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Dogs were domesticated in the Arctic: Culling practices and dog sledding at Ust'-Polui

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ABSTRACT

Domestication has particular salience in archaeology, and numerous recent theoretical papers describe this process as a set of evolutionary, ongoing, social, and material relationships between humans and select other species. In contrast, analytical papers on the domestication of dogs nearly always involve a search for their origins as marked by changes in genes and morphologies. This article explores this contrast through the examination of dog remains from the Iron Age Ust'-Polui site in the western Siberian Arctic. Many of the numerous dogs represented at this site were killed and probably consumed when young, likely as part of sacrifices. Others at the site were intentionally buried. Ust'-Polui also contains abundant evidence of advanced dog sledding, including probable harness parts and portions of several complex sleds. Sacrificing and otherwise killing dogs is a domestication practice, as these activities are a form of selective breeding. Domestication of dogs at Ust'-Polui and elsewhere is more than selective breeding, as it is enabled and dependent upon specific landscapes, built things, and other species. At Ust'-Polui these at a minimum included a rich local environment, sleds and harness swivels, and freshwater fish, all of which intertwined in making the particular domestic relationships at the site possible.

1. Introduction

The study of domestication is widely acknowledged to be of fundamental importance in archaeology (Kintigh et al., 2014), but the ways in which it is studied and described are highly variable. Many recent definitions of animal domestication argue that one of its most identifying features is influence upon or control of animal breeding over multiple generations resulting in genetic, morphological, developmental, and behavioral changes in those animals (Clutton-Brock, 2012; Larson and Burger, 2013; Russell, 2011; Zeder, 2015). In mammals, this pattern has been referred to as the domestication syndrome (Wilkins et al., 2014). Correspondingly, many archaeological papers explicitly analyzing animal domestication focus on the emergence of changes in the genes and skeletal morphologies of past animals thought to be the outcomes of changes in the selection process. Animal domestication in such approaches is in effect examined as the evolution of an ecotype or a form of initial speciation caused by our intervention in animal reproduction—the bodily outcomes of domestication are of interest.

The selective breeding of domestication can be carried out in many ways. Perhaps the most familiar form of selective breeding is pairing chosen males and females and allowing only them to reproduce by isolating or (in the case of males) castrating them. Many modern dog breeds of course developed through such highly restrictive practices over the past few centuries (American Kennel Club, 2006; Larson et al., 2012). Another approach (sometimes carried out in association with paired breeding) is to cull unsuitable individuals and their offspring. Culling patterns (demographic profiles) have long been used as evidence for initial domestication of some species, including in some cases where no morphological change is yet apparent (Bökönyi, 1969; Chaplin, 1969; Ducos, 1978; Hesse, 1982; Zeder and Hesse, 2000). Motivations for culling in the past were undoubtedly variable and not always undertaken with a specific evolutionary outcome in mind. As Larson and Fuller (2014:116) have recently stated, animal domestication has been "driven by selection pressures created by both unintentional and deliberate human actions". Animal sacrifice and other sorts

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of ritual slaughter are modern culling practices and part of the context for killing and consumption of domestic animals in many societies (Ingold, 1986:243; Russell, 2011:88–91). Culling can also be undertaken based on assessment of an animal's qualities for tasks such as hunting, herding, and transport. Coppinger and Coppinger (2016:181) term these latter processes "postzygotic selection", or the "favoring and supporting certain animals or culling individuals that are not wanted". Culling-based approaches to selection must shape evolutionary outcomes—they eliminate animals from the breeding pool—as do the more familiar domestication practices of paired breeding and castration.

At the same time, domestication clearly involves more than selective breeding and its bodily outcomes. By default, domestication is constituted by inter-species interaction (people and animals) occurring far beyond just the contexts of breeding, as domestic animals are at times fed, provided care, and otherwise socialized. Breeding alone does not ensure the perpetuation of domestic relationships. Many definitions of domestication in fact insist upon its multigenerational structure (Zeder, 2015; see Russell, 2011 for an extensive historical review of domestication definitions). Selective breeding of course can result in offspring that are easier for humans to be with. However, actual day-to-day interaction between people and animals, the experience of each other's dispositions, needs, capacities, and limitations, is also essential in carrying out our lives together. In other words, domestication is always a social process, not just a bodily one (Lien, 2015). Domestication is also dependent upon and enmeshed with various forms of material culture, landscapes, and suites of other organisms (Anderson et al., 2017; Loovers, 2015; Terrell et al., 2003). Working relations with domestic animals are perhaps most overtly dependent on and enabled by things such as harnesses, sleds, saddles, and food, the latter 'fueling' an animal's ability to engage in tasks. Even selective breeding itself can require things such as pens and tethers to limit or encourage animals' encounters with others. Tools such as knives are also used in domestication (even when strictly defined), in particular to cull or castrate individuals deemed unsuitable for reproduction.

Many scholars also now describe domestication as a mutualistic and co-evolutionary process where both humans and domestic animals (and plants) reshape environments and landscapes, and in turn are affected themselves by these changes, both in terms of their life histories and evolution (McClure, 2015; O'Connor, 1997; Smith, 2006; Zeder, 2016). Further, domestication is defined as an emergent or ongoing process rather than a threshold passed long ago with the first appearance of genotypic or phenotypic difference. Larson and Burger (2013:198) state that, "Because the evolution of domestic animals is ongoing, the process of domestication has a beginning but not an end". Such an understanding of domestication appears to be cognizant of the fact that the controls over breeding in place during the initial emergence of a domestic animal (and other aspects of these relationships) do not simply cease or radically transform once the animal is physically distinct from its wild counterparts. Put another way, there is no unequivocal point at which domestication ends and some other practices (such as husbandry or breeding) begin. Further acknowledgement of this perspective can be seen in the writing of scholars (e.g., Zeder, 2016) who discuss "initial domestication" in contrast to domestication in general, and describe organisms evolving closely with humans as "domesticates" rather than domesticated—something finished or complete. This is recognition of domestication as an unfolding relationship and not a discrete distant moment of accomplishment marked solely by bodily change—it is more than an instant of speciation. Overall, one can argue that archaeologists seem to no longer view domestication as a revolution, and that as such one can study these processes and relationships long after they first become apparent in bodily change.

However, if archaeology has truly embraced such understandings of domestication, why are recent archaeological studies explicitly on dog domestication (e.g., Germonpré et al., 2011; Frantz et al., 2016; Larson et al., 2012; Pionnier-Capitan et al., 2011; Thalmann et al., 2013, among many others) overwhelming dominated by research designed to understand the places and timing of dog origins and not on our subsequent 15,000+ years of life together? A noticeable disconnect persists between our domestication theories and how we analytically engage with these processes and relationships when we are dealing with dogs (and other animals). For example, why are we so interested in when dogs' heads first attained a certain shape or how often they interbred with wolves, but at the same time not investigating how selection was carried out, or when dogs began to regularly pull sleds, carry packs, hunt with us, and share our diseases and parasites? As a discipline we still seem to value some parts of domestication far more than others. Taking our own theories and definitions seriously requires some reconsideration of what counts as domestication research.

The Arctic is a compelling place to examine dog domestication. This region has never been proposed as an origin place for dogs, yet people and dogs have carried out lives together in parts of the Arctic for millennia. Dogs surely did not arrive in the Arctic ready-made for surviving its climate, particularly if they first originated from wolves in the far warmer climate of Southeast Asia (e.g., Pang et al., 2009; Savolainen et al., 2002; Wang et al., 2016). Grey wolves have evolved in relation to specific climates and environments (Gefen et al., 2004), and one should expect some such changes in dogs (Coppinger and Coppinger, 2016:212), who have lived with us in the Arctic for at least ~9000 years (Pitulko and Kasparov, 2017). It also seems unlikely dogs were always involved in the daily pulling of sleds or herding of reindeer, two of their iconic roles in some parts of the north. These practices probably also shaped their domestication, including their body conformations. For example, some modern northern dog breeds have body forms that make them far more efficient long distance runners than other breeds, presumably as a result of domestication (Bryce and Williams, 2017). Additionally, the deep histories of the material things (sleds, harnesses, whips, and so on) that enable such northern dog practices have seen very little systematic research in the Arctic. Perhaps most telling, even the word domestication is rare in archaeological papers on Arctic dogs (e.g., Brown et al., 2013, 2015; Morey and Sørensen, 2002; Morrison, 1984; Park, 1987; but see Pitulko and Kasparov, 2017), suggesting we still largely understand this ongoing process to have been achieved and completed outside the region.

This paper uses archaeological data from the Ust'-Polui site in the Yamal region of Russia to show how Arctic dog domestication practices can be investigated in new ways. Ust'-Polui has one of the largest assemblage of dog remains from the far north, making it ideally suited to this task. Further, it has a remarkable artifact collection that too informs about the unique forms of domestication practices present in this portion of the North. Regional ethnography is used in support of our interpretations of this remarkable material.

2. Setting and background

Ust'-Polui is located within the modern city of Salekhard at the confluence of the Polui and Ob rivers (Fig. 1). The site is at the western edge of high ground overlooking the floodplains of these two rivers, and the Polar Ural Mountains are about 50 km to the west-northwest. Today the local area is forested tundra, and open tundra is intermittently present just a few kilometers to the north. The northern border of the site is near a small creek and its western margin the bank of the Polui River (Fig. 2). Archaeological deposits were found extending ~130 m south from the creek and ~70 m east from the riverbank.

Most of the intact portions of Ust'-Polui appear to now be excavated, but substantial portions of the central site area were destroyed by modern construction. The first formal research was conducted at the site in 1935–6, and subsequent excavations occurred in 1946 (limited surface collection only), 1991, 1993–5, and 2006–2015 (Adrianov, 1936a, 1936b, 1936c; Fedorova and Gusev, 2008; Gusev and Fedorova, 2012, 2017; Moshinskaia, 1953, 1965). A small portion of the northeastern part of the site consisted of permafrost-preserved deposits that produced perishable items, including wood zoomorphic and