Plog, F. T.
1973 Diachronic Anthropology. In *Research and Theory in Current Archaeology*, edited by C. L. Redman, pp. 181–198. John Wiley, New York.

Rosen, A. M., C. Chang, and F. P. Grigoriev
2000 Paleoenvironments and Economy of Iron Age Saka-Wusun Agro-pastoralists in Southeastern Kazakhstan. *Antiquity* 74: 611–623.

Rouse, I.
1972 Settlement Patterns in Archaeology. In *Man, Settlement, and Urbanism*, edited by P. J. Ucko, R. Tringham, and G. W. Dimbleby, pp. 95–107. Duckworth, London.

Shott, M. J.
1995 Reliability of Archaeological Records on Cultivated Surfaces: A Michigan Case Study. *Journal of Field Archaeology* 22(4): 475–490.

Stuiver, M., et al.
1998 INTCAL98 Radiocarbon Age Calibration. *Radiocarbon* 40(3): 1041–1083.

Wandsnider, L., and E. L. Camilli
1992 The Character of Surface Archaeological Deposits and Its Influence on Survey Accuracy. *Journal of Field Archaeology* 19(2): 169–188.

Yablonsky, L. T.
1995 The Material Culture of the Saka and Historical Reconstruction, Chapter 14. In *Nomads of the Eurasian Steppes in the Early Iron Age*, edited by J. Davis-Kimball, V. A. Bashilov, and L. T. Yablonsky, pp. 201–240. Zinat Press, Berkeley.



9

# From Atlatl to Bow and Arrow

## Implicating Projectile Technology in Changing Systems of Hunter-Gatherer Mobility

PEI-LIN YU

In regional culture histories, the transition from large, broad-based projectile points to smaller, lightweight forms is often cited as a shift in the launching method from spearthrower (or atlatl) to bow and arrow (cf. Aikens and Higuchi 1982: 109; Cabrera Valdez 1984: 279; Grayson 1994: 250). Much research on the projectile transition has focused on intrinsic attributes of points in order to separate them into discrete types (Bettinger and Eerkens 1999: 231; Beck 1998: 21). In addition to formal variation in stone points, the reduction method may differ. Analysis of one sample from northeastern North America showed that dart points are typically reduced from cores and arrow points from flakes (Nassaney and Pyle 1999: 251–252).

Projectile point types are often used as chronological markers or "guide fossils" (Huckell 1996: 326), although variation in form may also result from mechanically conditioned behaviors, such as breakage, repair, and resharpening (Huckell 1996: 327). In a global survey, Pierre Cattelain (1997: 232) found that projectile point form alone is not correlated with hafting contexts or means of launching. Charlotte Beck's (1998) analysis of examples from Gatecliff Shelter indicates that neck width is acted upon by selective forces and is useful in distinguishing darts from arrow points. Statistical tests for many archaeological sequences show that small, lightweight points replace or augment large, heavy, broad-based points (Shott 1997).

The projectile transition occurred at different times, and at different rates, throughout the world. The transition to bow and arrow never occurred in Australia. Atlatls and bows and arrows were used in tandem in the recent past in the Arctic, the North American Southeast, and parts of Mesoamerica. Recent efforts to explain the variation in scope and timing of the projectile transition have focused on distinguishing between *in situ* development and diffusion, especially in North America (cf. Bettinger and Eerkens 1999; Nassaney and Pyle 1999), then proceeding to test models for different modes of transmission. Rob-