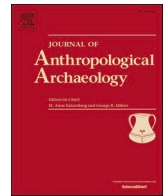


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# An integrative examination of elk imagery in Middle Holocene Cis-Baikal, Siberia

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## ABSTRACT

Elk are common in forager archaeological artwork of northern Eurasia. During the Middle Holocene, the peoples of Cis-Baikal produced numerous elk depictions in rock art and mobiliary items. Most of the rock art has now been destroyed. However, Cis-Baikal's cemeteries and habitation sites are increasingly well documented, with the former generating numerous elk images. To better understand this imagery, we first discuss elk biology and behavior. We then contextualize the imagery within other forms of archaeological data, including cemetery location, dietary patterns, and human population changes and dispersals. We integrate these findings with a model of northern Eurasian forager cosmologies and ideologies. Elk were not a dietary staple in Cis-Baikal. Instead, diets often had a substantial aquatic component, and red deer and roe deer were the most commonly used ungulates. All of Cis-Baikal's Middle Holocene cemeteries were located near bodies of water. Elk's ability to cross a fundamental boundary, that between the terrestrial and aquatic worlds, resulted in these animals being considered liminal beings. The elk depicted perhaps were cosmological forces, transporting the souls of the dead to the underworld. They also may have been constituted a generative life force and assisted souls in returning to the living world.

## 1. Introduction

Specialists now produce most archaeological data and present their results in discrete packages, at times with limited reference to other relevant data. At the same time, integrating such specialized datasets clearly can provide novel and compelling understandings of human history, experience, and practice. Archaeological imagery, whether as rock art or portable items, is a case in point. Its interpretations are most convincing when analyses integrate information on the imagery's broader contexts. For example, elk (*Alces alces*) are common in the imagery of many northern European foraging societies during the Holocene. Researchers have explored these items' intra-site and landscape contexts, the subsistence practices and settlement patterns of communities creating them, and even forager ethnographies and epic poetry to interpret this imagery (Bolin, 2000; Kashina and Zhulnikov, 2011; Lahelma, 2007; Malmer, 1981; Mantere and Kashina, 2020; Tilley, 1991; Zhulnikov and Kashina, 2010; Zvelebil, 1997). In Siberia and the Russian Far East, elk also are abundant in Holocene rock art, particularly along the rivers of the southern boreal forest zone—the Lena, Angara,

Enisei, and Tom (Devlet and Devlet, 2005; Martynov, 1991; Melnikova et al., 2012; Okladnikov, 1959, 1966, 1974b; Okladnikov and Martynov, 1972; Okladnikov and Zaporozhskaya, 1959, 1972; Sher, 1980). Such elk images are sometimes found in compositions similar to those in northern Europe, including being proximate to boats (Kulikova, 2014; Zaika, 2003a,b), suggesting that a common elk theme at times spanned large portions of Eurasia (Martynov, 1991). Interpretations of much of this Siberian imagery remain poorly integrated with in-depth understandings of regional prehistory, which in some places has only emerged in the last two decades or so.

One of the major centers of elk imagery in Siberia is the Angara River region downstream from Lake Baikal (Fig. 1). The Angara's rock art is both compelling and frustrating. Several dams built on the Angara have rendered most of this rock art flooded and inaccessible, the exception being that found on the upper Lena River. Further, most information about this rock art comes from Okladnikov's reports, which were written decades ago (Okladnikov, 1960, 1966, 1976b). Okladnikov demonstrated clearly that elk were predominant in the river's rock art. Typically, this elk imagery involves naturalistic full-body depictions of the

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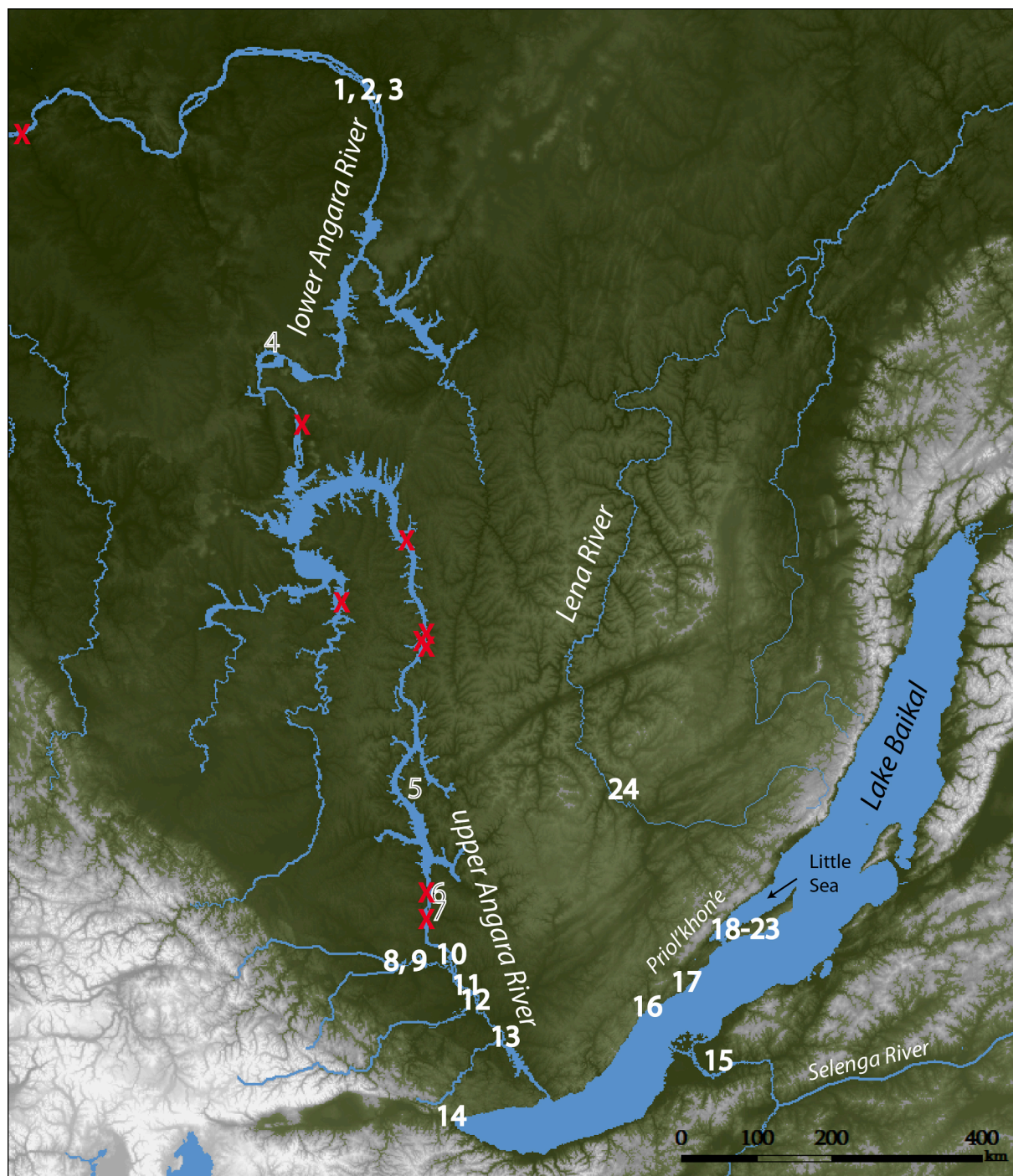
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animals viewed from the side, or just their heads, in both cases usually without antlers. Okladnikov also proposed that Middle Holocene foragers produced most of these images, but suggested some potentially dated to the Upper Paleolithic (Okladnikov, 1959:42; Okladnikov, 1966: 109-111). His assignment of rock art images to culture history period or mortuary tradition was largely based on stylistic comparisons with a handful of portable images from regional cemeteries such as Bazaikha near Krasnoiarsk. At the time, however, nearly none of Cis-Baikal's numerous graves were directly radiocarbon dated. Subsequent research

has repeatedly shown that typological dating of graves in Cis-Baikal is often unreliable (Weber et al., 2006, 2010, 2021). Further, it is widely known that Okladnikov's chronological ordering of the region's mortuary traditions is partially incorrect (Mamonova and Sulerzhitskii, 1989; Weber, 1995). Clearly, even some most basic details of Okladnikov's interpretations of elk imagery in Cis-Baikal require further scrutiny.

Today, the Middle Holocene forager cemeteries of Cis-Baikal (the lands west of Lake Baikal including the Angara River to its confluence



**Fig. 1.** Map of the study area. Red X's indicate locations of major rock art locations on the Angara River. Sites mentioned in the text: 1) Ostrov Listvenichnyi; 2) Ust'-Edarma II; 3) Ust'-Keul I; 4) Zhiloi; 5) Ust'-Uda; 6) Gorodishche II; 7) Ust'-Ida; 8) Ust'-Khaite; 9) Gorelyi Les; 10) Ust'-Belaia; 11) Shumilikha; 12) Kitoi; 13) Lokomotiv; 14) Shamanka II; 15) Fofanovo; 16) Bugul'deika II; 17) Sagan-Zaba II; 18) Ulan-Khada IV; 19) Khuzhir-Nuge XIV; 20) Kurma XI; 21) Irtykhei; 22) Ulan-Khada; 23) Tyshkine II and III; 24) Verkholensk. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

with the Ilim River and the Upper Lena downstream to the mouth of the Karella River) are some of the most thoroughly studied sites of their kind anywhere (e.g., Weber et al., 2010; Weber and Bettinger, 2010; Weber, 2020). Sculptural depictions of elk are present among the burial accouterments in some of these cemeteries, offering intriguing clues to the ages of the region's rock art as well as its meanings. Further, the faunal remains from many of Cis-Baikal's habitation sites and cemeteries are now analyzed (c.f., Losey and Nomokonova, 2017). This faunal database, along with stable isotope values of human remains from the region's Middle Holocene cemeteries (Katzenberg and Weber, 1999; Katzenberg et al., 2012; Weber et al., 2011; Weber and Goriunova, 2013; Weber et al., 2016a,b; White et al., 2020), have the potential to inform our understanding of elk and their roles in local practices and cosmologies. This suite of recent studies, particularly those published in English, have rarely made reference to Cis-Baikal's elk imagery, be it from cemeteries or the region's mostly now-flooded rock art. This points to unrealized potential for integrative research.

At the same time, the Angara's rock art elk images have played prominent roles in broad scale studies of Siberia's archaeological artwork. Okladnikov, who has recorded far more rock art across Siberia than any other scholar, including on the Angara, unfortunately provided mostly brief and often contradicting interpretations of the region's elk imagery. Most of his writings on such rock art, for example, are descriptive and typological rather than comprehensive direct interpretations of specific image types or panels. Okladnikov also focused much attention on the images' periods of production, assigning a large portion of the elk imagery to the Neolithic, but also some to earlier and later periods. Note that the term Neolithic in Siberia refers to forager societies that utilized pottery and ground stone technologies but lacked agriculture. More broadly, Okladnikov highlighted the general importance of elk as a representation of the universe, a cosmic being at times associated with the Lower World (in a tiered universe), a sky god, or the focus of cult practices (Okladnikov, 1959, 50-70; Okladnikov, 1966, 110-117). Okladnikov (1950:292) also makes passing comments regarding elk being associated with a mythical river among a few Indigenous groups of Siberia. Further, he argues for the importance of elk in subsistence and technology in parts of Siberia because they were the largest and the strongest animal in the taiga.

Overall though, Okladnikov generally proposed that elk rock art from the Middle Holocene of Siberia related to (shamanic) hunting magic (Okladnikov, 1959: 58; 1966: 116, 125-6; 1974, 103-104). This interpretation is arguably not based upon the actual content of most of the rock art. Of the hundreds of elk rock art he assigned to Middle Holocene hunter-gatherers, we are aware of only two possible depictions of elk hunting (Okladnikov, 1966: 124). Clear images of elk hunting in Cis-Baikal typically depict riders on horseback pursuing the animals, which according to Okladnikov himself, are almost from the Late Holocene (Okladnikov, 1959, 116-117). Okladnikov's interpretations of the rock art instead appear to stem largely from Siberian ethnography, albeit quite indirectly. For example, Okladnikov (1959: 51-6) describes Evenki rituals and other practices related to ensuring successful elk hunts. Some of these rituals involved wooden elk figurines that were put in breeding positions during shamanic dances. However, direct links between such practices and rock art production are unspecified, and the wood figures he briefly describes seem unlike all mobiliary elk objects in Cis-Baikal (described below). Regardless, Okladnikov's thoughts on elk and elk imagery clearly continued to be heavily influential among subsequent generations.

For example, just a few decades later, Martynov (1991), one of Okladnikov's students, placed much of the Angara rock art elk imagery into an Early and Middle Holocene tradition that spanned much of northern Eurasia. Martynov's interpretations of these images are clear and direct, and his explanations for them are made specific. He proposed that the elk images related to communicating two fundamental aspects of life, namely success in hunting and animal reproduction (Martynov, 1991:30). The reproduction proposal was based on the predominance of

female elk in the rock art, probably following one of Okladnikov's earlier observations, as just described. Hunting magic was linked to elk because some images were said to be associated with sets of parallel vertical lines. Martynov (1991:32) interprets these sets of lines as representations of enclosures used in elk hunting. Further, he argues that elk predominate in the Early and Middle Holocene rock art in northern Eurasia because elk were the largest animals present in the boreal forest and the primary prey pursued by hunters, again presumably following Okladnikov's thoughts on this matter.

Writing more recently, Jacobson-Tepfer (2015), Jacobson (1993) proposed that the Angara rock art elk images (and early elk rock art from the Tom River) are indicative of a belief in a cosmological "animal mother" that acted as an "ever-renewed source of human sustenance". She further proposed that the elk images are linked to rivers, the easterly direction, and funerary rites, but does not elaborate on these points. This animal mother figure eventually transformed and gave rise to a "mother of animals" entity that played important roles among early cattle herding societies in southern Siberian and western Mongolia. Jacobson-Tepfer finds Martynov's hunting magic hypothesis unconvincing, primarily because there are no clear indications of hunting in the animal mother rock art. The vertical lines highlighted by Martynov, for example, cannot be shown to be contemporaneous with the elk images in the panels, and their interpretation as hunting surrounds is unsubstantiated.

Ponomareva (2016; Ponomareva and Taçon, 2019) most recently analyzed elk imagery in Cis-Baikal. She highlighted the ambiguous ways elk imagery from the Angara region has been defined, and how this has led to claims that the styles dates anywhere from ~7000 to 3000 years ago, depending on the specific area and imagery considered. To resolve this ambiguity, Ponomareva (2016) analyzed Okladnikov's reports and curated rock art photographs. She identified a progression of styles, with the earliest phase consisting of naturalistic but simple zoomorphic images (which Okladnikov suggested were Upper Paleolithic in age), followed by a phase consisting of far more abundant but also naturalistic depictions of the animals. This form of elk imagery, termed the "Angara style", involved careful attention to their eyes, lips, and ears, with the animals commonly shown in motion, from the side, and without antlers. When antlers are present, they are always far smaller than would occur in a mature adult individual. She posits that the Angara basin was the origin place for the Angara style, which eventually appeared along the upper Lena and middle Enisei rivers, which (along with the Angara itself) she termed the "central Angara rock-art area". The subsequent styles were more schematic in form, and the noses of the elk are often overly large. These styles likely date to the Bronze Age, which also witnessed the appearance of anthropomorphic figures and boats in the region's rock art.

Ponomareva and Taçon (2019) then assessed mobiliary elk art in Cis-Baikal, largely in an effort to assign ages to the Angara style elk rock art. They convincingly argued that this style dates at least as early as the Early Neolithic, or from ~7560 to 6660 cal. BP (Weber et al., 2021). Further, Ponomareva and Taçon (2019) suggested that the Angara style appears in south-central Sakha Republic, perhaps around 6500 years BP, arguing that it arrived there as a result of migration of people from the Baikal region. In the southern regions of Western Siberia, the Angara elk imagery style seemingly appears as early as the Late Neolithic. Ponomareva and Taçon (2019) note that previous scholars (e.g., Kiriushin et al., 2000; Kungurova, 2005) inferred that southwestern Siberia experienced an influx of migrants from the Baikal region during the Late Neolithic. Overall, Ponomareva and Taçon see the Angara style elk as a form of ethnicity making and marking that first emerged in Cis-Baikal, and argue that the distribution of this style can be used to explore population movements. Why the Neolithic peoples of the Angara chose to focus on elk in their rock art or portable imagery, however, is not addressed in their work.

The somewhat independent interpretations of the Baikal region's elk imagery offered by all of the above authors—that it involves a female

generative force or cosmic being and is associated with mortuary rites and rivers; that elk are focused upon because they were primary food resources and large; that the style disperses from this region to the north and west in the Neolithic as part of human population movements—are far more interesting when viewed in their broader contexts. Given that much of the rock art of Cis-Baikal is beyond the reach of additional technical studies and cannot be directly dated, we focus on mobiliary elk imagery and its archaeological context, linking this to a suite of recently generated data on cemetery location, human subsistence and dietary patterns, and potential human population shifts in the region's Middle Holocene culture history. We conclude by linking these patterns to widely utilized models of northern Eurasian forager cosmologies.

## 2. Background

### 2.1. Elk biology and behavior

To explore the uniqueness of elk, some basic characteristics of their physical forms and behavior are described here. These can be compared to the other common cervids of the region, red deer (*Cervus elaphus*) and roe deer (*Capreolus pygargus*), which constitute the vast majority of ungulate remains in Cis-Baikal's Middle Holocene archaeological sites (see below).

Elk are a member of the deer family (Cervidae) and are widely found in forested regions of northern Eurasia and North America (Karns, 2007). They have inhabited Cis-Baikal since at least the Late Pleistocene (Kalmykov, 2016; Lavov, 1974). Elk are the largest living deer, with adult males in Eastern Siberia attaining weights of up to 550 kg (Petrina, 2003). Perhaps elk's most distinctive physical feature is their nose or proboscis, which appears droopy and enlarged compared to that of other deer. This unique nose is in part an adaptation for browsing on aquatic vegetation (Clifford and Witmer, 2004; Márquez et al., 2019). Their upper bodies have a bulky appearance, while their legs are slender and shoulders humped when viewed in profile. Another distinct physical feature is an area of hair-covered skin on their lower necks, known as the bell, which is present in both males and females. Females tend to have smaller and more tail-shaped bells, while those of males are larger and more disc-shaped (Bubenik, 2007; Miquelle and Van Ballenberghe, 1985). Only male elk have antlers, again the largest in the extant deer family (up to 2 m wide). These form starting in their first year of life, and become larger as the animals develop, reaching maximum size between five and ten years of age (Bowyer et al., 2001; Steward et al., 2000). They are lost each winter and begin to regrow in the spring. In many individuals they have a palmate form, which is quite distinct from the antlers of other deer in Siberia.

Elk are recurrently described as having a solitary nature, a low degree of sociality, or being individualistic, especially when compared to other species of deer (Baskin and Danell, 2003; Franzmann and Schwartz, 2007). Common exceptions to their otherwise solitary lives include when adult females care for their calves over the first year of their lives, and congregations of adults during the fall breeding season. Female elk reach puberty as early as 16 months of age and most produce one calf (but sometimes two or three) in the spring (Schwartz, 2007).

Bubenik (2007:206), referring to North American *Alces alces*, states that, "moose stand their ground rather than flee more often and longer than most other large ungulates will." Elk also are notorious for occasionally becoming aggressive, particular when adult females defend their calves, or when adult males battle for breeding opportunities in the fall (Bubenik, 2007; Geist, 1998). In fact, elk have been observed killing brown bears, wolves, and humans when threatened by them (Geist, 1998:237). Males spar with their antlers, and both sexes will rise up on their back feet to attack with the front limbs. Both males and females will vocalize when excited or threatened, which Geist (1998:237) describes as "a loud, short, choppy, deep, nonharmonic sound, more reminiscent of a large carnivore's roar than that of an herbivore".

Elk prefer to forage in rough terrain and near cover, generally

avoiding open and flat areas, and their home ranges cover a few hundred to just over 1000 ha (Baskin and Danell, 2003; Geist, 1998). Seasonal migrations occur in some populations, at times involving distances of nearly 500 km (Baskin and Danell, 2003). Diets can range from highly specialized to diverse, but in winter browsing focuses on twigs and in summer on the foliage and twigs of deciduous plants (Renecker and Schwartz, 2007). Willows (*Salix* spp.) are a highly preferred food, and in summer elk also consume aquatic vegetation (Renecker and Schwartz, 2007). Utilizing aquatic habitats also appears to have some function in thermal regulation, relief from biting insects, and acquiring sodium (Peek, 2007). Despite their size, elk are excellent swimmers, having been observed crossing open water distances of up to 20 km; they typically swim with all but their heads submerged (Bubenik, 2007). Further, elk can completely submerge (dive) and have been observed feeding on plants in water up to 5.5 m deep (Peterson, 1955).

Red deer and roe deer are both far more gregarious than elk (Geist 1998). Roe deer can form herds of several hundred individuals in the fall and winter, and some populations migrate up to 500 km to winter foraging locations (Danilkin, 1995, 1996). Red deer form smaller herds and appear to have shorter migrations, today around 140 km or less (Baskin and Danell, 2003). In Siberia, roe deer adult males reaching ~ 60 kg, while adult male red deer are far larger, obtaining weights of around 300 kg (Danilkin, 1995; Heptner et al., 1961). Both red and roe deer lack the palmate antler form seen in most elk, and neither have bells. These two species range further south than elk in Asia, and both can readily inhabit more open landscapes, including forest-steppe environments (Baskin and Danell, 2003; Danilkin, 1996; Danilkin et al., 2000; Liarkin, 2002). Roe deer tend to have two calves per year, and red deer only one (Baskin and Danell, 2003). Neither dives nor regularly feeds on aquatic vegetation.

### 2.2. Cis-Baikal's Middle Holocene culture history

The chronology for the Middle Holocene culture history of Cis-Baikal has been established through radiocarbon dating of the region's cemeteries, and consists of the following periods, from oldest to youngest: Late Mesolithic, Early Neolithic, Middle Neolithic, and Early Bronze Age. All periods are characterized by the presence of foraging societies. Detailed chronological analyses of the region's habitation sites are generally lacking, so we largely limit our discussions of culture history here to the research done on cemeteries. Dates presented for culture history periods here are modeled age ranges from Weber et al. (2021). Relevant information on habitation sites is present in the sections on cemetery location and subsistence below.

The Late Mesolithic, from ~ 8630 to 7560 cal. BP, is the most poorly documented period, with its chronology based on the dating of 25 burials (Bazaliiskii, 2010; Weber et al., 2021). The Mesolithic probably gave rise to the far better evidenced Early Neolithic, which dates from ~ 7560 to 6660 cal. BP (Weber et al., 2021). This period is characterized by a marked increase in human burials. Most Early Neolithic burials are in the Angara Valley and on the southern shore of Lake Baikal at the large cemeteries of Lokomotiv and Shamanka II, respectively. Nearly all of these burials are assigned to the Kitoi mortuary tradition. Early Neolithic cemeteries are also present in the Little Sea area in the Priol'khon'e region of Baikal's western shore and even east of the lake on the lower Selenga River (Ivashina, 1979; Khamzina and Ivashina, 1982; Lbova et al., 2008).

Arguably the most distinct feature of the region's Middle Holocene culture history is a near-complete absence of burials during the Middle Neolithic, which spans from ~ 6660 to 6060 cal. BP (Weber et al., 2021). This period's chronology is based on the modeled radiocarbon dates for the latest Early Neolithic burials and the earliest burials from the subsequent Late Neolithic period. The Middle Neolithic has been referred to as a biocultural hiatus or discontinuity (Weber, 1995; Weber and Bettinger, 2010; Weber et al., 2010, 2016a, 2021), in large part because following this temporal gap in burials, mortuary practices are markedly

distinct from previous traditions, cemeteries are differently distributed on the landscape, and human population genetics are significantly changed (Mooder et al., 2005, 2006; Moussa et al., 2018; Weber, 1995; Weber and Bettinger, 2010; Weber et al., 2016a). Some have questioned whether Early and Late Neolithic/Early Bronze Age populations are fully discontinuous or rather exhibit some level of continuity (Movsesian et al., 2014; Kuzmin, 2007; Berdnikova, 2012). Note that these latter arguments are based largely on nonmetric cranial traits and artifact typology whereas the proposals for discontinuity are founded on paleogenetic data.

A major factor driving the dearth of burials in Cis-Baikal during the Middle Neolithic and the related (possible) biocultural discontinuity is a marked period of climate change (Tarasov et al., 2007; White and Bush, 2010; Bezrukova et al., 2010, 2013; Tarasov et al., 2017; Kobe et al., 2020). In general, thicker and longer winter snow cover mark this period, as does a shift in vegetation (in most areas) from birch (*Betula* sp.) and shrub vegetation to a biome dominated by Scots pine (*Pinus sylvestris*). Both may have resulted in poorer foraging opportunities for the region's ungulates (Kobe et al., 2020; Tarasov et al., 2017; White and Bush, 2010).

The Late Neolithic, from ~ 6060 to 4970 cal. BP, is marked by the reappearance of burials and cemeteries in Cis-Baikal (Weber et al., 2010, 2016a, 2021). While Late Neolithic cemeteries appear to have been numerous, particularly along the Angara, most of these sites were excavated decades ago by Okladnikov and his colleagues and their collection are now lost (Weber et al., 2016a). Regardless, two co-occurring mortuary traditions existed during this period, Isakovo and Serovo, with both sometimes present in the same cemeteries (Bazaliiskii, 2010; Weber and Bettinger, 2010; Weber et al., 2016a). Isakovo has been identified only on the Angara.

The Early Bronze Age, from ~ 4970 to 3470 cal. BP (Weber et al., 2021), marks the final period of widespread forager cemetery creation in Cis-Baikal, and is believed to have derived directly from the proceeding Late Neolithic (Weber and Bettinger, 2010). The predominant mortuary tradition of this period is known as Glazkovo. Early Bronze Age graves are found in Priol'khon'e, the southern and western shores of Lake Baikal, and along the upper Lena and Angara rivers, but few from the Angara are available for analyses, again a result of being excavated decades ago. The end of the Early Bronze Age is marked by a second temporal gap in the region's human burials, which reappear (at least on the western shore of Lake Baikal) around 2750 cal. BP with the permanent settlement of the region by pastoralists (Losey et al., 2017a).

### 2.3. Portable elk imagery from Cis-Baikal

The portable elk imagery from Cis-Baikal described here is entirely from human graves, only some of which are radiocarbon dated. Radiocarbon dating of human bone in the Baikal region is complicated by a geographically variable freshwater reservoir effect (FRE) (Nomokonova et al., 2013; Schulting et al., 2014, 2015, 2018; Weber et al., 2016a,b, 2021; Weber, 2020). Correction for this bias requires dating of materials from graves not biased by the FRE (e.g., deer bone), or adjustment of radiocarbon dates through region-specific regression formulae that take into account human diet as assessed through stable isotope analyses. For the graves considered here, such corrections are only published for the Shamanka II, Lokomotiv, Gorodishche II, and Ulan-Khada IV cemeteries (Weber et al., 2016a,b, 2021; White et al., 2020). For consistency, we present the uncalibrated radiocarbon ages for burials along with their culture history period assignments (Table 1); the latter are done through typology where radiocarbon dates are unavailable. The quality of ageing and sexing information varies greatly between the sites, and the most precise published data is presented where available. Basic metric data on the objects is shown in Table 2.

Six Early Neolithic cemeteries have produced mobiliary elk imagery, including Zhiloi Island, Ust'-Belaia, Kitoi, Lokomotiv, Shamanka II, and Fofanovo. The elk sculpture from Zhiloi Island is the most poorly

**Table 1**

Published uncalibrated and uncorrected radiocarbon dates for graves with elk imagery in Cis-Baikal.

Site and grave #	Age	Sex	Lab #	Date BP	Date $\sigma$	Citation
Ust'-Belaia grave 10 (1962)	Adult	?	GIN-4126	6760	160	Mamonova and Sulerzhitskii, 1989
Lokomotiv grave 11 (1980)	50+	M	Ox-36102	6754	40	Weber et al., 2021
Lokomotiv grave 23 (1981)	20–25	M	Ox-25629	6695	40	Weber et al., 2016b
Lokomotiv grave 36 (1986)	20–25	F	Ox-36093	6795	38	Weber et al., 2021
Shamanka II grave 8 (2000)	35–40 y.	M	Ox-30358	6874	32	Weber et al., 2016b
Shamanka II grave 14 (2001)	25–30 y.	M	Ox-30482	6904	36	Weber et al., 2016b
Shamanka II grave 14 (2001) individual 1	20–25 y.	F	Ox-30577	6937	37	Weber et al., 2016b
Shamanka II grave 15 (2001) individual 2	25–35 y.	M	Ox-30578	6807	36	Weber et al., 2016b
Shamanka II grave 59 (2005) individual 1	35–39 y.	M	Ox-21533	6450	38	Weber et al., 2016b
Shamanka II grave 59 (2005) individual 2	15–19 y.	F?	Ox-21540	6694	39	Weber et al., 2016b
Shamanka II grave 62 (2005) individual 1	35–45 y.	F?	Ox-26449	6862	37	Weber et al., 2016b
Shamanka II grave 62 (2005) individual 2	35–45 y.	M	Ox-26450	6895	37	Weber et al., 2016b
Shamanka II grave 62 (2005) individual 3	20 + y.	F?	Ox-26451	7022	39	Weber et al., 2016b
Shamanka II grave 62 (2005) individual 4	20 + y.	M?	Ox-26452	7005	38	Weber et al., 2016b
Shamanka II grave 83 (2006) individual 1	20–22 y.	M	Ox-21550	6620	40	Weber et al., 2016b
Shamanka II grave 83 (2006) individual 2	20–30 y.	F?	Ox-26457	7095	36	Weber et al., 2016b
Fofanovo grave 11	45+	M	GIN-7133	6600	100	Mamonova and Sulerzhitskii, 1989
Gorodishche II grave 4 (1997)	Adult	M	Ox-26896	4445	31	Weber et al., 2021
Shumilikha (Kalashikha) grave 2 (1977)	Adult	?	SOAN-1665	4380	150	Okladnikov and Konopatskii, 1984
Ulan-Khada IV grave 4 (1959) individual A	Adult	M?	Ox-33946	4461	37	White et al., 2020

(continued on next page)

Table 1 (continued)

Site and grave #	Age	Sex	Lab #	Date BP	Date σ	Citation
Ulan-Khada IV grave 4 (1959) individual B	Adult	M?	Ox-33947	4469	36	White et al., 2020
Ulan-Khada IV grave 4 (1959) individual C	Adult	?	Ox-33948	4326	36	White et al., 2020
Ulan-Khada IV grave 4 (1959) individual D	Adult	M?	Ox-33954	4346	37	White et al., 2020
Ulan-Khada IV grave 4 (1959) individual E	Adult	M?	Ox-33955	4304	38	White et al., 2020

Table 2

Metric data (where available) for elk imagery discussed in the paper.

Cemetery	Grave	Item	Item type	Length (cm)
<i>Early Neolithic</i>				
Zhiloi	na	1	Head sculpture	?
Ust'-Belaia	10 (1962)	1	Head sculpture	5.5
Ust'-Belaia	10 (1962)	2	Head sculpture	6.3
Ust'-Belaia	10 (1962)	3	Head sculpture	6.3
Kitoi	2 (1958)	1	Head sculpture	7.8
Lokomotiv	4 (1948)	1	Spoon?	6.9
Lokomotiv	10 (1949)	1	Head sculpture	10.7
Lokomotiv	11 (1980)	1	Head sculpture	8.6
Lokomotiv	23 (1981)	1	Spoon	21.1
Lokomotiv	36 (1986)	1	Head sculpture	7.3
Lokomotiv	36 (1986)	2	Head sculpture	7.8
Shamanka II	8 (2000)	1	Rod-like item	21.9
Shamanka II	14 (2001)	1	Incised antler arch	20
Shamanka II	15 (2001)	1	Head sculpture	10.3
Shamanka II	59 (2005)	1	Spoon	25.4
Shamanka II	62 (2005)	1	Spoon	9.6
Shamanka II	78 (2006)	1	Pendant	3.6
Shamanka II	78 (2006)	2	Pendant	2.7
Shamanka II	78 (2006)	3	Pendant	2.7
Shamanka II	78 (2006)	4	Pendant	2.5
Shamanka II	83 (2007)	1	Rod-like item	25.7
Shamanka II	115 (2019)	1	Head sculpture	3.4
Fofanovo	11 (1991)	1	Head sculpture	9.1
<i>Early Bronze Age</i>				
Ust'-Uda	5 (1936)	1	Flat full body carving	~25
Ust'-Uda	5 (1956)	1	Head sculpture?	5.0
Gorodishche II	4 (1997)	1	Knife	13.4
Shumilikha	2 (1977)	1	Flat full body pendant	3.9
Shumilikha	2 (1977)	2	Flat full body pendant	3.3
Shumilikha	2 (1977)	3	Flat full body pendant	3.9
Shumilikha	2 (1977)	4	Flat full body pendant	2.3
Shumilikha	38 (1972)	1	Head sculpture	~29.0
Ulan-Khada IV	4 (1950)	1	Head sculpture	4.3
Verkholsensk	4 (1949)	1	Head sculpture	5.5

contextualized of the group. Zhiloi is north of Bratsk on an island within the Angara River (Fig. 1). Okladnikov (1939:184) provides little detail on the grave containing the object, stating only that it is from the “early Kitoi” tradition. The sculpture fragment (material is unspecified) has two elk heads oriented in opposing directions, and below the juncture of the two heads is a projection, likely for attachment to another object (Fig. 2) (Okladnikov, 1939:181). The elk heads have open-looking eyes and sweptback ears, and the intact head has a well-defined nose and open mouth—it is naturalist. No indications of antlers are present. Unfortunately, no scale is provided for the object.

Ust'-Belaia is a cemetery located at the juncture of the Belaia and Angara rivers (Fig. 1). In 1962, three elk depictions were found in grave

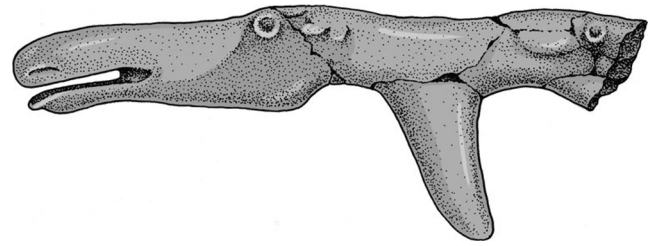


Fig. 2. The Early Neolithic double-headed elk sculpture from Zhiloi Island. Redrawn from Okladnikov (1939:181). No scale was provided in the original illustration.

10 at this site (Georgievskaja, 1979: 79, 81, 1989: 69; Studzitskaia, 1993: 78-9). The grave contained the largely disarticulated and incomplete skeletal remains of five individuals. The elk sculptures were in northern corner of the grave pit. All three are carved in antler and are naturalistic elk heads with sweptback ears, alert-looking eyes, and clearly defined mouths and noses (Fig. 3). All lack antlers, but one of the three has a small knob-like projection on the midline of its forehead. One of the three is broken at the end opposite the nose, but the other two are fully intact, and their bases are wedge shaped.

A similar elk sculptural item was found in an undated grave at the Kitoi (or Kitoi Iarki) site, located at the confluence of the Kitoi and Angara rivers (Fig. 1) (Khoroshikh, 1979). Grave #2 (1958) contained the remains of an adult male buried in a sitting position, with the elk item (carved in antler) being found in the upper leg area. As at the above two sites, only the head is depicted, and the elk appears alert and lacks antlers (Fig. 4). A small knob-like projection is present on the midline of the forehead. While burials in the sitting position are relatively rare for the Early Neolithic (Okladnikov, 1950; Weber, 1995), the grave contained multiple Kitoi style fishhook shanks (Khoroshikh, 1979). The presence of such fishhook shanks is one of the defining features of the Early Neolithic Kitoi mortuary tradition (Okladnikov, 1950: 355-383, 403-411; Bazaliiskii, 2010; Bazaliiskii and Savelev, 2008; Bazaliiskii and Weber, 2004, 2005, 2006, 2008; Bazaliiskii et al., 2006, 2016), which derives its name from this site.

Lokomotiv is the largest Early Neolithic cemetery on the Angara River (Fig. 1) (Bazaliiskiy and Savelyev, 2003; Bazaliiskii and Savel'ev, 2008; Khoroshikh, 1950; Okladnikov, 1974a; Studzitskaia, 1993). This site is on a hilltop near the modern confluence of the Irkut and Angara rivers. Five Early Neolithic graves at Lokomotiv produced elk imagery. Grave 4 (1948) contained the remains of an adult male and a child, the adult in extended supine position, with the child placed on the adult's abdomen or chest (Okladnikov, 1974a: 156). The location of the elk sculptural items is not described, but the grave illustration seems to indicate that it was under or just to the left of the adult's skull. This antler item consists of an elk head with small dot-like eyes and ears, clearly defined mouth and nose, and a knob-like projection on the midline of the forehead (Fig. 5-1) (Khoroshikh, 1966: 90). No antlers are present, and the object is incomplete. The end opposite the nose is broken off, and the area of the break surface is deeply concave on the lower face. It may be a fragment of a spoon similar to that in Lokomotiv grave 23 or Shamanka II grave 59 (Figs. 7 and 11). The grave is undated, but the styles of artifacts found in it are consistent the Early Neolithic Kitoi tradition. Grave 10 (1949) at Lokomotiv contained the skeletal remains of an adult male and female lying side-by-side and heavily coated in ochre (Khoroshikh, 1950: 14, 1-25; 1966: 90; Okladnikov, 1974a: 42-5; Studzitskaia, 1993: 78-9). Over 200 burial accouterments were present in the grave, including an elk sculptural item found in the upper arm region between the buried individuals (Fig. 5-2). This object, carved from antler, has the same form as the three elk images at Ust'-Belaia. It consists of an alert-looking elk head lacking antlers and with a knob-like projection on the forehead; its opposite end is wedge shaped. The grave is undated but the style of artifacts present is consistent with

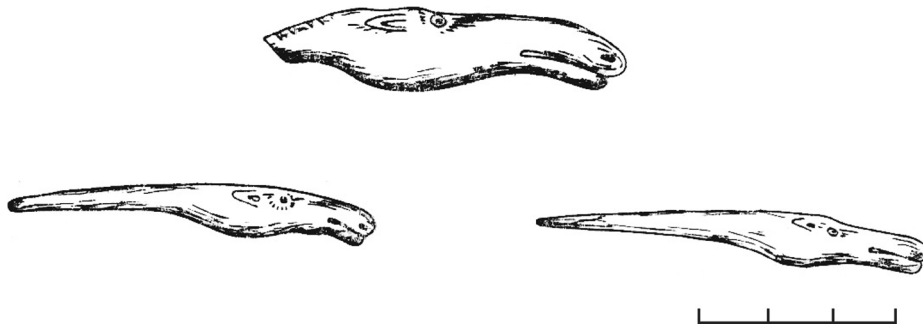


Fig. 3. Early Neolithic elk head sculpture from Ust'-Belaia grave 10 (1962). Redrawn from Georgievskaja (1989:86).

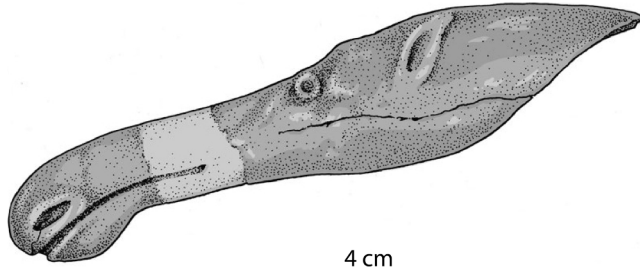


Fig. 4. Early Neolithic elk head sculpture from Kitoi grave #2 (1958). Redrawn from Medvedev and Goriunova (2005).

the Early Neolithic Kitoi mortuary tradition.

Grave 11 (1980) at Lokomotiv contained the remains of a 50+ year old male buried in an extended supine position (Lieverse et al., 2007). Near the left knee was an elk head sculpture (carved in antler) similar to that in grave 10—just the head is depicted, antlers are absent, a knob is present on the forehead, and the end opposite the nose is wedge shaped (Fig. 6). Grave 23 (1981) contained the remains of an adult male, 20–25 years of age (Lieverse et al., 2007), buried in an extended supine position (Bazaliiskiy and Savelyev, 2003). A cluster of objects was found directly north of the head. An antler spoon with an elongated basin and a handle in the form of an elk head was found in this cluster (Fig. 7) (Bazaliiskiy and Savelyev, 2003: 22). The design of the head is similar to that of the other elk objects from Lokomotiv, complete with the small knob on the forehead and the lack of antlers. Finally at Lokomotiv, two elk sculptural items were found in grave 36 (1986), both carved in antler (Fig. 8). This grave contained the remains of a 20–25 year old female buried in extended supine position (Lieverse et al., 2007; Bazaliiskii and Savel'ev, 2008). No cranium was present, a pattern seen in ~ 23.4% of the graves at Lokomotiv (Bazaliiskiy and Savelyev, 2003). Where the cranium should be found, a fragmented elk sculpture was present, showing only the head without antlers, and the end opposite the nose is wedge-shaped (Bazaliiskii and Savel'ev, 2008: 13). The ears are swept back but extend somewhat from the surface, and the underside of the chin has an incised chevron pattern. A second elk image was found near the right wrist/hand area. This object has a wedge-like end, and opposite to it is an alert-looking elk head lacking antlers with a small knob on the midline of the forehead.

Eight graves at Shamanka II have items potentially depicting elk. This site is on the south shore of Lake Baikal (Fig. 1). Two of the graves (#s 78 and 115) are not radiocarbon dated, but six others are directly dated (Table 1) (Weber et al., 2016b). All six dated graves fall within the first phase of cemetery use, which modeling indicates spanned from ~ 7510 to, 7230 cal. BP, and the remaining two are typologically assigned to the Early Neolithic more broadly (Weber et al., 2016b). Grave 8 (2000) contained the mostly disarticulated skeleton of a 35–40 year old male (Lieverse et al., 2007; Bazaliiskii and Weber, 2004). Near the center of the grave an antler rod-like item was found with one end

carved in the outline form of an elk head (Fig. 9-1) (Bazaliiskii and Weber, 2004: 36). No facial features are present, and no antlers are evident. Grave 14 (2001) contained two burials, a 25–30 year old male and a 20–25 year old female, both in extended supine position and lying side by side (Bazaliiskii and Weber, 2004). Near their heads were a few artifacts, including an arching flat piece of antler with a zoomorphic head at one end, and the opposite end broken off (Fig. 10-1) (Bazaliiskii and Weber, 2004:36). This object possibly was part of a cap worn by the deceased. One face of the object is incised with paired dot and circle designs, and between at least two sets of these are ~ 1 cm long incised zoomorphic images. Both show the head and neck only and have upright ears, and the left-most image has a nose similar to that of an elk. Neither image has antlers. Grave 15 (2001), the most elaborate burial in the cemetery, contained the remains of a 25–35 year old male (Bazaliiskii and Weber, 2004). The body appears to have been placed in the grave after being exposed for some period, and when excavated was found partially disarticulated. Much of the floor of the grave pit below the body was filled with a layer of artifacts. Below the right lower leg, an elk head sculpture was found that was quite similar to those seen at Ust'-Belaia, Kitoi, and Lokomotiv (Fig. 10-2) (Bazaliiskii and Weber, 2004: 36). Specifically, the object has a wedge-like base and the elk head is naturalistic, alert looking, and lacks antlers. No knob feature is evident on the forehead but three dot and circle design elements are present.

Grave 59 (2005) at Shamanka II contained two non-contemporaneous human burials, with the earliest interred individual being a 15–19 year old female, and the later a 35–39 year old male (Bazaliiskii and Weber, 2005). A spoon with an elk head handle was found in a cluster of artifacts at the feet of the female burial, which was largely disarticulated (Fig. 11). The spoon is similar to that at Lokomotiv except that portions of the basin have incised design elements (Bazaliiskii and Weber, 2005: 19). The head is naturalistic, lacks antlers, and has a small knob on the forehead. Grave 62 (2005) was utilized during at least two periods for the burial of five individuals, and an elk sculptural item was found just above the cranium of a 45–49 year old man buried in the prone position (Bazaliiskii and Weber, 2005: 19). The individual's lower limbs were not present in the grave. The elk item appears to be a handle fragment of a spoon (remnants of the basin are present), and the head has a naturalistic form and lacks antlers (Fig. 12). The ears are indicated by drilled holes, and the forehead lacks design elements. Five disarticulated and incomplete human skeletons were found in grave 78 (2006), including the remains from three females and one probable female, as well as one male (Bazaliiskii and Weber, 2008). Four elk head pendants were found in the grave, none of which are clearly associated with a specific human individual (Figs. 13-1, 2, 3, 4) (Bazaliiskii and Weber, 2006: 14, 2008: 185). Three pendants are carved in bone and have only the eyes and mouth indicated. All have holes at the ends opposite the nose for attachment and are flat in cross section. The fourth object is carved in stone (talc) and has a naturalistic head and a lobe-like posterior end. Again, no antlers are present, the ears are swept back, and the forehead lacks a knob feature, but posterior to the ears are a series of incised parallel lines.

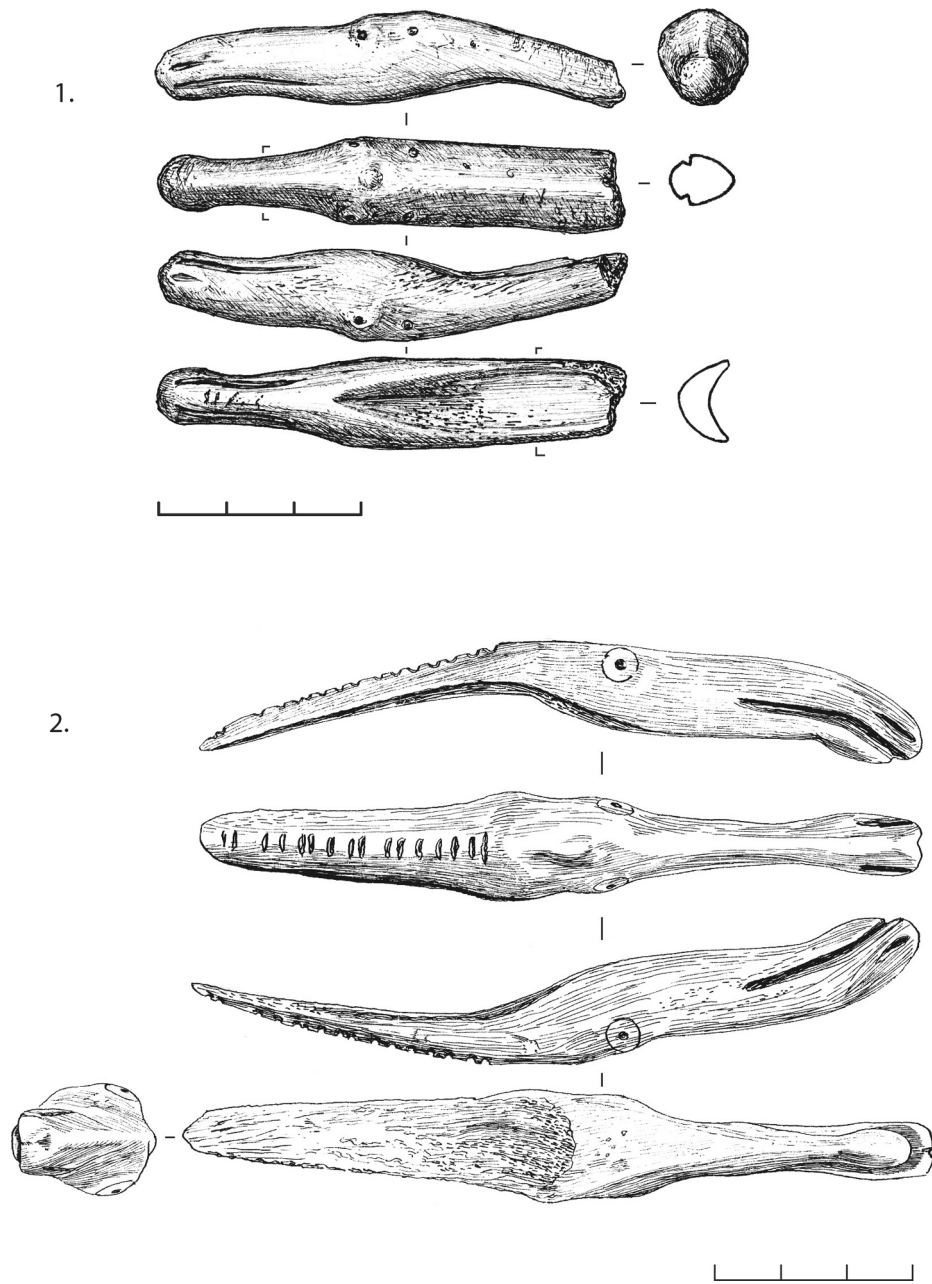


Fig. 5. Early Neolithic elk head sculptures from: 1) Lokomotiv grave 4 (1948); 2) Lokomotiv grave 10 (1949).

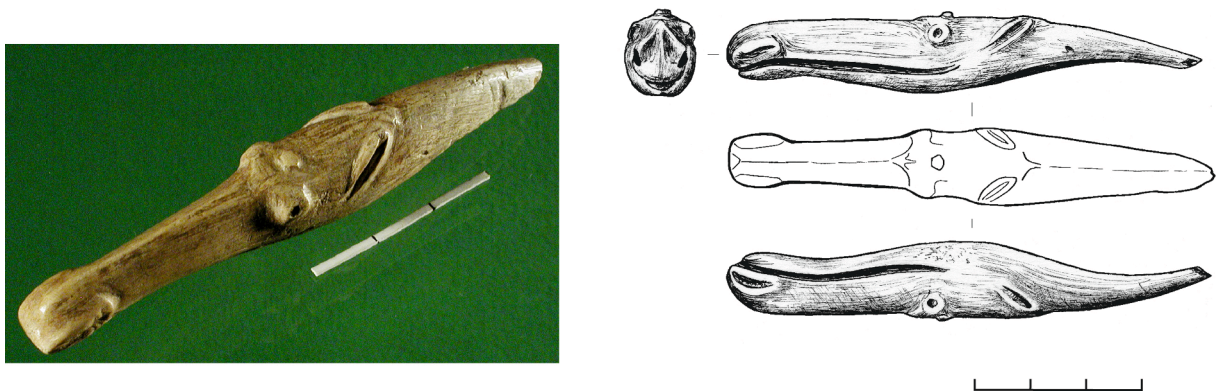


Fig. 6. Early Neolithic elk head sculpture from Lokomotiv grave 11 (1980).



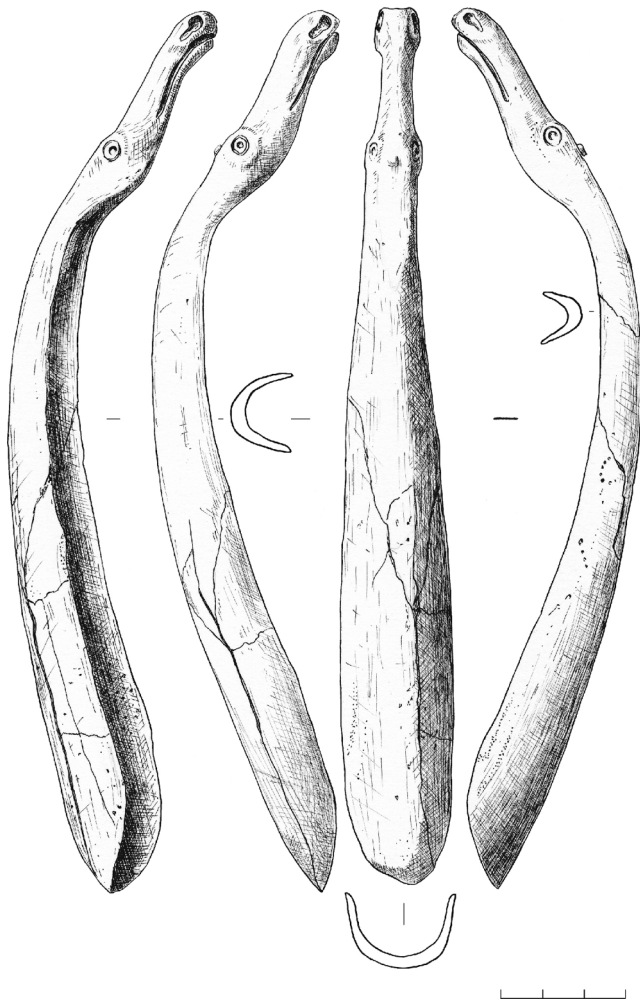


Fig. 7. Early Neolithic spoon with an elk head from Lokomotiv grave 23 (1981).

Grave 83 (2007) at Shamanka II contained the largely disarticulated remains of a 20–22 year old male and a 20–30 probable female (Bazaliiskii and Weber, 2006). At one end of the grave was a scatter of 193 artifacts, including a rod-shaped antler item with an elk-like head carved at one end (Fig. 9-2) (Bazaliiskii and Weber, 2006: 14). The object is very similar to that in grave 8 at Shamanka II, with the head having nearly no features—here only a small line indicating the mouth is present. Finally, grave 115 (2019), which was partially destroyed by modern construction at the site, contained the remains of an adult female and an infant, the latter lying on the chest of the adult. In the area of the lower right arm of the adult was an eroded and incomplete elk head item, with clearly visible mouth, nose and eyes (Fig. 13–5).

The final Early Neolithic elk image was found in at the Fofanovo cemetery on the lower Selenga River east of Lake Baikal (Fig. 1). Grave 11 (1991) contained the simultaneous burials of a 45+ year old male, a 35–45 year old female, and a 7–8 year old child. Under the head of the male, a concentration of artifacts was found, including an elk head sculpture fragment (Fig. 14) (Lbova et al., 2008: 57-9; Zhambaltarova and Volkov, 2013: 114-124). Again, the head is fairly naturalistic, and has a small knob on the forehead and lacks antlers. The area where the ears may have been located is not present.

Elk images are currently unknown from Late Neolithic sites in Cis-Baikal. This may be partially attributable to the dearth of well-documented graves of this period. Regardless, elk imagery from the region's Early Bronze Age graves is markedly distinct from that in Early Neolithic. Five sites from this period have possible elk imagery,

including Ust'-Uda, Gorodishche II, Shumilikha, Ulan-Khada IV, and Verkholsk.

The Ust'-Uda cemetery on the Angara (Fig. 1) has two graves with items potentially depicting elk, but neither are radiocarbon dated. Their assignment to the Early Bronze Age is based on typology. Grave 5 (1936) contained the remains of an adult buried face down; the grave was partially disturbed through riverine erosion (Okladnikov, 1975: 144, 298). Under the head or chest was a fragmented flat carving of the full body of an elk viewed from the side (Fig. 15-1). The nose is over-exaggerated and drooping, and a round hole is present in the torso, presumably for attachment to another object. This object is reminiscent of one of the elk sculptural items from the poorly dated Bazaikha cemetery (Okladnikov, 1975:298; Ponomareva and Taçon, 2019). No scale is included in Okladnikov's (1975:298) illustration of the object, but assuming it was drawn to the same scale as the other objects in the figure, its length was 20–25 cm. Another grave 5, this one excavated in 1956, contained the remains of an adult buried in a flexed position and on their right side (Okladnikov, 1975: 157, 310). Near the legs was a cluster of items, including an elk head sculpture, which Okladnikov describes as having enlarged lips and small eyes and ears (Fig. 15-2). The object is poorly illustrated but appears to have been broken near the back of the head, and the underside of the head was concave. Okladnikov suggests the object was part of a handle.

Gorodishche II is on the Angara River just downstream from well-known Early Bronze Age cemetery Ust'-Ida I (Fig. 1). Grave 4 (1997) at this site contained the flexed burial of an adult male, and near his right hip was a bronze knife, with the knife handle carved in the form of a full-body sculpture of an elk (Fig. 16) (Tiutrin, 2008:191-4). The head is elongated compared to the body, the legs are tucked under the body as if in the sitting position, and a series of rib-like incised lines are present on the torso. No antlers are evident, and the eyes are indicated by small raised projections. The grave is directly dated to the Early Bronze Age.

Shumilikha, seemingly previously referred to as Kalashikha (Okladnikov and Konopatskii, 1984), is an Early Bronze Age cemetery on the Angara with two graves containing potential elk imagery (Fig. 1). Grave 2 (1977), which is directly dated, contained the remains of an adult individual in extended supine position. Near the head were four flat bone zoomorphic figures, each with holes in the upper backs (Fig. 17-1) (Okladnikov and Konopatskii, 1984:20-3; Studzitskaia, 1993: 79). While the excavators claimed these were images of elk, all lack the distinct noses present in other local elk sculptures and could easily represent other quadrupeds. Only one of the images, the largest of the group, has a feature that might identify it as an elk—it appears to have a bell. Grave 38 (1972) contained the burial of an adult in the sitting position, and in the area of the left hip and hand was a large sculpture said to depict the head of an elk (Goriunova, 2002: 55; Goriunova and Smotrova, 1981). The object was carved from the tibia of a wholly rhinoceros (*Coelodonta antiquitatis*). The mouth of the figure is open, and the nose and eyes are indicated by circular holes. No indications of antlers are present. This grave is not directly dated but included multiple items typologically assigned to the Early Bronze Age, including other zoomorphic and anthropomorphic sculptural images.

Only one burial on the western shore of Lake Baikal has produced elk imagery, namely grave 4 (1959) at Ulan-Khada IV in the Little Sea area (Fig. 1). This Early Bronze Age grave contained the remains of six humans, with the two earliest individuals being an adult female buried in extended supine position and the disarticulated and partial remains of an adult male (Komarova and Sher, 1991: 37; White et al., 2020). Near the cranium of the male (individual B in Table 1) was an elk head figure, broken in the neck region, with a drooping nose and clearly defined eyes and mouth (Fig. 18-1). Antlers are absent, and the overall form of the head is similar to that seen in Ust'-Uda grave 5 (1936), described above.

Finally, one site on the upper Lena River has produced potential elk imagery, namely the Verkholsk cemetery (Fig. 1). Grave 4 (1949) at this site is undated but typologically assigned to the Early Bronze Age (Okladnikov, 1978: 10–11). The grave contained the poorly preserved

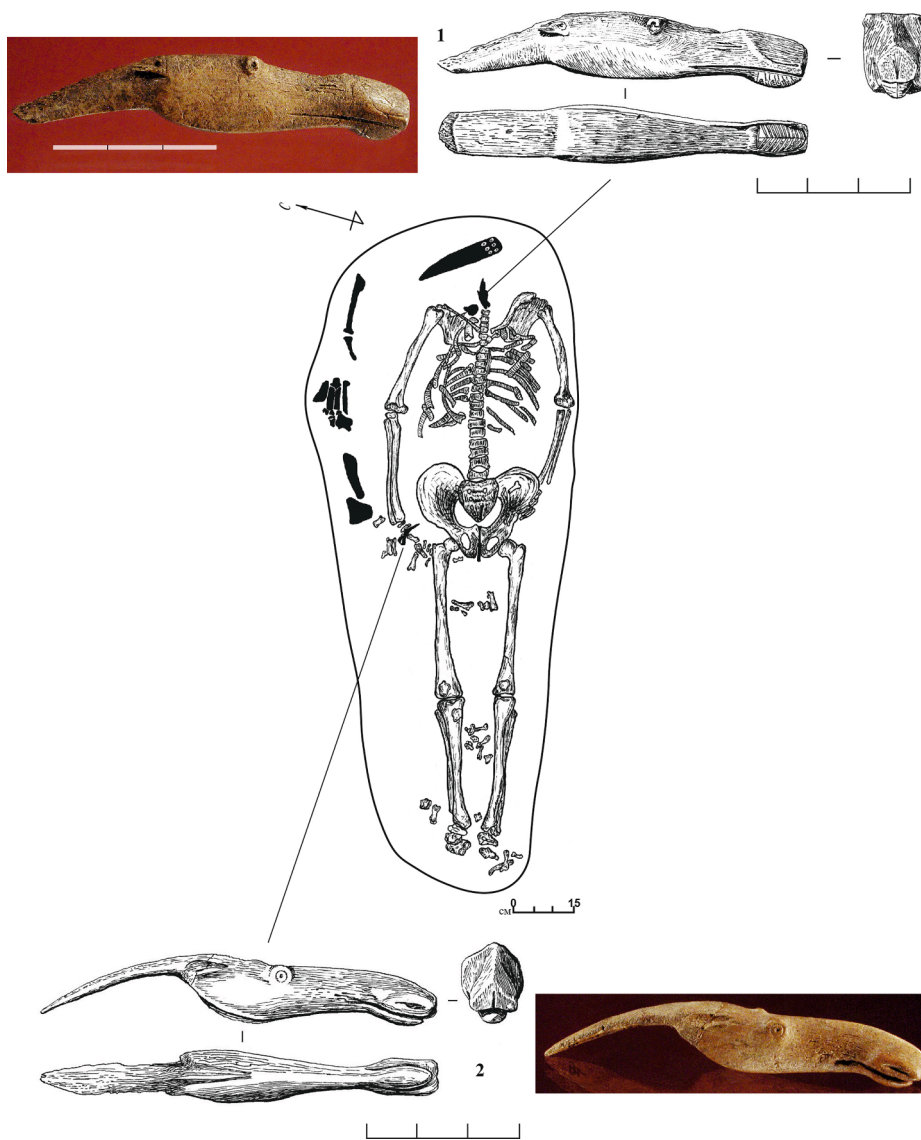


Fig. 8. Two Early Neolithic elk head sculptures from Lokomotiv grave 36 (1986). Location of the objects within the grave is shown at center.

remains of an adult, with the skull being absent. A small and stylized antler figure was found in an undisclosed location in the grave (Fig. 18-2). The figure has circular eyes, a short mouth, but lacks nostrils. Arched incised designs posterior to the eyes are present and could indicate the ears, and no indication of antlers is evident.

#### 2.4. Cemetery location

Cis-Baikal has well over 100 Middle Holocene cemeteries (Weber, 1995; Weber et al., 2010), and virtually all are near rivers or Lake Baikal, regardless of culture history period. All maps of these sites show they are clustered along portions of the Lake Baikal shoreline and the banks of the Angara and Lena rivers and their larger tributaries (e.g., Goriunova, 2002; Okladnikov, 1950, 1955, 1974a, 1975, 1976a; Weber, 1995: 109; Weber and Bettinger, 2010:494). Conversely, the vast stretches of forest-steppe, taiga, and mountain landscapes in Cis-Baikal are void of forager cemeteries, including the Angara and Lena valleys away from their respective rivers.

This distribution of cemeteries appears related to several factors. First, overall patterning in cemetery distribution in Cis-Baikal likely reflects general population distribution during the Middle Holocene (Weber and Bettinger, 2010). In other words, cemeteries are most

prevalent where human populations were highest. These regions tend to have productive fisheries or access to sealing areas on Lake Baikal along with relatively open landscapes and gentle topography. Second, archaeological research has focused on readily accessible areas of the landscape and those places affected by construction activities. This has directed research attention to river courses (where hydroelectric projects have occurred), but also to portions of the Baikal shoreline with road access and construction related to tourist facilities. Finally and most importantly here, we suspect this pattern in mortuary site distribution is indicative of cultural proscriptions that mandated cemeteries be placed near water.

Multiple lines of evidence indicate that people of Cis-Baikal were at times (perhaps seasonally) living away from Lake Baikal and local rivers, but nonetheless still returned to these areas to inter their dead. For example, in the Little Sea region of Priol'khon'e (Fig. 1), habitation sites are overwhelming dominated by aquatic fauna, particularly the remains of freshwater fish and Baikal seal (Nomokonova and Losey, 2017; Nomokonova et al., 2017). Conversely, ungulate remains are very small components of these assemblages throughout the entire Early and Middle Holocene. Detailed information on faunal remains from this area's cemeteries is limited to the Early Bronze Age sites Kurma XI and Khuzhir-Nuge XIV (Nomokonova and Losey, 2017) (Table 3). In stark

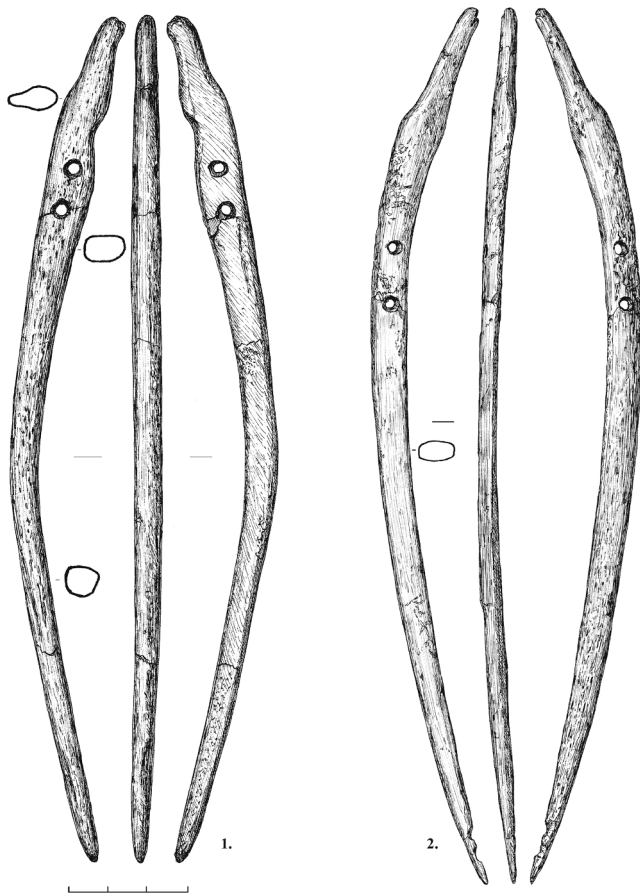


Fig. 9. Early Neolithic antler rods with elk (?) head designs from: 1) Shamanka II grave 8 (2000); 2) Shamanka II grave 83 (2007).

contrast to local habitation sites, remains of ungulates are ubiquitous in these cemeteries, with red deer and roe deer being most common. Remains of aquatic fauna are limited to a single Baikal seal (*Pusa sibirica*) bone from one of the two cemeteries—fish are entirely absent (Nomokonova and Losey, 2017:93). Combining all habitation site faunal assemblages from the Little Sea cannot account for the deer remains seen at even just these two cemeteries—and there are numerous other cemeteries along this portion of the lake’s shoreline. Clearly, Early Bronze Age people buried along the Little Sea were at times living distantly from the lake, most likely in the forested hills and mountains west of Baikal (Losey et al., 2016; Losey and Nomokonova, 2017:123). Similarly, Weber and Goriunova (2013:344) have used human strontium isotope data from Little Sea burials to argue for a “seasonal migration round connecting some other area of the Baikal region, perhaps the upper Lena, with the Little Sea” during the Early Bronze Age. Again, the lands between the upper Lena and the Little Sea involved in such seasonal movements lack cemeteries from the Middle Holocene.

In the Angara and South Baikal regions, faunal assemblages from the Early Neolithic graves at the Lokomotiv and Shamanka II cemeteries also indicate recurrent occupation of non-aquatic landscapes. At both cemeteries, tarbagan marmots (*Marmota sibirica*) numerically dominate the faunal assemblages (Losey et al., 2017b; Masuda et al., 2016). These animals inhabit desert, steppe, and forest-steppe environments (Zimina, 1978). They would not be expected on the shore of Lake Baikal where Shamanka II is located, nor in a riparian environment such as that of Lokomotiv. Further, habitation site faunal assemblages from the Angara valley lack remains of marmots from any time period (Losey et al., 2017b). Tarbagan hibernate in burrows from September through March, meaning that at least some people utilizing the two cemeteries likely occupied steppe or forest steppe environments during the warm season.

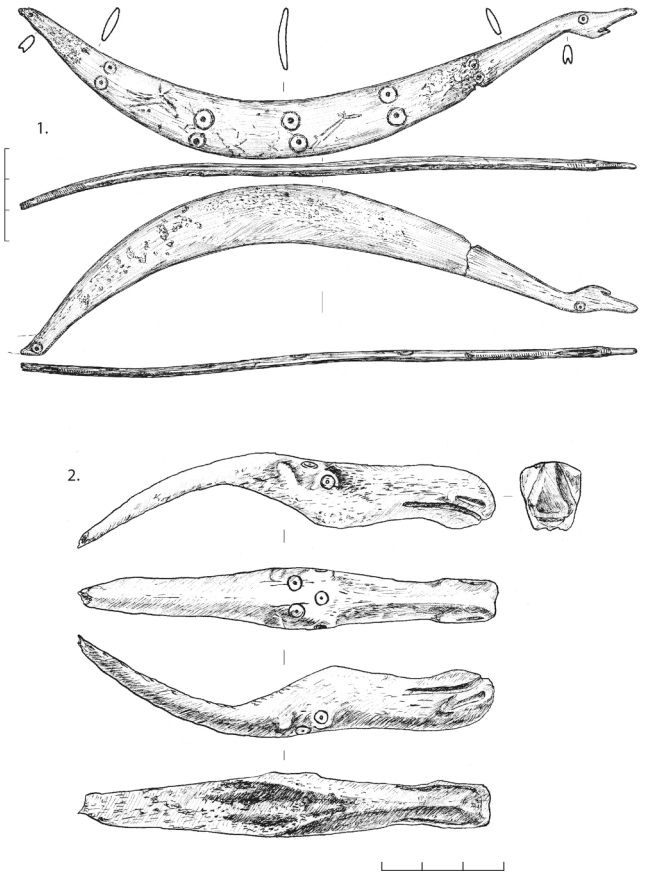


Fig. 10. Early Neolithic arched antler piece from: 1) Shamanka II grave 14 (2001). Both ends had zoomorphic designs but the left is incomplete. Note the incised ungulate-like forms on the arch surface; 2) Elk head sculpture from Shamanka II grave 15 (2001).

Regardless, all known burials from the Early Neolithic are located proximate to rivers or Lake Baikal.

## 2.5. Diets and elk

Middle Holocene subsistence practices and diets varied diachronically and geographically in Cis-Baikal. Regardless, several lines of evidence indicate that elk were relatively minor components of diets in most of Cis-Baikal, with the exception of the lower Angara River valley. Note, however, that zooarchaeological data is entirely lacking from the Upper Lena, meaning that the deer species utilized in this area are unknown. Finally, elk were clearly not the largest ungulate eaten by the Middle Holocene people of Cis-Baikal—urochs (*Bos primigenius*) remains are found in several regional sites.

Elk appear to have been small parts of the diet in several locations where portable elk imagery was abundant. At the south end of Lake Baikal, the Early Neolithic graves at Shamanka II produced a total of 685 identified (to genus or species level) ungulate remains (Losey et al., 2017b). Of these, only 9.1% were elk, with the bulk of the remainder being roe deer and red deer (Table 3). The elk remains were found in only three of the 98 Early Neolithic graves and consisted of a highly fragmented and eroded cranium in grave 8, a maxillary 2nd premolar pendant in grave 15, and a scraper fashioned from a mandible in grave 59. At Lokomotiv in the upper Angara Valley, elk remains were entirely absent (Table 3). Red deer (NISP = 109) and wild boar (*Sus scrofa*) constitute most of the site’s ungulate remains (Losey et al., 2017b). The apparent dearth of elk in these two sites, which together produced much of the Early Neolithic elk imagery in this paper, should be viewed cautiously. First, both sites contain hundreds of items manufactured

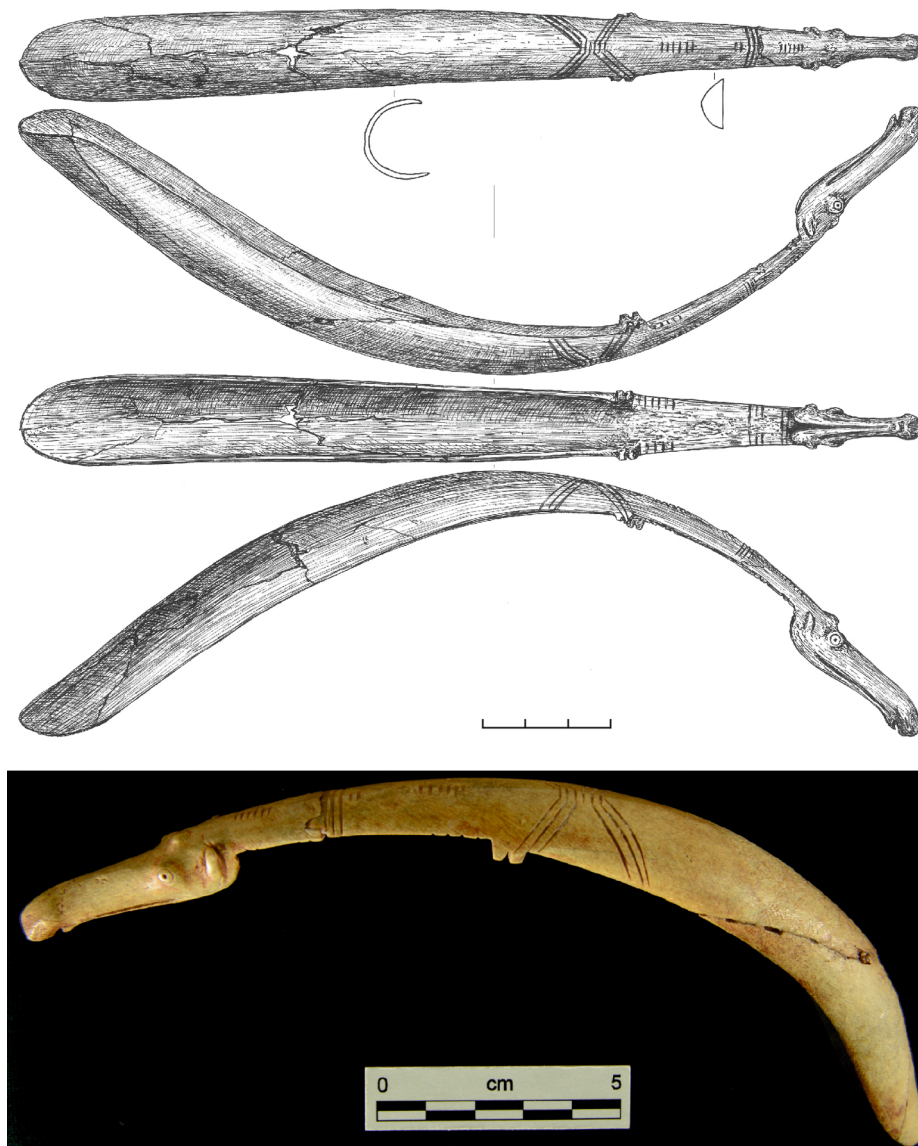


Fig. 11. Early Neolithic antler spoon with an elk head from Shamanka II grave 59 (2005).

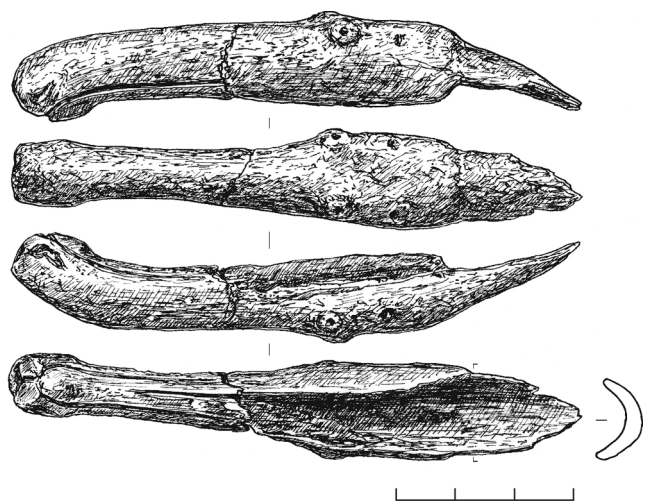


Fig. 12. Early Neolithic elk head sculpture from Shamanka II grave 62 (2005). The specimen is incomplete and may have been the handle of a spoon.

from antler that were identified only to the family level (Cervidae)—at least some of these items are potentially elk antler. Second, relative abundances of faunal remains in graves may not reflect well human dietary patterns. Many factors shape what animals and their body parts were utilized in such contexts, not just dietary patterns.

Stable isotopic studies of human bone collagen at Shamanka II and Lokomotiv circumvent this issue to some extent, but these methods cannot identify specific animal species in diets in most cases. For example, stable isotope values of modern deer from the Baikal area are overlapping (Weber et al., 2011), meaning that the extent of reliance on individual species cannot be determined. These stable isotope data make it clear, however, that diets at both cemeteries consisted of significant amounts of aquatic fauna, most of which was likely fish. At Shamanka II, all dated burials with elk imagery were from the first phase (phase 1) of cemetery use. The mean  $\delta^{13}\text{C}$  value for the phase 1 individuals ( $n = 99$ ) is  $-16.7 \pm 0.71\text{‰}$  and the  $\delta^{15}\text{N}$  mean value is  $14.7 \pm 0.98\text{‰}$  (Weber et al., 2016b). These values seemingly represent diets consisting of a mix of riverine and lakeshore fish with game (deer) (Weber et al., 2016b). At Lokomotiv, the mean  $\delta^{13}\text{C}$  value for the 72 analyzed Early Neolithic individuals is  $-15.7 \pm 0.8\text{‰}$  and the  $\delta^{15}\text{N}$  mean value is  $14.1 \pm 0.7\text{‰}$ , again interpreted as indicating diets rich in both fish (local Angara fish

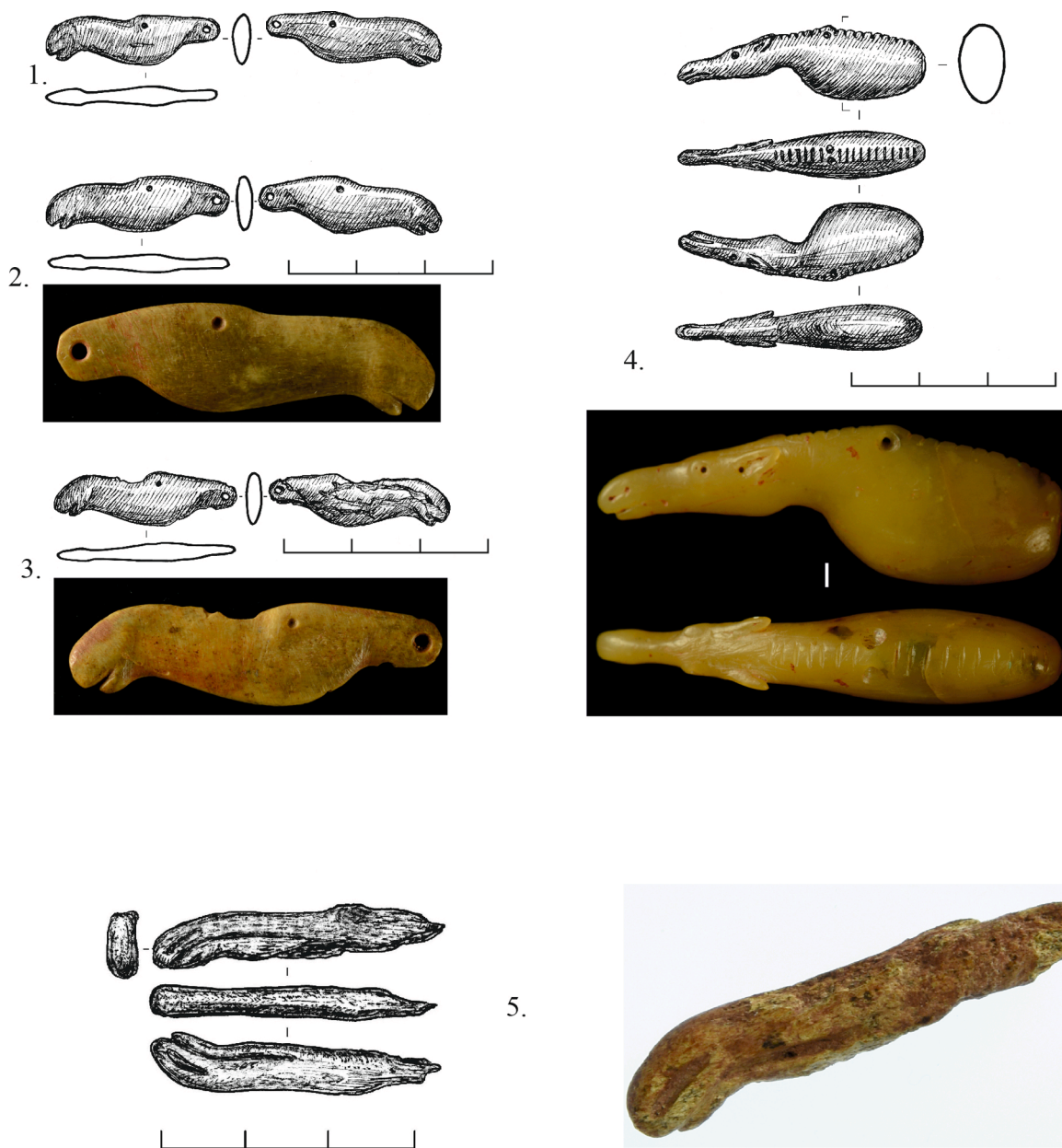


Fig. 13. Early Neolithic elk head pendants from Shamanka II grave 78 (2006): 1, 2, and 3 are bone and 4 is talc. Item 5 is an antler elk head sculpture from Shamanka II grave 115 (2019). The object is eroded and incomplete.

and some moving into the river from Baikal) and game (Weber et al., 2011).

The only other cemetery on the Angara with detailed faunal information and stable isotope data is Ust'-Ida I. This site is about 120 km downstream of Lokomotiv (still within the upper Angara Valley) and has graves from both the Late Neolithic and Early Bronze Age (Fig. 1) (Bazaliiskii, 2010; Tiutrin and Bazaliiskii, 1996). Elk constitute 14.8% of the identified ungulate remains from its Late Neolithic graves (Table 3), but all were incisor pendants found in a single grave (#20) (Losey et al., 2017b). The same pattern is present in the Early Bronze Age graves, where 44% of the identified ungulate remains were elk, again all incisor pendants from a single grave (#3). Clearly, the faunal assemblages at Ust'-Ida I are relatively small and should be cautiously interpreted. As at Shamanka II and Lokomotiv, many antler implements were present at Ust'-Ida I and some could be from elk. Notably, 17 atlas vertebrae from large deer (elk or red deer) were found in upper portions of at least 9 Late Neolithic graves at the site. These remains were not included in the

Table 3 data as they were not clearly placed in the graves with the buried individuals. However, radiocarbon dating suggests these atlas vertebrae are contemporaneous with the burials, perhaps parts of rituals that immediately followed interment of the bodies (Losey et al., 2017b). Finally, stable isotope data is available for 30 Late Neolithic adults as well as 11 adults from the Early Bronze age (Weber et al., 2011). The Late Neolithic individuals have a mean  $\delta^{13}\text{C}$  value for of  $-17.9 \pm 0.7\text{‰}$  and their  $\delta^{15}\text{N}$  mean value is  $11.7 \pm 0.8\text{‰}$ . The Early Bronze Age mean  $\delta^{13}\text{C}$  value is  $-18.7 \pm 1.3\text{‰}$  and the  $\delta^{15}\text{N}$  mean value is  $11.3 \pm 1.0\text{‰}$ . These data suggest less fish consumption than at Shamanka II or Lokomotiv, but still a substantial aquatic component in the diets.

Additional human stable isotope data from the upper Angara valley is available for a handful of adult individuals, all found upstream on the river from Ust'-Ida I (Weber et al., 2011). These include three Early Neolithic individuals and one Early Bronze Age individual from Ust'-Belaia, and a single Early Neolithic individual from Kitoi. The Early Neolithic individuals' isotope values are consistent with a diet similar to

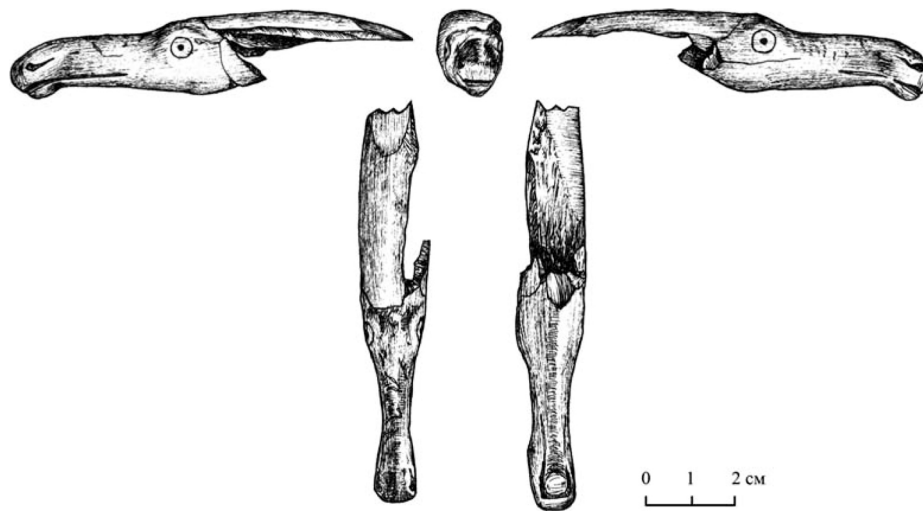


Fig. 14. Early Neolithic elk head sculpture from Fofanovo grave 11 (1991). The object is incomplete.

that at Lokomotiv, while the Early Bronze Age individual's values are similar to those at Ust'-Ida I. In other words, all have substantial aquatic components to their diets, but the Early Bronze Age individual was less reliant on such foods.

Perhaps more informative about the relative importance of elk on the Angara is the structure of habitation site faunal assemblages. Two sites from upper Angara, Ust'-Khaita and Gorelyi-Les (Fig. 1), have published faunal assemblages (Table 3), both with well-dated components from the Mesolithic through Early or Middle Neolithic periods (Losey et al., 2017b; Savel'ev et al., 2001). Elk account for less than 1% of the ungulate remains found at the sites; roe deer and red deer overwhelmingly dominate the assemblages. Only along the lower Angara River—north of Bratsk at the western margin of Cis-Baikal—are elk relatively abundant in habitation site faunal assemblages. For example, elk constituted ~45% or more of the identified ungulates at the Ust'-Keul I, Ostrov Listvenichnyi, and Ust'-Edarma II (Fig. 1) habitation sites (Table 3) (Klement'ev, 2012, 2014). Any one of these sites has more elk remains than those found in all other sites in Cis-Baikal combined.

In the Priol'khon'e area on the west shore of Baikal (Fig. 1), ungulate remains of any kind are relatively small components of habitation site faunal assemblages—all are dominated by remains of fish or Baikal seal (Nomokonova and Losey, 2017; Nomokonova et al., 2017). Elk are very minor components of the identified ungulate remains at these sites, with only seven total specimens being present here from the entire Holocene (Table 3). Among the cervids, roe deer and red deer clearly predominate. As mentioned earlier, the two cemeteries in this region with well-analyzed faunal assemblages, Khuzhir-Nuge XIV and Kurma XI, also have only trace quantities of elk remains, while those of roe deer are relatively abundant (Table 3) (Nomokonova and Losey, 2017).

Human stable isotopes values in the Little Sea region of Priol'khon'e, the vast majority of which are from the Early Bronze Age, fall into two general patterns, one in which diets are primarily terrestrial game and fish, and the other game, fish, and Baikal seal (Waters-Rist et al., 2021; Weber et al., 2011; Weber and Goriunova, 2013; White et al., 2020). On the upper Lena River, human stable isotope values (mostly from the Late Neolithic and Early Bronze Age) tend to have lower  $\delta^{15}\text{N}$  and  $\delta^{13}\text{C}$  values than in any other region of Cis-Baikal, indicating less aquatic foods in diets (Weber et al., 2016a; White et al., 2020). Again, however, these isotope results cannot indicate which specific ungulates were contributing to the diet, and no faunal data is available for the upper Lena that might help to resolve this issue.

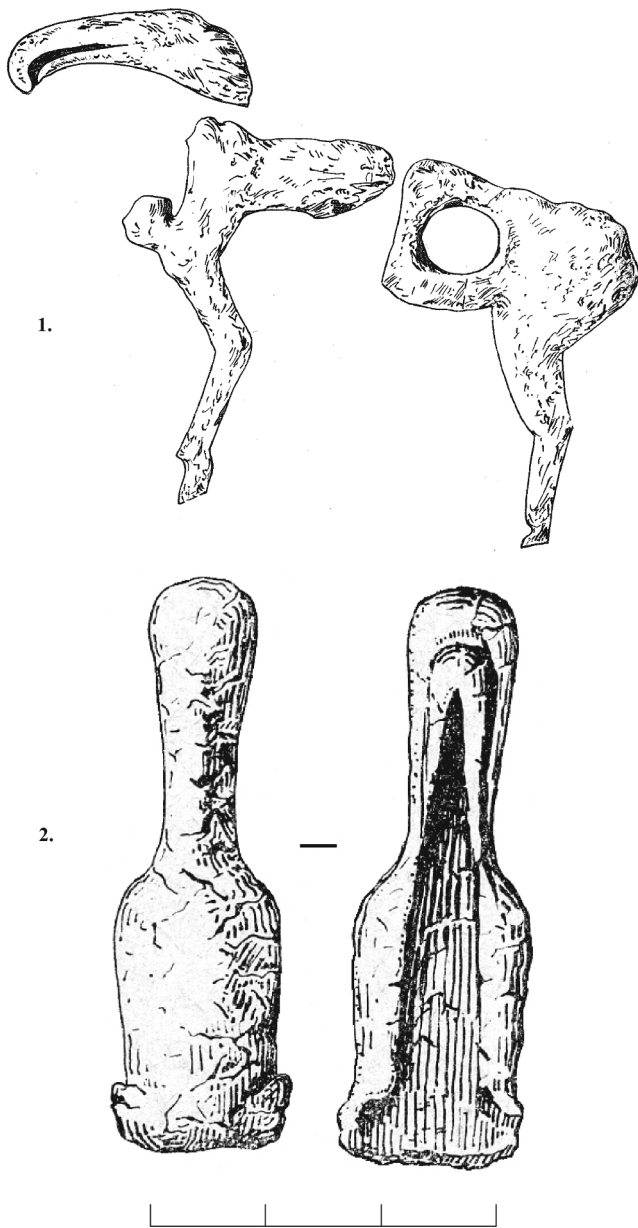
Finally, aurochs were utilized by the Middle Holocene people of Cis-Baikal, albeit rarely, and these likely were larger bodied animals than elk. While we are unaware of body mass estimates specifically for

Siberian aurochs, those for recent European aurochs suggest body masses >600 kg (De Esteban-Trivigno and Köhler, 2011). As mentioned, the upper fill of nine Early Neolithic graves at Ust'-Ida I contained remains of bovines and equines, including eight bovine atlas vertebrae and a fragmented crania of an aurochs (Losey et al., 2017b). Two of the bovine atlas vertebrae are directly AMS radiocarbon dated to the Late Neolithic (Losey et al., 2017b:48-9). A few bovine remains were also found in the Mesolithic and Early Neolithic layers at Ust'-Khaita and Gorelyi-Les, and these too are likely from aurochs (Losey et al., 2017b:31, 38). In addition, aurochs remains have been found on the Priol'khon'e shoreline of Lake Baikal at the Bugul'deika II habitation site, where they are directly dated to the Middle to Late Neolithic transition (Losey et al., 2016).

### 3. Discussion

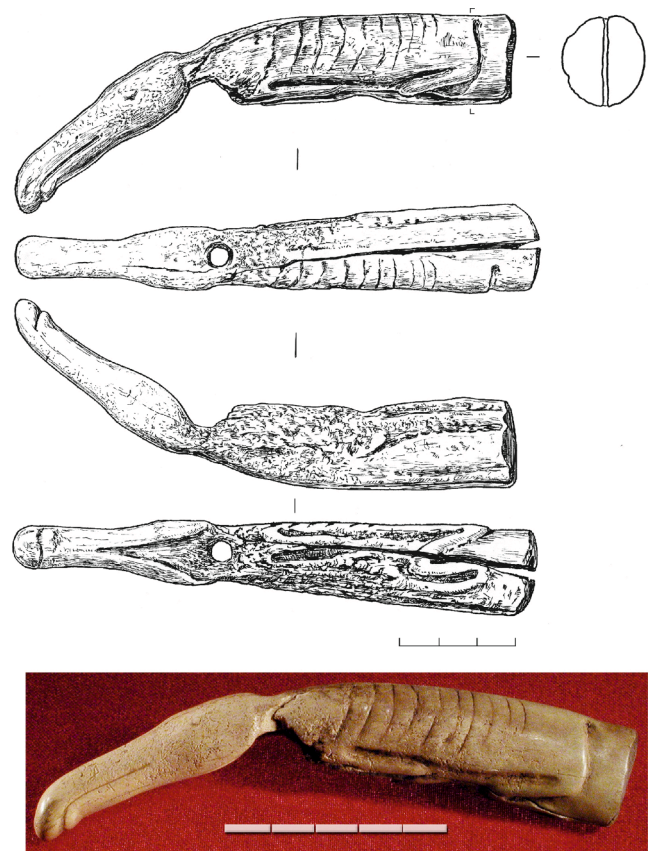
Several proposed explanations for the relative ubiquity of elk imagery in Middle Holocene Cis-Baikal probably should be dismissed. First, the Priol'khon'e and upper Angara River areas show little evidence that elk were a dietary staple during the Holocene. Elk are very small components of the ungulate faunal assemblages in these regions, and stable isotopic studies show diets were generally rich in aquatic foods. On the Angara, elk perhaps increased in relative dietary importance to the northwest (downstream). As one moves downstream, the forests become more truly boreal and open landscapes are increasingly rare. This may have favored elk relative to roe deer and red deer, the latter more often utilizing open habitats. The extent of use of elk on the upper Lena is less clear, but one might expect that it also increased as one moved downstream (generally to the north). Overall, however, the dominance of elk imagery in Cis-Baikal, particularly along the upper Angara River, cannot be closely linked to a dietary dependence on these animals. If animal imagery mirrored dietary importance, we would likely see fish, seals, roe deer, and red deer dominate the region's imagery, particularly in the Upper Angara and Priol'khon'e regions (some fish and seals are present, but they are never numerically dominant). Finally, elk were not the largest animals utilized in Priol'khon'e or the upper Angara valley. Aurochs were exploited well into the Neolithic, as were other large bodied animals such as wild equids, but neither is well-evidenced in the region's Middle Holocene imagery. Elk's large body sizes seem a poor explanation for the dominance of these animals in local imagery.

Other earlier interpretations of the imagery seem well supported. First, the arguments that the elk imagery depicts a female entity or "animal mother" cannot be easily refuted. The defining visual traits of male elk, their antlers, are seemingly absent from all portable imagery

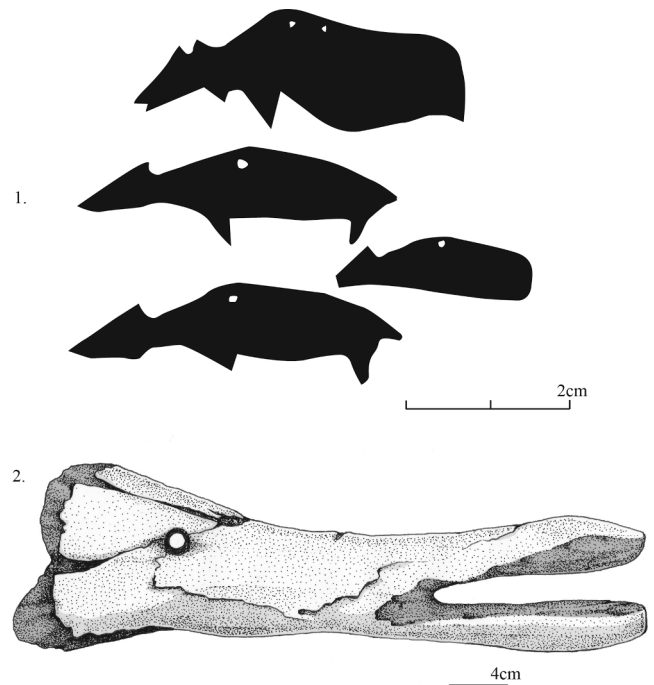


**Fig. 15.** Item 1 is an Early Bronze Age elk sculpture from Ust'-Uda grave 5 (1936). No scale was provided in the original illustration, but estimated length is 20–25 cm. Item 2 is a possible elk head sculpture (spoon fragment?) from Ust'-Uda grave 5 (1956). From [Okladnikov \(1975: 298, 310\)](#).

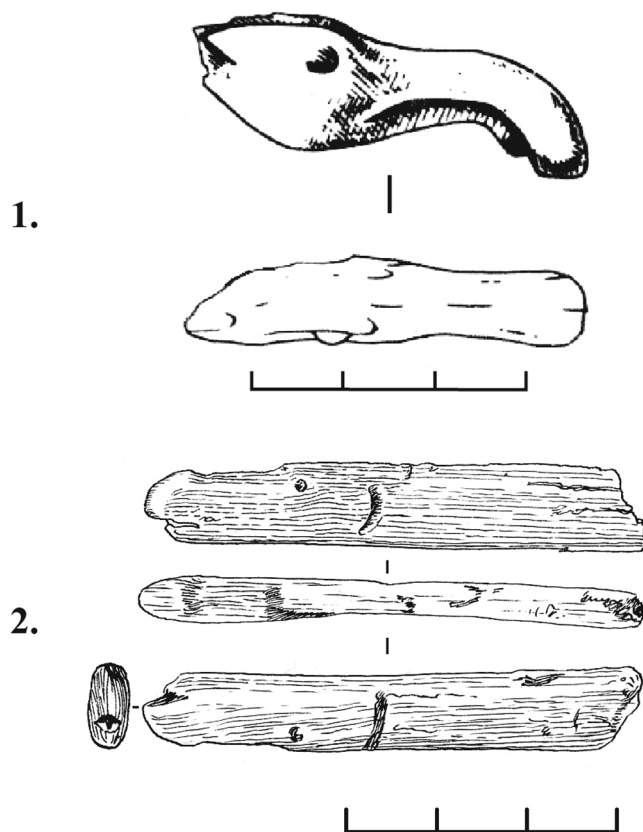
described here. Note, however, that many of the Early Neolithic elk heads have knob-like projections on their foreheads. It is at least possible these represent pedicles (the attachment point for antlers on the skull) or antlers. In both cases, however, two pedicles or antlers would be expected, not one, and they should be found between the eyes and ears, not on the midline of the forehead. If these features do not represent antlers or their pedicles, it seems reasonable that the images connote a female being. If they are representations of pedicles or antlers, then the elk images may still represent a generative force or being. Antlers are an overt sign and form of regeneration in elk—in males they grow every year, often to incredible size, and are lost in winter, only to regrow again in the spring. Second, Jacobson-Tepfer's (and in places also Okladnikov's) assertion that the Angara River rock art elk imagery is linked to rivers and funerary rites also appears well supported. We cannot yet link the imagery to the easterly direction, which she also proposed, as information on imagery orientation is largely unavailable. Regardless, all



**Fig. 16.** Early Bronze Age handle for a bronze knife from Gorodishche II grave 4 (1997). The handle is carved in the form of the full body of an elk with an enlarged head and drooping nose. The bronze blade was also present but is not shown here.



**Fig. 17.** Early Bronze Age zoomorphic items from Shumilikha: 1) flat bone pendants from grave 2 (1977); 2) elk (?) head sculpture carved from a tibia of a woolly rhinoceros in grave 38 (1972). Redrawn from [Okladnikov and Kono-patskii \(1984:23\)](#) and [Goriunova \(2002:55\)](#).



**Fig. 18.** Item 1 is an Early Bronze Age elk head sculpture fragment from Ulan-Khada IV. Redrawn from Komarova and Sher (1991:37). Item 2 is an Early Bronze Age elk (?) head sculpture from Verkholensk. Redrawn from Okladnikov (1978:11).

portable elk imagery described here is from human graves. In fact, we are aware of only a single object from a regional habitation site that is claimed to be an elk, that from Ust'-Edarma II (Fig. 1) (Lokhov and

Dudarek, 2012; Ponomareva and Taçon, 2019). This zoomorphic sculpture appears to date to the Mesolithic, and is in our opinion not clearly an elk depiction. It lacks the prominent drooping nose seen in nearly all other regional elk imagery and has no other traits to link it to elk. Regardless, elk imagery is present in multiple graves, and these and virtually all other Middle Holocene graves are found near bodies of water. All of Cis-Baikal's Middle Holocene elk rock art is also found along bodies of water (Fig. 1). Mortuary practices, water, and elk are clearly associated with one-another.

We also see little grounds for critiquing Ponomareva and Taçon's (2019) premise that the Angara style elk imagery is tied of identity making and marking. As they described, the Early Neolithic mobiliary elk imagery has a distinct form characterized by naturalistic and alert looking heads, seemingly without antlers. Naturalistic whole elk bodies, or occasionally just their heads, also characterize the Angara style rock art imagery, which likely dates at least to the Early Neolithic. In contrast, mobiliary Early Bronze Age elk imagery is more abstract, to the point where some items are not clearly depictions of elk, and whole bodies are sometimes present. Ponomareva (2016) documented a change towards more abstract forms in the Angara's elk rock art imagery following the period of naturalistic imagery production (i.e., after the Early Neolithic). As described earlier, multiple forms of archaeological evidence from Cis-Baikal indicate a cultural and genetic discontinuity between the Early Neolithic and later forager groups in the region. The differences in elk imagery from the Early Neolithic to the Early Bronze Age (and perhaps also the Late Neolithic, which is poorly presented on the Angara) in all likelihood are linked to the clearly different identities of their makers. Notably, the fate of Cis-Baikal's Early Neolithic population is unclear. It is possible that the Middle Neolithic involved emigration of at least portions of Cis-Baikal's forager populations to other regions. Such population movements might help explain the apparent dispersals of the Angara style elk imagery to the north and west as described by Ponomareva and Taçon (2019). These ideas, however, require additional supporting evidence, which is beyond the scope of this study.

Moving beyond these general observations, Table 1 shows that the 23 Early Neolithic elk items were always found with adults (where such determinations could be made), and eight were found with males, three

**Table 3**

Summary data for cervid remains from habitation sites and cemeteries in Cis-Baikal. Data from Losey and Nomokonova (2017) and Klement'ev (2012, 2014).

Cemeteries	Period	<i>Alces alces</i> NISP/%	<i>Capreolus pygargus</i> NISP/%	<i>Cervus elaphus</i> NISP/%	Other ungulates NISP/%	Total NISP
<i>Upper Angara-Southwest Baikal regions</i>						
Ust'-Ida	Late Neolithic	24/14.8	10/7.2	105/82.0	23/16.7	138
Ust'-Ida	Early Bronze Age	11/44.0	0/0.0	7/28.0	7/28.0	25
Lokomotiv	Early Neolithic	0/0.0	13/5.1	109/43.8	131/51.8	253
Shamanka II	Early Neolithic	62/9.1	149/21.8	350/51.1	124/18.1	685
<i>Priol'khon'e region</i>						
Khuzhir-Nuge XIV	Early Bronze Age	8/3.7	18/8.3	187/87.0	2/0.1	215
Kurma XI	Early Bronze Age	0/0.0	9/3.6	244/96.4	0/0.0	253
<b>Habitation Sites</b>						
<i>Lower Angara region</i>						
Ostrov Listvenichnyi	Mesolithic	106/44.7	119/50.2	12/5.1	0/0.0	237
Ust'-Edarma II	Mesolithic-Iron Age	454/46	251/25.4	74/7.5	209/21.2	988
Ust'-Keul' I	Mesolithic	104/78.2	17/12.8	12/9.0	0/0.0	133
<i>Upper Angara region</i>						
Ust'-Khaita	Mesolithic-Early Neolithic	36/0.8	2656/62.2	1437/33.7	140/3.3	4269
Gorelyi Les	Neolithic	0/0.0	220/81.8	45/16.7	4/1.5	269
<i>Priol'khon'e region</i>						
Bugul'deika II	Mesolithic-Iron Age	0/0.0	21/14.4	64/43.8	61/41.8	146
Sagan-Zaba II	Mesolithic-Iron Age	5/0.9	220/38.1	81/14.0	271/47.0	577
Ityrkhei	Mesolithic-Iron Age	2/8.7	8/34.8	13/56.5	0/0.0	23
Ulan-Khada	Mesolithic-Iron Age	0/0.0	2/11.1	10/55.6	6/33.3	18
Tyshkine III	Neolithic-Iron Age	0/0.0	21/13.0	121/75.2	19/11.8	161
Tyshkine II	Neolithic-Iron Age	0/0.0	1/2.0	33/64.7	17/33.3	51



with females, and three with either males or females. In all cases, these objects depict only the heads of elk. Among the Early Neolithic items, just over half ( $n = 12$ ) are sculptures of elk heads (Table 2). These were found among clusters of other implements (perhaps placed in bags within the graves) or on or near the body. The four small elk head pendants were found in a disturbed grave, but it is possible they were worn on the body. The four spoons were not directly on bodies, but when found in undisturbed contexts were within clusters of implements, as were the two rod-like items and the incised antler arch at Shamanka II (which may also be an adornment). The elk head elements of all Early Neolithic items are no more than 5–6 cm long. They were discernable from only a few meters distance—these were likely items for personal use.

The ten Early Bronze Age items were also all found with adult individuals, but only two of these are sexed, both as males (Table 1). These include four pendants, three head sculptures, one knife handle, one possible handle fragment, and the flat sculptural object from Ust'-Uda. All but the large sculptural head from Shumulikha and the full body elk carving from Ust'-Uda are likely for personal use—they are relatively small and could have been pragmatically worn on the body or carried (Table 2). Notably, only the knife from Gorodishche II was found directly on a body. The other objects were in clusters of items near bodies or from unspecified locations. The Ust'-Uda full body elk image is a larger object, and given the hole in its body, could have been exhibited on a staff. The abstract Shumulikha head was also relatively large and potentially could have been used for larger-scale public displays, including mortuary rituals.

In Early Neolithic and Early Bronze Age graves, however, potential elk imagery is actually relatively rare. Only 23 Early Neolithic graves have produced elk imagery, while 246 graves in Cis-Baikal are now assigned to this period (Weber et al., 2021). In the Early Bronze Age, these items are scarcer, with only 6 of 470 such graves having elk imagery. These figures should be viewed cautiously. As mentioned earlier, numerous Middle Holocene graves were excavated in Cis-Baikal in the first half of the 20th century by Okladnikov and his colleagues, and many were not directly dated and some are now lost. Regardless, portable elk imagery appears somewhat more widespread in graves from the Early Neolithic than in the Early Bronze Age, but overall was never commonplace—even in the Early Neolithic it was present in less than 10% of graves. Why the portable imagery has only been found with this limited set of individuals is unclear but could relate to aspects of their identities—their statuses, roles as ritual specialists, kinship with human and non-human persons, and so on. Unfortunately, we cannot yet directly assess these possibilities.

To better understand the meaning of elk to the Middle Holocene peoples of Cis-Baikal requires further steps, including contemplating elk behavior and models of the cosmologies and ideologies of Eurasian foraging groups. Elk's largely solitary lives and occasionally confrontational behavior likely stood in contrast to most other large mammals of the region, particularly those regularly used as sources of food. Red deer and roe deer, by contrast, are far more gregarious animals, and it seems likely that local equids and aurochs also were relatively social. Most of the rock art and all of the mobiliary imagery seemingly depicts female elk or male elk who have recently lost their antlers, and this also should not be overlooked. Like most previous scholars, we are inclined to link this pattern to reproduction and regeneration. In other words, the elk images potentially embody a generative entity or force. Conceivably, however, females of many other species could have held such roles, particularly those that served as regular food sources—they literally gave people life on a daily basis. Further, male red deer also annually grow massive antlers. In other words, elk are no more successful at reproduction than roe deer and red deer, and they are not the only species to grow impressive antlers, so these biological traits alone cannot fully explain the focus on elk.

We suspect that one of the most critical behavioral traits of elk was their use of aquatic habitats. As mentioned, elk sometimes feed on

aquatic vegetation, plunging their heads beneath the water, and they occasionally also swim and dive. As far as we are aware, no other large 'terrestrial' mammal in northern Eurasia shares these behaviors. Elk have the ability to cross a fundamental boundary, that between terrestrial and aquatic. This is in effect similar to the abilities of burrowing animals, which can move between the surface world and that of the underworld, or even diving birds, which can fly but also descend below the water surface. In other words, they possess qualities that allow them to be liminal beings with the ability to occupy or move across boundaries or thresholds.

This brings us to models of Eurasian forager cosmologies and ideologies. The most widely applied such model in northern European archaeology was developed by Zvelebil (1993, 1997, 2003a, 2003b, 2008); Zvelebil and Jordan, 1999). His model is based upon multiple ethnographies of forager and reindeer herding groups from northeast Europe and northwest Siberia. While we find his model both convincing and applicable, we are aware that there has been longstanding critique of the use of the direct historical approach or ethnographic analogy in archaeology (c.f., Wobst, 1978). Currie (2016) has provided a useful summary of such critiques (and more recent ones), arguing that two key issues are at work: 1) that ethnographic data itself is considered time-limited and unrepresentative of even contemporary variability; 2) that cultural and society are thought to be too labile to be used in a historically comparative manner. While these critiques have some valid points, Currie (2016) found nothing whatsoever to warrant outright dismissal of ethnographic analogies. In fact, he argues that ethnographic analogy in archaeology is just another comparative approach, similar to that used in many other sciences, including biology. He ultimately suggests that the applicability of such analogies needs to be evaluated on a case-by-case basis. Doing this involves careful scrutiny of ethnographic data and taking into account whether such lines of evidence converge with other forms of insight on the questions investigated.

Zvelebil avoids some of the potential biases involved with using ethnographic data by constructing his model using multiple sources from several different groups. This reduces the likelihood that the views of a few individuals dominating insights on any particular topic. He argues that the employment of such ethnographic data is also warranted due to a level of continuity between the Mesolithic groups of Northern Europe and the ethnographically-known societies he references (Zvelebil, 2008:42). Further, these groups shared similar ecologies and many elements of their economic systems. For Cis-Baikal, we cannot demonstrate a direct historical link between the Early Neolithic or Early Bronze age peoples and any specific current social group. Links to groups to the north and west would not be unexpected, however, given the apparent dispersal of the region's Early Neolithic rock art traditions in these directions. Further, Cis-Baikal is a boreal region, albeit a more southerly form of this environment than focused upon by Zvelebil.

The question of the stability or lability of social and cultural traits is harder to evaluate. Perhaps the best supporting evidence that elements of Zvelebil's model are long-standing is that they exist and persist far beyond his area and period of interest. For example, the practices of reciprocal acts of reverence and deference to hunted animals are widespread across much of the circumpolar North, including in North America (c.f., Ingold, 1986). The same can be said for the notion that the cosmos consists of a series of tiers or planes (see below). In fact, many elements of Zvelebil's model appear to be present across multiple groups in the north, suggesting the possibility for shared and resilient ideologies with roots that potentially extend back into the Pleistocene.

Several features of Zvelebil's model (with other details added here) appear relevant to the Middle Holocene archaeology of Cis-Baikal, including its elk imagery. First, Zvelebil argued that many northern Eurasian groups knew the cosmos to be composed of three tiers, namely the upper sky world, the middle or earth plane, and the underworld; these correspond to air, land, and water (Zvelebil, 2008:43). The tiers are linked by a pillar or cosmic river, and the dead (their souls) often travel to the underworld via boats. Second, humans and many other

beings (including animals) possess souls, with their character and number being variable. These endure after the life of the being, and some cycle through the cosmos, moving to the underworld and then potentially back to the tier of the living to constitute a new being (c.f., Ingold, 1986; Willerlsev, 2007). Third, spiritual leaders (shamans) mediated in issues related to the tiers of the cosmos. This was achieved in part by spiritual helpers, often in animal form, with the most common being aquatic birds, bears, deer, or elk. Regarding such elk helpers or agents, Zvelebil (2008:44) stated that, “elk play a central role in the myths of revival and regeneration, as well as a role in the mediation between the world of spirits and of humans”. Okladnikov referenced aspects of all three of these features in some of his general interpretations of Siberia’s rock art (Okladnikov, 1955: 323, 1950: 289, 292).

This ideological and cosmological model converges with many elements of Cis-Baikal’s Middle Holocene archaeological patterning. First, many scholars have already shown that elk were a major focus in imagery in the Middle Holocene. Bears also were significant animals. At the Shamanka II cemetery, for example, the heads of bears received special attention, being placed in the upper portions of at least 35 Early Neolithic graves (Losey et al., 2013a). Some were from butchered animals, remains of which there then afforded burial in the cemetery, in many ways paralleling the treatment given bears among many recent northern societies, including those referenced by Zvelebil. Aquatic birds also seem to have been important to the region’s Middle Holocene societies, with remains of these birds being relatively common in the Early Neolithic graves at Shamanka II and Lokomotiv and the Late Neolithic graves at Ust’-Ida I; remains of birds of prey are also common in these contexts (Losey et al., 2017b). The aquatic bird remains were most often modified into implements such as needle cases, but occasionally just the beaks of geese, mergansers, loons, bitterns, and cranes were found in the graves; their purposes and meanings are unknown.

The ensoulment of people and animals in Cis-Baikal is potentially evidenced in their mortuary treatments. Some dogs from this region were given mortuary treatments like those provided to humans during the Middle Holocene (Losey et al., 2011; Losey et al., 2013b). As mentioned above, bear heads were also sometimes distinctly treated in mortuary contexts. In both cases, we argued these animals were considered other-than-human forms of persons. Further, these beings required funerary rites because they had enduring essences or souls that needed to be properly *sent* to their afterlives—they were not just resources or food items. The best evidence humans also possessed such souls is also their burials, many of which were well equipped with ornaments and implements such as knives, fishing equipment, and weaponry. Even the famously cynical Hawkes, who considered ideologies one of the most difficult aspect of past societies to reconstruct, stated that burial accoutrements indicated an understanding of life after death (Hawkes, 1954:162).

Cis-Baikal’s Middle Holocene cemeteries and elk imagery are all found near bodies of water. This ties in with the notion that a cosmic river or other bodies of water linked (or provided openings to) the tiers of the cosmos for these groups, potentially allow passage of the souls of the dead to the underworld. This is not a novel proposal, as it has already been offered as an explanation for the placement of cemeteries near bodies of water in parts of Siberia and northern Europe (e.g., Bolin, 2000; Conneller, 2011; Martynov, 1991:40; Okladnikov, 1955: 323; Zaika, 2003a,b), and the location of some rock art panels with abundant elk imagery (and boats with elk-head prows) in northern Fennoscandia (Bolin, 1999, 2000, 2010; Helskog, 2004; Lahelma, 2007). Linking cemeteries, water bodies, elk, and boats is more challenging in Cis-Baikal. Boats seem to appear in the rock art of Cis-Baikal only during the Bronze Age, and even then are rare (Kulikova, 2014; Ponomareva, 2016). To our knowledge, none of the boats have prows with elk heads, as seen in western Siberia and parts of northern Europe (Bolin, 2000; Lahelma, 2007; Kulikova, 2014; Zaika, 2003a). Generally, elk are not associated with boats in this region.

If Cis-Baikal’s elk imagery indicates a liminal force or being, then the presence of elk imagery in graves and along the region’s rivers is somewhat predictable. This elk being potentially was a vehicle or assistant in traversing the tiers of the cosmos—it had the ability to cross such boundaries. Specifically, it could have assisted in the travel of souls to the afterlife, carrying or directing them downstream to the underworld. The placement of elk images along the banks of the Angara seemingly invoked this being’s assistance in such sending of souls, as did the interment of elk images in graves. Some of the portable imagery, particularly that from the Early Bronze Age, was large enough to have been used in relatively large social events, including mortuary rites—where the dead were mourned, remembered, but also sent on their cosmological journeys.

As a generative force or being, elk were more than conduits or guides to the underworld, also potentially offering life. Many of the portable elk items discussed were seemingly for everyday personal use—pendants, spoons, knives, and figurines. They were worn, used to feed oneself, and of course handled and considered. They were perhaps reminders of such a generative being or force, but also a way of invoking its affects. Employing such an object potentially called such generative forces into action for the user and their group. The strength, ferociousness, and energy of the elk being passed to these people, helping to ensure their wellbeing. This elk being was perhaps even regenerative, aiding in the return of souls from the underworld to the tier of the living. Additional details on the orientation of elk images in rock art along the Angara might be particularly telling in regard to this proposal. If the images were oriented both upstream and downstream, perhaps these beings traversed the tiers of the cosmos in multiple directions.

#### 4. Conclusion

Integrating various forms of archaeological evidence can generate significant insights on a region’s past, providing new understandings of site locations, imagery, and even cosmologies and ideologies. At the same time, such efforts quickly reveal gaps in knowledge, which are research outcomes in their own right. In Cis-Baikal, information on mortuary practices, subsistence, and even imagery is noticeably uneven. For example, the Early Neolithic on the upper Angara and south Baikal is relatively well studied, while the Late Neolithic is poorly represented along the entirety of this river. Other portions of Cis-Baikal, such as the upper Lena, do not yet have a single well-described habitation site. This unevenness hinders our ability to interpret the region’s imagery, but also other important aspects of local prehistory, including prominent issues such as gaps in the mortuary record and population movements through Siberia.

Additional study of the Angara’s rock art could be highly beneficial, although this will have to rely upon previous investigators’ curated notes and photographs—the imagery is now flooded and likely destroyed. Further information on elk image orientation is needed—many of the elk seem to be facing to the right, but it is unclear if this is upstream, downstream, or both. Efforts could also be made to directly date burials with elk imagery that currently lack radiocarbon dates. Just as important, Cis-Baikal also has a wealth of other portable imagery, particularly from the Early Bronze Age, which has seen little interpretation or integration with other forms of archaeological data. The growing wealth of data on Cis-Baikal’s Middle Holocene archaeology renders this imagery even more suitable for detailed study. As with the elk imagery discussed here, efforts to these items to patterns in subsistence, cemetery location, and cosmologies and ideologies are likely to be fruitful.

Finally, comparisons could be made between the Cis-Baikal elk imagery and that from northern Europe, particularly its mobiliary objects. For example, multiple elk head staffs have been found in northern Europe, which also seem to be represented in some Fennoscandia rock art sites (e.g., Bolin, 1999; Mantere and Kashina, 2020; Kashina and Zhulnikov, 2011; Zhulnikov and Kashina, 2010). The elk head staffs

seem considerably larger than most of the Cis-Baikal elk head portable imagery, and some have been found in habitation sites, not just graves. Regardless, careful comparisons potentially could reveal some similar contexts of use and related meanings, particularly when examined in light of other aspects of that region's archaeological record.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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