

# 1 Multispecies Northern Worlds

## Reimagining Human–Animal Relations in the Circumpolar North

*Erica Hill and Peter Whitridge*

DOI: [10.4324/9780429456947-1](https://doi.org/10.4324/9780429456947-1)

An increasing number of archaeologists are incorporating insights from human–animal studies into their reconstructions of the human past. Much of this work, like several chapters in this volume, begins with the basic data of zooarchaeology—the species present at a site, their proportional representation, and their depositional contexts. But the animals in these assemblages were much more than economic resources—they led active lives in the past—as agents, co-domesticates, co-workers, and companions; as deities, ancestors, and the spirits of the dead; as ritual helpers and scapegoats for illness or misfortune, and even as living spaces in the cases of whales ([Habu and Savelle 1994](#); [Patton and Savelle 2006](#)) and mammoths ([Pryor et al. 2020](#)). Animals also functioned in utilitarian terms, employed by humans to negotiate status and identity, to mediate gendered labor relations, and to manifest hunting prowess and political power. Often, the entangled lives of humans and animals involved oscillation between ontological subjectivity and objectivity, depending on the task, location, and social context. A nineteenth-century Inuit puppy might take the role of a lost human child, cuddled and petted as a member of the family, in the winter become a sled dog subject to the needs of a human caretaker, only to regain autonomy in the summer, scavenging and roaming at will; its fur might ultimately trim a parka.

This volume explores the entwined human and animal histories of the circumpolar North. Here, contributors ‘reimagine’ a more nuanced and multidimensional Arctic past co-created by humans and other animals. The chapters in this book address a host of northern animals, demonstrating that despite an often depauperate fauna, humans and animals led textured lives where distinctions among seals, or flatfish, or dogs mattered. Hunting sea mammals figures in several contributions (e.g., Whitridge, Hill, Desjardins and Hazell), highlighting the centrality of sea and ice to Indigenous adaptations in the North American Arctic. Charismatic species, such as bears and whales, have long attracted the interest of anthropologists, sometimes obscuring less salient species of insects, fish, birds, and mammals.

Muskrats, semiaquatic rodents (*Ondatra zibethicus*) broadly distributed across subarctic North America, were trapped and traded into the early twentieth century by many Athabascan groups across

Alaska and Canada ([Nelson 1986](#)). Muskrat were also valued as food and pelts for clothing and trade by Yupiit of Alaska ([Nelson 1899](#)). Like the whale ([Turner 1990](#)), the muskrat decided whether to enter the trap, which is itself a piece of complex technology that connects hunter and muskrat with gendered labor and the prospective agency of the grasses used to construct the trap. The fur of the muskrat became part of the parka—a multispecies masterpiece in which each animal plays a specific role. Forty muskrat make gifts of their skins so a human might benefit from their warmth, while the wolverine contributed a ruff and the caribou contributed a decorative trim ([Fienup-Riordan 2007](#)).

Each northern world discussed in this volume features a historically specific set of human–animal relations, like that represented by a muskrat parka. Chapter authors explore constellations of human–animal relations that are detectable archaeologically—for example, in caches ([Chapter 2](#), LeMoine et al.) or at offering sites (Salmi and Kjellström). Contributors also investigate animal representations, including fish in Mesolithic rock art (Mansrud, [Chapter 6](#)), birds in northwest Siberia (Nomokonova et al., Chapter 9), and whales on drill bows (Whitridge, [Chapter 3](#)) and boat seats (Hill, [Chapter 4](#)). While marine mammals are a common theme, northern inhabitants also paid considerable time and attention to ‘non-charismatic’ species, such as sculpins, benthic scorpaeniform fish, which were meaningful to Dorset people in ways we have not yet resolved. Archaeological sites, ethnographic accounts, and museum collections continue to yield rich material, narrative, and representational evidence with more to tell us. Below, we briefly discuss some broad animal categories relevant to the circumpolar northern past. This section is followed by the exploration of future prospects for work in multispecies archaeology, including new analytical techniques. We close this introduction with short summaries of the chapters in this volume.

## **Companions, Chattel, and Prey**

### ***Dogs and Other Domesticates***

Domesticates—particularly reindeer (Salmi and Kjellström, this volume), but also dogs, muskoxen, sheep, goats, and cows—have been critical to many northern peoples, including the Norse in the North Atlantic, Sámi of Fennoscandia, and Sakha agropastoralists of Yakutia. Archaeologists and geneticists are collaborating and using a variety of new techniques to distinguish species and date chapters of their coevolutionary trajectories. Relations between humans and domesticates in pastoralist societies appear to have required ontological adjustments, reflected in everything from living arrangements to mythopoeics. The Bronze Age Scandinavian longhouse, for example, created a shared life-space where the temporal rhythms of human and animal lives synchronized ([Armstrong Oma 2010](#)).

As recent publications demonstrate, the evolution and domestication of dogs continue to attract both popular and scholarly attention (e.g., [Dugatkin and Trut 2017](#); [Losey et al. 2018b](#); [Miklósi 2018](#); [Serpell 2017](#)). Much of that recent attention has focused on early dogs in Siberia ([Germonpré et al. 2017](#); [Pitul'ko and Kasparov 2016](#)) and their contributions to human colonization and settlement ([Ní Leathlobhair et al. 2018](#)). The roles of dogs in northern cultural adaptations are incredibly varied ([Pasarić and Warren 2019](#)). Dogs assisted in herding ([Armstrong Oma 2020](#)) and hunting ([Laugrand and Oosten 2015](#): 152–153). They provided traction ([Ameen et al. 2019b](#); [Losey et al. 2018a](#); [Sheppard 2004](#); [Whitridge 2018](#)) and served as sacrificial victims ([Losey et al. 2018a](#)), companions in death (Hill 2018), and food sources ([McManus-Fry et al. 2018](#)).

Humans and dogs have lived together in the Arctic since at least the Late Pleistocene ([Perri et al. 2021](#)). The unique, often ambiguous positions occupied by dogs in many human societies and their status as the first domesticate have led to intense scrutiny of their genetics, osteology, and archaeological context, giving them particular salience in studies of prehistoric human–animal relations ([Germonpré et al. 2009, 2017](#); [Morey 2010](#); [Pasarić and Warren 2019](#); [Perri 2016](#)).

Dog traction enabled Inuit sea mammal hunters to colonize high latitudes and rapidly expand across the North American Arctic early in the second millennium AD ([Ameen et al. 2019a](#)). In exchange for provisioning, dogs assisted humans by pulling sleds, dragging watercraft upriver, and serving as pack animals. Human–canine codependence, however, did not ensure the well-being of Arctic dogs, many of whom suffered broken ribs, fractured skulls, and tooth removal at the hands of humans ([Losey et al. 2014](#); [Park 1987](#)).

Work by Kristin Armstrong Oma ([2016, 2020](#)) highlights the hybrid, mediating role of dogs in sheep herding societies, where dogs occupied an ambiguous ‘fringe’ position—neither wholly animal nor wholly human, but possessing features of both. Dogs also formed triads with humans and reindeer in Siberian pastoralist societies, where their status and roles shifted depending on task, training, and time of year ([Davydov and Klovov 2018](#)).

## ***Marine Mammals***

In the North Pacific, the North Atlantic, and much of the North American Arctic, marine mammals were keystone species in human subsistence. Today, whaling and cultural identity continue to be closely linked among Indigenous Alaskans and, increasingly, Canadian Inuit. Whaling also has a long history in Norway and the islands of the North Atlantic. There is strong evidence for North Atlantic whaling during the European medieval period; the practice may have originated as early as the sixth century AD ([Hennius et al. 2018](#)).

From an anthropological perspective, whaling is a compelling example of how cooperative hunting fuels status differentiation. Successful whaling favored the emergence of leadership. In Alaska, that leader was the *umialik*, the owner of the umiaq, or skin boat. An *umialik*, his wife, and family acquired surplus meat, as well as resources such as walrus tusks and hides. As whaling grew in significance, a set of beliefs and ritual practices developed that governed human relations with whales. Like other marine prey such as seals and walrus, whales were considered persons—sentient, agential, and capable of giving or withholding their bodies from humans. Relations with humans and whales differed based on sex and one's role in the hunt. The *umialik* and harpooner, closer to the whale than other crew members, wore special clothing and ornaments to please the whale. The *umialik*'s wife, who remained behind on land or ice, played a critical role in the whaling crew's success; her behavior heavily influenced the whale and thus the entire economy of the extended family. The example of whaling demonstrates the embeddedness of human–animal relations in the organization of (human) labor, social relations within and among families, and in ritual life and practice.

In some northern communities, walrus or bearded seals—rather than whales—were keystone species. Walrus (*Odobenus rosmarus*) offered ivory, a highly valued and versatile material intensively sought by Indigenous Arctic peoples, Norse, and later medieval traders ([Frei et al. 2015](#)). Demand for ivory conditioned both Indigenous and Norse interactions with walrus. In the western Arctic, acquisition and control of surplus walrus meat, hides, and tusks allowed some human individuals to gain status and prestige ([Bogojavlensky 1969](#)). Walrus were the subject of ritual elaboration on both sides of Bering Strait; like whales, they were considered agential persons ([Hill 2017](#)). The heads have been described as the focus of ceremonies among the Chukchi ([Bogoras 1907](#): 381) and Yupiget of Chukotka ([Krupnik and Ainana 2000](#)). Yet an alternative interpretation of these practices suggests that the walrus was an invited guest, celebrating and feasting with the human community.

The Yup'ik Bladder Festival is instructive here. In Southwest Alaska through the nineteenth-century, seals, especially bearded seals (*Erignathus barbatus*), were feted each year before their bladders were returned to the sea ([Fienup-Riordan 1990](#)). As with the walrus head, the seal bladder operated via synecdoche, with the body part representing the whole, retaining the living animal's powers of agency and observation. The persistence of agency in animal parts has critical implications for the study of Arctic material culture. Sonne ([2017](#)), for example, points to the use of bearded seal for shamans' gutskin parkas and boot soles. These clothing items facilitated travel between worlds by the shaman in ways analogous to the seal's travel between sea ice and ocean realms. Complex forms of material culture, including watercraft ([Hill 2023](#)), harpoons ([Whitridge 2004b](#)), and parkas, were hybrid creations that mobilized the traits and affordances of animals. A water-resistant hide or the tensile strength of a

seal-skin thong embodied durable and persistent animal features; sometimes these items retained the agency of the animal as well.

### ***Non-Charismatic Species***

While charismatic species such as whales and bears have received considerable attention from anthropologists, biologists, and wildlife managers, non-charismatic species also featured in art, narrative, and subsistence. Greater attention to rodents, like the muskrat, and to other species identified in zooarchaeological assemblages, such as fox, Arctic hare, and ground squirrel, would contribute to a fuller picture of human–animal relations in the North.

Invertebrates, including insects and other small creatures, represent another category of animal relevant to northern Indigenous peoples. Terms for these creatures used by Canadian Inuit and Yupiit of Alaska do not map to scientific taxonomic categories. For example, the Inuktitut term *qupirruit* includes worms, spiders, and shrimp ([Laugrand and Oosten 2010](#), 2015). *Qupirruit* are associated with consumption and transformation, in some cases predatory ([Randa 2017](#)). Yet in the past, they also acted as messengers and divinatory beings, often in ritual contexts ([Laugrand 2017](#)). *Ciissit* is a similarly general term used by Alaskan Yupiit, and includes lice, beetles, flies, spiders, caterpillars, and worms ([Fienup-Riordan 2017a](#)). Some *ciissit*, such as maggots, or *paralut*, have strongly negative associations with death and devouring. Caterpillars, however, are considered agents of healing and regeneration. *Ciissit* figure in Yup'ik oral narratives and in nineteenth-century masks and ivory carvings.

Archaeoentomology has the potential to further inform our understanding of how humans cohabited with animals in the North ([Forbes et al. 2017](#)). In the absence of oral narratives, fine-grained recovery, identification and analysis of insect taxa may provide insight on lifeways and human–animal relations, as well as seasonality, hygiene and grooming practices, and animal husbandry. Ectoparasites, such as lice and fleas, may be indicators of activity areas, the presence of particular species, or contact between species. At the late pre-contact site of Nunalleq, Alaska, for example, Forbes et al. ([2019](#)) identified dog-biting lice from structure floors, supporting the contention that dogs were sometimes permitted to share human habitation. Two ectoparasites of sheep, identified in unusually large quantities at the medieval farm of Stóraborg, Iceland, were interpreted as evidence of wool processing by Buckland and Perry ([1989](#)), even in the absence of sheep bone.

## **Prospects**

### ***Multispecies Archaeology***

The visibility and influence of the approach of “multispecies archaeology” has increased since the term was first used in print by Overton and Hamilakis in 2013. Birch (2018) pulled together a variety of approaches to the material record united by their intent to decenter the human subject and elevate the roles of non-human animals and plants in the past. Boyd (2017), however, sees this approach as problematic in its potential to blur the power asymmetries that arguably inflect all social relations. Archaeology is already multispecies, in the sense that the entirety of the human past involved relations among humans and multiple sorts of non-humans. Zooarchaeologists, paleoethnobotanists, and archaeoentomologists have worked for the past five decades to identify the plant and animal species that humans consumed, represented, harnessed, harvested, and hosted. A multispecies archaeology, however, moves beyond identification, taxon counts, and dietary proportions to explore the nature of those relations, which could be complex, contradictory, and ambivalent. Non-humans of many kinds, like the fish Todd (2018: 61) meets in the community of Paulatuq, arctic Canada, ‘exist and operate in pluralities... simultaneously food, specimens of study for scientific research; sites of memory and stories; non-human persons with agency.’

The multispecies approach is implicit in works that explore the idea of ‘co-domestication,’ as Fijn (2011) does in her study of Mongolian herders and their horses, sheep, and goats. Multispecies relations among humans, animals, and others also feature in explorations of ‘relational ontologies’ in which the self—whether human, animal, or other—is constituted through social interaction. Objects, too, are implicated in multispecies perspectives when those ‘objects’ are agential or animate. McNiven (2018), for example, highlights the role of the Torres Strait canoe as a bird-like marine predator. Applying the term ‘object-being,’ McNiven explains how the canoe as an animated agent mediated hunting relations between humans and marine prey.

Multispecies archaeology might also consider the relations between humans and other humans conceived as fundamentally ‘other,’ not quite human, or ‘like animals.’ The distinction between types of humans is often reflected in ethnonyms, in which ‘people’ or ‘real people’ are semantically distinguished from other kinds. Examples include the Inuit characterization of the Late Dorset Tuniit and the Norse encounter with Greenlandic *Skrælinja* (Gulløv 2016). Other kinds of human-like creatures concerned many inhabitants of the north. In Southwest Alaska, for example, *ircenrraat* or ‘extraordinary persons’ often lived close to human habitations (Rearden et al. 2021). These persons are depicted in ivory and wood, populate oral narratives, and respond to human acts and intentions (Fienup-Riordan 2017b). For Yupiit, they are indeed sentient and agential persons, albeit not in the same mold as ‘real people.’

Some humans, through mishap, illness, or misfortune, could become less-than or not-quite-human. In Greenland, *qivittut* were Inuit who left society to live as outcasts in the interior. Viewed with

apprehension, *qivittut* were distinguished from humans who lived according to social norms by their shelters (caves), poorly made clothing, and inland diet ([Grønnow 2009](#)). Bogojavlensky ([1969](#)) describes ‘drifters’ as hunters who became lost on the ice or who were swept away on a drifting floe in the Bering Sea. These unfortunates were considered beyond human society, dangerous outsiders who might be killed without consequence. The outlaws described in Icelandic sagas occupied a similarly ambiguous ontological position, monstrous and marginal ([Merkelbach 2019](#)).

The ‘nonempirical’ ([Burch 1971](#); [Hill 2012](#)) and former human inhabitants of the north such as *qivittut*, drifters, and outlaws could be part of a multispecies archaeology if archaeologists are willing to seriously consider how such beings affected the behaviors and perceptions of human persons. Many North American Inuit and Yupiit took precautions when on land, sea, or ice, either to avoid encountering these not-quite-human beings or, when an encounter was inevitable, to escape safely. Notably, and worthy of future consideration, is the common antisocial element among many of these former humans. The *qivittut*, drifters, and Icelandic outlaws all share an ontological space that is beyond or outside that of human society. Taking a multispecies approach to such beings highlights their status as fundamentally different forms of humans. In oral narratives and sagas, they are distinguished by their appearance and behaviors—clothing, manner of living, diet. While we are not suggesting such beings occupied a category of ‘animal,’ they were a natural part of many northern landscapes.

### ***Osteobiography***

A multispecies archaeology invites us to reflect on the complexity and diversity of non-human lives, a project that can be enhanced by importing the sorts of social bioarchaeological (Robb 2002) and life course (Hawkey 1998) frames to the zooarchaeological record that human osteobiography has brought to the osteological one (Hosek and Robb 2019). Rejecting the reductively instrumental view of animal lives as thoroughly molded and controlled by human masters—in effect only zooarchaeologically interesting to the extent that they served human economic and social needs—faunal osteobiography assembles a variety of methodological approaches (zooarchaeological age and sex determinations, paleopathology, musculoskeletal stress markers, isotopic studies of ancestry and diet, taphonomy, mortuary archaeology) to construct individual life histories for particular animals and composite life histories for local populations (Losey et al. 2011; Hill 2013; Hull 2020).

A faunal osteobiography seems especially apt for arctic domesticates, whose osteological indicators of diet, work, disease, and trauma are interpretable with respect to archaeological evidence of human provisioning, harnessing, discipline and, in some cases, sacrifice, processing, and consumption (Salmi and Fjellström, this volume; [Harris et al. 2020a](#); [Hill 2018](#); [Losey et al. 2018a](#); [Whitridge 2018](#)). The

frequent survival of hair and other tissues allows forms of analysis that are not strictly ‘osteological’ and that are informative about other scales of non-human lives, from the very short term (based on the biochemical profile of growing hair) to the genetic differentiation of populations ([Harris et al. 2020b](#)). The lives of dogs and reindeer were thoroughly entwined with those of humans but are not reducible to this object functionality, since they also engaged in complex social relationships with conspecifics and other creatures (Salmi and Fjellström, this volume). Other species were less obviously ensnared in the human life world, at least until they were harvested; their life histories reveal trajectories through other biomes and help flesh out the wider multispecies context of human lives (Whitridge, this volume).

### ***Actor-Network Theory***

While actor-network theory does not specifically engage the agency of non-human animals, it envisions an agentic landscape that includes them, along with humans, things, and other entities, within an all-embracing narrative frame for action-in-the-world. Expanding on Callon’s ([1984](#)) sociological account of the relationships among French biologists, fishermen, scallops, and the sea floor installations to which the scientists hoped the scallops would anchor, Bruno Latour ([2007](#)) formulated a compelling approach to the analysis not only of scientific practice, but of an ever-expanding universe of relationships among people, animals, plants, microbes, soil, technical devices, non-human things, climate, and whatever else might be folded into the networks in which they figured. Latour developed an explanatory idiom that described these networks of relationships as though they composed the semiotic constituents of texts (following [Greimas 1987](#)), rejecting the presumed agentic primacy of humans and redistributing agency within networks of narratively homologous actors. Latour might be considered a social theorist, but he began his career as a philosopher, worked for years as an anthropologist, and conversed about non-human agency with archaeologists, geographers, and others, as illustrated by his contribution to Graves-Brown ([2000](#)).

This democratic enfolding of non-human actors within our explanations of the past has begun to be emulated more widely by archaeologists ([Knappett and Malafouris 2008](#); [Vadala and Duffy 2021](#); [Van Oyen 2015](#); [Whitridge 2004a](#)), although more often with respect to human–thing relations than human–animal ones. Nevertheless, its utility in the latter regard is apparent. Whitridge ([2004b](#)) adopted an actor-network theory framework to model the prehistory of arctic whaling, and the changing constellations over time of hunters, boat crews, households, and whales themselves within an ontologically flattened explanatory space. The technological things (tools, weaponry, clothing, watercraft) and skills (stalking, navigating, herding) that northern hunters and pastoralists employed as parts of their everyday lives figured prominently in their relations with animals, as did the agencies of the animals themselves, acting

both individually and as parts of larger groups (pods, herds, flocks, schools). Animals simultaneously engaged with their own proliferating networks of relations with predators, prey, forage, and environment. Whether under the ‘actor-network’ or some other moniker (meshwork, entanglement, rhizome, even system), the notion of a heterogeneous tangle of relationships that conceptually levels the capacities of humans and non-humans provides good explanatory purchase within archaeology and other fields of history and social science.

### ***Molecular Approaches***

Zooarchaeology has grown enormously since its dramatic emergence as part of archaeology’s processual-quantitative revolution in the late 1970s, in no small part due to contributions from northern scholarship (most iconically, [Binford 1978](#)). Several decades of data accumulation and methodological refinement later, northern researchers are active participants in the contemporary ‘molecular turn,’ recovering ever more rarefied traces and residues that reveal the presence of an array of species, even in the absence of the macroscopic bone, tooth, and shell on which zooarchaeological methodology was founded. With an ambient taphonomic environment that can be highly conducive even to preservation of soft tissue, arctic sites have yielded everything from extremely well-preserved animal bone with evidence of human and carnivore modification to ancient and environmental DNA.

Ancient DNA (aDNA) is genetic material recovered from archaeological, paleontological, or historical contexts. Sources as varied as eggshell, dental calculus, and aurochs horn ([Bro-Jørgensen et al. 2018](#); [Orlando et al. 2021](#)) have yielded aDNA that could be amplified and sequenced. Preservation conditions at arctic and alpine sites were recognized from the beginning to favor recovery of aDNA ([Nielsen et al. 1994](#)). Permafrost, low temperatures, and low humidity preserved the molecular traces of humans and non-human cohabitants. Rasmussen et al. ([2010](#)) sequenced a Saqqaq individual’s complete genome, and Raghavan et al. ([2014](#)) modeled the human population history of the entire North American Arctic from nuclear and mitochondrial DNA. While early applications targeted ancient human remains and extinct fauna, the techniques for extracting aDNA from bone and other tissues have improved substantially, making it analytically useful and, increasingly, economically feasible for speciating faunal remains and identifying animal materials in objects such as textiles (e.g., [Sinding et al. 2017](#)). Seersholm et al. ([2022](#)) illustrate the potential application to northern zooarchaeology, extracting aDNA from bulk faunal samples selected from 25 pre-Inuit, Inuit, and Norse sites in Greenland and identifying dozens of taxa, including osteologically unidentified fish and whales, the latter frequently overlooked or misidentified ([Charpentier et al. 2022](#)).

The further discovery that taxonomic occurrence of species at a site can be established through bulk processing of sediments to isolate residual DNA fragments, a technique in part pioneered on arctic sites ([Pedersen et al. 2015](#)), has led to a surge of interest in the extraction of paleobiological evidence from sediments that may lack any macroscopic traces. The Arctic and Subarctic have proven to be exceptionally fertile grounds for such eDNA research. Wang et al. ([2021](#)) illustrate the value to Quaternary geography of a ‘metagenomic’ circumpolar sampling program. Elsewhere eDNA has been used to produce detailed reconstructions of the local environmental context of Beringian human remains ([Wygala et al. 2022](#)). The entire early Pleistocene ecosystem at a site in northern Greenland has been reconstructed with exceptional detail by Kjær et al. ([2022](#)), who identified birds, algae, invertebrates, and multiple boreal tree species. Although most applications to date have been ecological or paleoecological, reconstructing past animal and plant communities from minimally invasive sediment sampling has substantial archaeological utility.

A more cost-effective and reliable approach to identifying fauna than aDNA analysis, Zooarchaeology by Mass Spectrometry (ZooMS) targets protein ‘fingerprints’ to identify remains that are challenging or impossible to discriminate osteologically, such as sheep and goat ([Buckley 2018](#)). The fragmentary cetacean and pinniped bone that occurs widely on northern coastal sites can be similarly challenging to narrow down taxonomically, but Buckley et al. ([2014](#)) illustrate the utility of ZooMS for identifying family, and often species, of ambiguous specimens from North Atlantic sites stretching back to the Mesolithic. Given the reliance of many northern groups on animal bone for tool manufacture, ZooMS is useful for identifying the taxon of bone when morphological features are absent and can increasingly be conducted without the destructive sampling used in the past ([Evans et al. 2023](#)).

Isotopic analysis of bone has likewise improved over the years and can extract useful information not only from stable isotopes of carbon, nitrogen, and oxygen but also from strontium, sulfur, lead, and hydrogen ([Szpak 2022](#)). In Alaska, carbon and nitrogen isotopes have been used to distinguish the diets of humans, dogs, and wild fauna ([McManus-Fry et al. 2018](#)), while strontium and oxygen isotopes from tooth enamel have informed reconstruction of the seasonal movements of caribou by Gignoux et al. ([2019](#)). Carbon and nitrogen isotope ratios in ringed seal bone were employed by Szpak et al. ([2019](#)) to model changes in marine productivity and ice cover during the late Holocene in the Canadian Arctic. Together, these and other molecular techniques demonstrate the vast analytic potential of new and legacy collections for characterizing the lives and environments of humans and animals at increasingly fine resolutions.

## The Chapters in This Book

Genevieve LeMoine, John Darwent, Christyann Darwent, Hans Lange, and James Helmer ([Chapter 2](#)) discuss unusual sets of ivory carvings from Late Dorset sites on Little Cornwallis Island and Greenland. The carvings, which include miniature harpoon heads and animals such as bears, were recovered in cache-like contexts. The carvings may have been strung together, but their exact use is unknown. While the carvings themselves are consistent with the larger corpus of Late Dorset representational art, the authors suggest that the deposition of the objects as sets highlights individual hunters' engagements with animals. In many relational systems, like that of the Late Dorset, hunters developed and maintained their own personal relations with animals, employing carvings—and disposing of them—in ways that best suited their unique, individual objectives. Further, LeMoine et al. suggest that the act of carving was likely part of the ongoing dialogue between hunter and prey; thus, each object has its own complex life history, as unique as the hunter who carved it.

Whitridge ([Chapter 3](#)) examines incised depictions of bowhead whaling on pre-contact and historical Yup'ik, Iñupiaq, and Inuit tool handles in an attempt to identify concrete features of the whaling process. The decorations redundantly, and probably accurately, depict critical details of the hunt, from the size of boat crews to preferred strike locations, and capture the most meaningful episodes in the overall whaling enterprise as carvers/hunters understood it. The ultimate moment of encounter, when a harpooner finally strikes the whale, emerges as a real narratological crisis that was repeatedly revisited in these insider representations of the whale hunt.

Hill ([Chapter 4](#)) steps back from the moment of the strike in a study of watercraft parts that depict bowhead whales. Originating along the Bering Sea coasts, the watercraft seats and cross-pieces that are the focus of Hill's chapter are only one component of a complex assemblage of whaling gear that included harpoons, blade boxes, ivory tackle, and a variety of items intended to facilitate human interaction with whales. The pre-contact Thule and later Inupiat and Yupiit of Alaska considered whales much more than prey animals; in recognizing their sentience, agency, and intentionality, whaling captains and crews made concerted efforts to flatter and attract bowhead whales. They carved or commissioned bas-relief representations of whales that featured precious materials. These wooden plaques served as seats in whaling craft, but were mounted facing the bottom of the boat so that whales—not humans—could view them.

Sean Desjardins and Sarah Hazell ([Chapter 5](#)) explore Yup'ik walrus hunting in the Walrus Islands of Southwest Alaska as a form of 'Intangible Cultural Heritage.' Archaeological evidence indicates that walrus hunting in the region dates back over 6,000 years, but hunters today face challenges that would have been unimaginable to those of earlier millennia, including cost of and access to fuel and technology and regulation by a paternalistic state game board that prohibited access to important harvesting sites in

the later twentieth century. The handling of walrus carcasses, and other large marine mammals, demonstrates strong continuities with the methods employed by earlier generations. Yup'ik techniques resembled those employed by Inuit walrus hunters thousands of kilometers away in the Canadian Central Arctic. In turn, the revival of bowhead whaling by Canadian Inuit communities parallels the revival of the Yup'ik walrus hunt, fostering community and cultural identity while serving an economic need.

Anja Mansrud ([Chapter 6](#)) challenges the bias toward mammals in the animal studies literature by focusing on fish in late Mesolithic Scandinavia. Although depictions of mammals dominate Scandinavian rock art, Mesolithic people singled out flatfish, especially halibut, for representation at coastal Norwegian rock art sites. Mansrud notes, as do Nomokonova et al., that there are often significant differences between the species most critical to subsistence and those receiving the greatest material and artistic elaboration (e.g., [Betts et al. 2015](#)). This distinction between 'good to eat' and 'good to think' is a striking pattern that Mansrud links to fishing method. She argues that solitary fishing for halibut created a context for individual, likely male engagement with large, high-status fish, whereas harvest of spawning plaice required communal effort and emphasis on both human and fish regeneration. Mansrud's chapter is a good example of how the specifics of animal behavior structure relations. Different species of fish require different harvest methods and foster different relational modes. Her contribution also points to the gendered components of human–animal relations, highlighting ways in which gender mediates engagements with fish.

Anna-Kaisa Salmi and Markus Kjellström reconstruct the osteobiographies of two reindeer from the Sámi offering site of Paddusas in [Chapter 8](#). Osteological and stable isotope analyses provide insights on diet, mobility, and the history of human–reindeer engagement in the medieval and early modern periods in Swedish Lapland. The remains of the two reindeer, JukPad9 and JukPad10, are part of a broader pattern of ritual deposits comprised of antlers and crania ([Olofsson 2010](#)). These offerings occurred when Sámi relations with reindeer were undergoing major changes, as a hunting lifeway was replaced by pastoralism.

In their contribution on the Ust'-Polui site (Chapter 9), Tatiana Nomokonova, Robert Losey, Natalia Federova, and Andrei Gusev describe an extraordinary ritual complex in northwestern Siberia. Referencing the rich ethnohistorical and ethnographic documentation on the Khanty, Mansi, and Nenets. Nomokonova et al. interpret an assemblage of wooden, ivory, and bronze bird effigies as part of a long-standing tradition of human–bird relations. Identifying emic categories of waterfowl, raptors, and owls, the authors argue that depositional practices at Ust'-Polui reflect perceptions of birds as protective ancestors, messengers, and shamanic helpers.

## Conclusions

The multispecies northern worlds represented by the chapters in this book convey only a fraction of the complexity and richness of human–animal entanglements in the past. Interactions were context dependent and informed by the sex, age, and role of both human and animal participants. Certain activities, such as halibut fishing and whaling, involved gendered human labor and demonstrated that roles, responsibilities, and relationships with prey species may differ between men and women. Children’s interactions with animals—both past and present—remain relatively unexplored, but represent another dimension of human engagement with animals. For example, relations between nineteenth-century Yup’ik boys and birds were marked by taboo and ritual. Consumption of certain species was prohibited, and children’s seasonal activities were linked to the presence of cranes and ducks ([Fienup-Riordan 1994: 126](#)).

The many examples described above, and the chapters in this book, demonstrate that closer attention to the temporal, spatial, and material specifics of human–animal relations provides archaeologists with a more nuanced understanding of the past. Contributors share the view that human and animal lives are mutually constituted and mediated by the particulars of human and animal bodies and affordances. Several chapters implicitly challenge archaeology’s anthropocentrism by taking animals seriously, as subjects of study (e.g., Salmi and Kjellström), as social actors (e.g., Hill), or as cohabitants with distinctive traits and behaviors (e.g., Mansrud; Nomokonova et al.).

In taking animals seriously, we are reimagining the life-worlds of the circumpolar North. Those reimagined pasts were more lively and nuanced than we realized, with animal figurines, rock art, and bone collagen offering new insights on what it meant to be human or reindeer or halibut. Reciprocity existed between humans and some animals, but so too did ambivalence and ambiguity. Relations among humans and animals shifted throughout the life course as new social and material configurations emerged and others dissolved. Radical shifts, to reliance upon sled dogs or from hunting to pastoralism, are part of the circumpolar past. Reimagining those shifts or reconstructing daily lives with animal subjects generates new stories—stories of a past that has always been multispecies.

## Acknowledgments

Many people have helped to bring this book to print. First, we thank David Anderson and Robert Losey, editors of the Arctic Worlds series, who have supported this project from the beginning. The editors also extend sincere thanks to several anonymous reviewers whose thoughtful comments on individual chapters helped make this volume possible. We are grateful to Katherine Ong, our editor at Routledge, for her patience and assistance as we assembled this volume.

## References

- [Ameen](#), Carly, Tatiana R. Feuerborn, Sarah K. Brown, Anna Linderholm, Ardern Hulme-Beaman, et al. 2019a. “Specialized Sledge Dogs Accompanied Inuit Dispersal Across the North American Arctic.” *Proceedings of the Royal Society B* 286 (1916). <https://doi.org/10.1098/rspb.2019.1929>.
- [Ameen](#), Carly, Tatiana R. Feuerborn, Sarah K. Brown, Anna Linderholm, Ardern Hulme-Beaman, et al. 2019b. “Specialized Sledge Dogs Accompanied Inuit Dispersal Across the North American Arctic.” *Proceedings of the Royal Society B: Biological Sciences* 286 (1916). <https://doi.org/10.1098/rspb.2019.1929>.
- [Armstrong](#) Oma, Kristin. 2010. “Between Trust and Domination: Social Contracts Between Humans and Animals.” *World Archaeology* 42 (2):175–187.
- [Armstrong](#) Oma, Kristin. 2016. “Sheep, Dog and Man: Multi-Species Becomings Leading to New Ways of Living in Early Bronze Age Longhouses on Jæren, Norway.” In *The Farm as a Social Arena*, edited by Liv-Helga Dommasnes, Gutsmedi-Schümann and Alf Tore Hommedal, 23–51. Munich: Waxmann.
- [Armstrong](#) Oma, Kristin. 2020. “On the Fringe: Sheepdogs and Their Status within Bronze Age Ontologies in Scandinavia.” *Current Swedish Archaeology* 28:99–120.
- [Betts](#), Matthew W., Mari Hardenberg, and Ian Stirling. 2015. “How Animals Create Human History: Relational Ecology and the Dorset–Polar Bear Connection.” *American Antiquity* 80 (1): 89–112. <https://doi.org/10.7183/0002-7316.79.4.89>.
- [Binford](#), Lewis R. 1978. *Nunamiut Ethnoarchaeology*. New York: Academic Press.
- [Birch](#), Suzanne E. Pilaar, ed. 2018. *Multispecies Archaeology*. New York: Routledge.
- [Bogojavlensky](#), Sergei. 1969. “Imaangmiut Eskimo Careers: Skinboats in Bering Strait.” Unpublished Ph.D. dissertation, Department of Social Relations, Harvard University.
- [Bogoras](#), Waldemar. 1907. *The Chukchee Part II. Religion*. New York: Memoirs of the American Museum of Natural History, vol. XI.
- [Boyd](#), Brian. 2017. “Archaeology and Human–Animal Relations: Thinking through Anthropocentrism.” *Annual Review of Anthropology* 46:299–316.
- [Bro-Jørgensen](#), Maiken Hemme, Christian Carøe, Filipe G. Vieira, Sofia Nestor, Ann Hallström, et al. 2018. “Ancient DNA Analysis of Scandinavian Medieval Drinking Horns and the Horn of the Last Aurochs Bull.” *Journal of Archaeological Science* 99:47–54. <https://doi.org/10.1016/j.jas.2018.09.001>.

[Buckland](#), Paul, and D. W. Perry. 1989. "Ectoparasites of Sheep from Stóraborg, Iceland and Their Interpretation." *Hikuin* (Århus) 15:37–46.

[Buckley](#), M., S. Fraser, J. Herman, N. D. Melton, J. Mulville, et al. 2014. "Species Identification of Archaeological Marine Mammals Using Collagen Fingerprinting." *Journal of Archaeological Science* 41:631–641. <https://doi.org/10.1016/j.jas.2013.08.021>.

[Buckley](#), Michael. 2018. "Zooarchaeology by Mass Spectrometry (ZooMS) Collagen Fingerprinting for the Species Identification of Archaeological Bone Fragments." In *Zooarchaeology in Practice: Case Studies in Methodology and Interpretation in Archaeofaunal Analysis*, edited by Christina M. Giovas and Michelle J. LeFebvre, 227–247. Cham: Springer International Publishing.

[Burch](#), Jr., Ernest S. 1971. "The Nonempirical Environment of the Arctic Alaskan Eskimos." *Southwestern Journal of Anthropology* 27 (2):148–165.

[Callon](#), Michel. 1984. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Briec Bay." *The Sociological Review* 32 (S1):196–233. <https://doi.org/10.1111/j.1467-954X.1984.tb00113.x>.

[Charpentier](#), Anne, Ana S. L. Rodrigues, Claire Houmard, Alexandre Lefebvre, Krista McGrath, et al. 2022. "What's in a Whale Bone? Combining New Analytical Methods, Ecology and History to Shed Light on Ancient Human-Whale Interactions." *Quaternary Science Reviews* 284:107470. <https://doi.org/10.1016/j.quascirev.2022.107470>.

[Davydov](#), Vladimir, and Konstantin Klovov. 2018. "Dogs, Reindeer and Humans in Siberia: Threefold Synergetic in the Northern Landscape." In *Dogs in the North: Stories of Cooperation and Co-Domestication*, edited by Robert J. Losey, Robert P. Wishart and Jan Peter Laurens Looers, 45–60. London: Routledge.

[Dugatkin](#), Lee A., and Lyudmila N. Trut. 2017. *How to Tame a Fox (and Build a Dog): Visionary Scientists and a Siberian Tale of Jump-Started Evolution*. Chicago: University of Chicago Press.

[Evans](#), Zara, Lindsey Paskulin, Farid Rahemtulla, and Camilla F. Speller. 2023. "A Comparison of Minimally-Invasive Sampling Techniques for ZooMS Analysis of Bone Artifacts." *Journal of Archaeological Science: Reports* 47:103738. <https://doi.org/10.1016/j.jasrep.2022.103738>.

[Fienup-Riordan](#), Ann. 1990. "The Bird and the Bladder: The Cosmology of Central Yup'ik Seal Hunting." *Études/Inuit/Studies* 14 (1):23–38.

[Fienup-Riordan](#), Ann. 1994. *Boundaries and Passages: Rule and Ritual in Yup'ik Eskimo Oral Tradition*. Norman, OK: University of Oklahoma Press.

[Fienup-Riordan](#), Ann. 2007. *Yuungnaqpiallerput/The Way We Genuinely Live: Masterworks of Yup'ik Science and Survival*. Seattle: University of Washington Press.

[Fienup-Riordan](#), Ann. 2017a. “Ciissit: les insectes dans la tradition orale yup'ik.” *Recherches amérindiennes au Québec* 47 (2–3):79–93. <https://doi.org/10.7202/1048597ar>.

[Fienup-Riordan](#), Ann. 2017b. “Ella-gguq allamek yuituq / They say the world contains no others, only persons”. *HAU: Journal of Ethnographic Theory* 7 (2):133–137. <https://doi.org/10.14318/hau7.2.016>.

[Fijn](#), Natasha. 2011. *Living with Herds: Human-Animal Coexistence in Mongolia*. Cambridge: Cambridge University Press.

[Forbes](#), Véronique, Frédéric Dussault, Olivier Lalonde, and Allison Bain. 2017. “Coléoptères, poux et puces subfossiles provenant d'habitats de chasseurs-cueilleurs: l'apport des recherches archéontomologiques dans le Nord circumpolaire.” *Recherches amérindiennes au Québec* 47 (2–3):11–21. <https://doi.org/10.7202/1048592ar>.

[Forbes](#), Véronique, Jean-Bernard Huchet, Ellen McManus-Fry, Yan Axel Gómez Coutouly, Julie Masson-MacLean, et al. 2019. “Activity Areas or Conflict Episode? Interpreting the Spatial Patterning of Lice and Fleas at the Precontact Yup'ik Site of Nunalleq (Sixteenth to Seventeenth Centuries AD, Alaska).” *Études / Inuit / Studies* 43 (1–2):197–221. <https://doi.org/10.7202/1071945ar>.

[Frei](#), Karin M., Ashley N. Coutu, Konrad Smiarowski, Ramona Harrison, Christian K. Madsen, et al. 2015. “Was It for Walrus? Viking Age Settlement and Medieval Walrus Ivory Trade in Iceland and Greenland.” *World Archaeology* 47 (3):439–466. <https://doi.org/10.1080/00438243.2015.1025912>.

[Germonpré](#), Mietje, Sergey Fedorov, Petr Danilov, Patrik Galeta, Elodie-Laure Jimenez, et al. 2017. “Palaeolithic and Prehistoric Dogs and Pleistocene Wolves from Yakutia: Identification of Isolated Skulls.” *Journal of Archaeological Science* 78:1–19. <http://doi.org/10.1016/j.jas.2016.11.008>.

[Germonpré](#), Mietje, Mikhail V. Sablin, Rhiannon E. Stevens, Robert E. M. Hedges, Michael Hofreiter, et al. 2009. “Fossil Dogs and Wolves from Palaeolithic Sites in Belgium, the Ukraine and Russia: Osteometry, Ancient DNA and Stable Isotopes.” *Journal of Archaeological Science* 36 (2):473–490.

[Gigleux](#), Ciara, Vaughan Grimes, Thomas Tütken, Rick Knecht, and Kate Britton. 2019. “Reconstructing caribou seasonal biogeography in Little Ice Age (late Holocene) Western Alaska

using intra-tooth strontium and oxygen isotope analysis.” *Journal of Archaeological Science: Reports* 23 (February):1043–1054. <https://doi.org/10.1016/j.jasrep.2017.10.043>.

[Graves-Brown](#), Paul, ed. 2000. *Matter, Materiality and Modern Culture*. London: Routledge.

[Greimas](#), Algirdas J. 1987. *On Meaning: Selected Writings in Semiotic Theory*. Minneapolis: University of Minnesota Press.

[Grønnow](#), Bjarne. 2009. “Blessings and Horrors of the Interior: Ethno-historical Studies of Inuit Perceptions Concerning the Inland Region of West Greenland.” *Arctic Anthropology* 46 (1/2):191–201.

[Gulløv](#), Hans Christian. 2016. “Inuit–European Interactions in Greenland.” In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, 897–914. New York: Oxford University Press.

[Habu](#), Junko, and James M. Savelle. 1994. “Construction, Use, and Abandonment of a Thule Whale Bone House, Somerset Island, Arctic Canada.” *The Quaternary Research (Daiyonki-Kenkyu)* 33 (1):1–18. <https://doi.org/10.4116/jaqua.33.1>.

[Harris](#), Alison J. T., Deirdre A. Elliott, Eric J. Guiry, Matthew Von Tersch, Lisa Rankin, et al. 2020a. “Diversity in Labrador Inuit sled dog diets: Insights from  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  analysis of dog bone and dentine collagen.” *Journal of Archaeological Science: Reports* 32:102424. <https://doi.org/10.1016/j.jasrep.2020.102424>.

[Harris](#), Alison J. T., Tatiana R. Feuerborn, Mikkel-Holger S. Sinding, James Nottingham, Robert Knudsen, et al. 2020b. “Archives of Human-Dog Relationships: Genetic and Stable Isotope Analysis of Arctic Fur Clothing.” *Journal of Anthropological Archaeology* 59:101200. <https://doi.org/10.1016/j.jaa.2020.101200>.

[Hennius](#), Andreas, Rudolf Gustavsson, John Ljungkvist, and Luke Spindler. 2018. “Whalebone Gaming Pieces: Aspects of Marine Mammal Exploitation in Vendel and Viking Age Scandinavia.” *European Journal of Archaeology* 21 (4):1–20. <https://doi.org/10.1017/eea.2018.15>.

[Hill](#), Erica. 2012. “The Nonempirical Past: Enculturated Landscapes and Other-than-Human Persons in Southwest Alaska.” *Arctic Anthropology* 49 (2):41–57.

[Hill](#), Erica. 2017. “The Archaeology and Ethnohistory of Walrus Ritual around Bering Strait.” *Etudes/Inuit/Studies* 41 (1–2):73–99.

[Hill](#), Erica. 2018. “The Archaeology of Human–Dog Relations in Northwest Alaska.” In *Dogs in the North: Stories of Cooperation and Co-Domestication*, edited by Robert J. Losey, Robert P. Wishart and Jan Peter Laurens Looovers, 87–104. London: Routledge.

[Hill](#), Erica. 2023. “Watercraft as Assemblage in the Western Arctic.” In *Sacred Nature: Animism and Materiality in Ancient Religions*, edited by Nicola Laneri and Anna Perdibon, 17–32. Oxford: Oxbow Books.

[Kjær](#), Kurt H., Mikkel Winther Pedersen, Bianca De Sanctis, Binia De Cahsan, Thorfinn S. Korneliussen, et al. 2022. “A 2-Million-Year-Old Ecosystem in Greenland Uncovered by Environmental DNA.” *Nature* 612 (7939):283–291. <https://doi.org/10.1038/s41586-022-05453-y>.

[Knappett](#), Carl, and Lambros Malafouris, eds. 2008. *Material Agency: Towards a Non-Anthropocentric Approach*. New York: Springer.

[Krupnik](#), Igor, and Lyudmila Ainana. 2000. *Pust’ govoriat nashi stariki: Rasskazy aziatskikh eskimosov-iupik [Let Our Elders Speak: Stories of the Yupik / Siberian Eskimo]*. Moscow: Russian Heritage Institute.

[Latour](#), Bruno. 2007. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.

[Laugrand](#), Frédéric. 2017. “Les messagers de l’invisible chez les Inuits de l’Arctique de l’Est canadien: les petites bestioles (*qupirruit*) à l’âge des changements climatiques.” *Recherches amérindiennes au Québec* 47 (2–3):135–147. <https://doi.org/10.7202/1048601ar>.

[Laugrand](#), Frédéric, and Jarich Oosten. 2010. “Qupirruit: Insects and Worms in Inuit Traditions.” *Arctic Anthropology* 47 (1):1–21.

[Laugrand](#), Frédéric, and Jarich Oosten. 2015. *Hunters, Predators and Prey: Inuit Perceptions of Animals*. New York: Berghahn.

[Losey](#), Robert J., Erin Jessup, Tatiana Nomokonova, and Mikhail Sablin. 2014. “Cranio-mandibular Trauma and Tooth Loss in Northern Dogs and Wolves: Implications for the Archaeological Study of Dog Husbandry and Domestication.” *PLoS One* 9 (6):e99746. <https://doi.org/10.1371/journal.pone.0099746>.

[Losey](#), Robert J., Tatiana Nomokonova, Andrei V. Gusev, Olga P. Bachura, Natalia V. Fedorova, et al. 2018a. “Dogs Were Domesticated in the Arctic: Culling Practices and Dog Sledding at Ust’-Polui.” *Journal of Anthropological Archaeology* 51 (September):113–126. <https://doi.org/https://doi.org/10.1016/j.jaa.2018.06.004>.

[Losey](#), Robert J., Robert P. Wishart, and Jan Peter Laurens Loovers, eds. 2018b. *Dogs in the North: Stories of Cooperation and Co-Domestication*. London: Routledge.

[McManus-Fry](#), Ellen, Rick Knecht, Keith Dobney, Michael P. Richards, and Kate Britton. 2018. “Dog-Human Dietary Relationships in Yup’ik Western Alaska: The Stable Isotope and

Zooarchaeological Evidence from Pre-Contact Nunalleq.” *Journal of Archaeological Science: Reports* 17 (February):964–972. <http://doi.org/10.1016/j.jasrep.2016.04.007>.

[McNiven](#), Ian J. 2018. “Torres Strait Canoes as Social and Predatory Object-Beings.” In *Relational Identities and Other-Than-Human Agency in Archaeology*, edited by Eleanor Harrison-Buck and Julia A. Hendon, 167–196. Boulder, CO: University Press of Colorado.

[Merkelbach](#), Rebecca. 2019. *Monsters in Society: Alterity, Transgression, and the Use of the Past in Medieval Iceland*. Boston, MA: Medieval Institute Publications.

[Miklósi](#), Ádám. 2018. *The Dog: A Natural History*. Princeton NJ: Princeton University Press.

[Morey](#), Darcy F. 2010. *Dogs: Domestication and the Development of a Social Bond*. Cambridge: Cambridge University Press.

[Nelson](#), Edward William. 1899. *The Eskimo about Bering Strait*. Washington, DC: Government Printing Office.

[Nelson](#), Richard K. 1986. *Hunters of the Northern Forest: Designs for Survival among the Alaskan Kutchin*. Second ed. Chicago: University of Chicago Press.

[Ní Leathlobhair](#), Máire, Angela R. Perri, Evan K. Irving-Pease, Kelsey E. Witt, Anna Linderholm, et al. 2018. “The Evolutionary History of Dogs in the Americas.” *Science* 361 (6397):81–85.

[Nielsen](#), Henrik, Jan Engberg, and Ingolf Thuesen. 1994. “DNA from Arctic Human Burials.” In *Ancient DNA: Recovery and Analysis of Genetic Material from Paleontological, Archaeological, Museum, Medical, and Forensic Specimens*, edited by Bernd Herrmann and Susanne Hummel, 122–140. New York: Springer.

[Olofsson](#), Camilla. 2010. “Making New Antlers: Depositions of Animal Skulls and Antlers as a Message of Regeneration in South Sámi Grave Contexts.” *Norwegian Archaeological Review* 43 (2):97–114.

[Orlando](#), Ludovic, Robin Allaby, Pontus Skoglund, Clio Der Sarkissian, Philipp W. Stockhammer, et al. 2021. “Ancient DNA analysis.” *Nature Reviews Methods Primers* 1 (1):14. <http://doi.org/10.1038/s43586-020-00011-0>.

[Park](#), Robert W. 1987. “Dog Remains from Devon Island, N.W.T.: Archaeological and Osteological Evidence for Domestic Dog Use in the Thule Culture.” *Arctic* 40 (3):184–190.

[Pasarić](#), Maja, and Graeme Warren. 2019. “Interactions of Care and Control: Human–animal Relationships in Hunter-gatherer Communities in Near-contemporary Eastern Siberia and the Mesolithic of Northwest Europe.” *Cambridge Archaeological Journal* 29 (3):465–478. <http://doi.org/10.1017/S095977431900012X>.

- [Patton](#), A. Katherine, and James M. Savelle. 2006. “The Symbolic Dimensions of Whale Bone Use in Thule Winter Dwellings.” *Etudes/Inuit/Studies* 30 (2):137–161.
- [Pedersen](#), Mikkel Winther, Søren Overballe-Petersen, Luca Ermini, Clio Der Sarkissian, James Haile, et al. 2015. “Ancient and modern environmental DNA.” *Philosophical Transactions of the Royal Society B: Biological Sciences* 370 (1660):20130383. <http://doi.org/10.1098/rstb.2013.0383>.
- [Perri](#), Angela. 2016. “A Wolf in Dog’s Clothing: Initial Dog Domestication and Pleistocene Wolf Variation.” *Journal of Archaeological Science* 68:1–4. <https://doi.org/10.1016/j.jas.2016.02.003>.
- [Perri](#), Angela R., Tatiana R. Feuerborn, Laurent A. F. Frantz, Greger Larson, Ripan S. Malhi, et al. 2021. “Dog Domestication and the Dual Dispersal of People and Dogs into the Americas.” *Proceedings of the National Academy of Sciences* 118 (6):e2010083118. <http://doi.org/10.1073/pnas.2010083118>.
- [Pitul’ko](#), Vladimir V., and Aleksey K. Kasparov. 2016. “Early Holocene Dog Bones from the Zhokhov Site (East Siberian Arctic) and the Question of the Reliability of Identification of Early *Canis familiaris* from Archaeological Excavations.” *Stratum Plus* (St. Petersburg) 1:171–207.
- [Pryor](#), Alexander J. E., David G. Beresford-Jones, Alexander E. Dudin, Ekaterina M. Ikonnikova, John F. Hoffecker, et al. 2020. “The chronology and function of a new circular mammoth-bone structure at Kostenki 11.” *Antiquity* 94 (374):323–341. <http://doi.org/10.15184/aqy.2020.7>.
- [Raghavan](#), Maanasa, Michael DeGiorgio, Anders Albrechtsen, Ida Moltke, Pontus Skoglund, et al. 2014. “The Genetic Prehistory of the New World Arctic.” *Science* 345 (6200). <http://doi.org/10.1126/science.1255832>
- [Randa](#), Vladimir. 2017. “Pénétration, dévoration, métamorphoses, adoption: modalités d’interactions entre les Inuits et les « petites bêtes » (qupirruit).” *Recherches amérindiennes au Québec* 47 (2–3):123–133. <https://doi.org/10.7202/1048600ar>.
- [Rasmussen](#), Morten, Yingrui Li, Stinus Lindgreen, Jakob Skou Pedersen, Anders Albrechtsen, et al. 2010. “Ancient human genome sequence of an extinct Palaeo-Eskimo.” *Nature* 463 (7282): 757–762. <http://doi.org/10.1038/nature08835>.
- [Rearden](#), Alice, Marie Meade, Mark John, and Ann Fienup-Riordan. 2021. *Ircenrraat: Other-than-human Persons in Southwest Alaska*. Fairbanks: Alaska Native Language Center.
- [Seersholm](#), Frederik V., Hans Harmsen, Anne Birgitte Gotfredsen, Christian K. Madsen, Jens F. Jensen, et al. 2022. “Ancient DNA provides insights into 4,000 years of resource economy across Greenland.” *Nature Human Behaviour* 6 (12):1723–1730. <http://doi.org/10.1038/s41562-022-01454-z>.

[Serpell](#), James, ed. 2017. *The Domestic Dog: Its Evolution, Behavior and Interactions with People*. Second ed. Cambridge: Cambridge University Press.

[Sheppard](#), William L. 2004. "The Significance of Dog Traction for the Analysis of Prehistoric Arctic Societies." *Alaska Journal of Anthropology* 2 (1–2):70–82.

[Sinding](#), Mikkel-Holger S., Filipe Garrett Vieira, and M. Hayeur Smith. 2017. "Unmatched DNA Preservation Prove Arctic Hare and Sheep Wool in Norse Greenlandic Textile from "The Farm Beneath the Sand"." *Journal of Archaeological Science: Reports* 14:603–608. <https://doi.org/10.1016/j.jasrep.2017.06.043>.

[Sonne](#), Birgitte. 2017. "Inuit Symbolism of the Bearded Seal." *Études/Inuit/Studies* 41 (1–2):29–50.

[Szpak](#), Paul. 2022. "Why Zooarchaeology Needs Stable Isotope Analysis." In *Isotope Research in Zooarchaeology: Methods, Applications, and Advances*, edited by Ashley E. Sharpe and John Krigbaum, 248–270. Gainesville, FL: University Press of Florida.

[Szpak](#), Paul, James M. Savelle, James Conolly, and Michael P. Richards. 2019. "Variation in Late Holocene Marine Environments in the Canadian Arctic Archipelago: Evidence from Ringed Seal Bone Collagen Stable Isotope Compositions." *Quaternary Science Reviews* 211:136–155. <https://doi.org/10.1016/j.quascirev.2019.03.016>.

[Todd](#), Zoe. 2018. "Refracting the State Through Human-Fish Relations: Fishing, Indigenous Legal Orders and Colonialism in North/Western Canada." *Decolonization: Indigeneity, Education & Society* 7 (1):60–75.

[Turner](#), Edith. 1990. "The Whale Decides: Eskimos' and Ethnographer's Shared Consciousness on the Ice." *Études/Inuit/Studies* 14 (1–2):39–52.

[Vadala](#), Jeffrey, and Lisa Duffy. 2021. "Using Actor-Network Theory to Characterize the Production of Ancient Maya Caching Events at Cerro Maya (Cerro, Belize)." *Journal of Archaeological Method and Theory* 28 (4):1027–1057. <https://doi.org/10.1007/s10816-020-09485-4>.

[Van Oyen](#), Astrid. 2015. "Actor-Network Theory's Take on Archaeological Types: Becoming, Material Agency and Historical Explanation." *Cambridge Archaeological Journal* 25 (1):63–78. <https://doi.org/10.1017/S0959774314000705>.

[Wang](#), Yucheng, Mikkel Winther Pedersen, Inger Greve Alsos, Bianca De Sanctis, Fernando Racimo, et al. 2021. "Late Quaternary dynamics of Arctic biota from ancient environmental genomics." *Nature* 600 (7887):86–92. <https://doi.org/10.1038/s41586-021-04016-x>.

[Whitridge](#), Peter. 2004a. “Landscapes, Houses, Bodies, Things: ‘Place’ and the Archaeology of Inuit Imaginaries.” *Journal of Archaeological Method and Theory* 11 (2):213–250. <https://doi.org/10.1023/b:jarm.0000038067.06670.34>.

[Whitridge](#), Peter. 2004b. “Whales, Harpoons, and Other Actors: Actor-Network Theory and Hunter-Gatherer Archaeology.” In *Hunters and Gatherers in Theory and Archaeology*, edited by George M. Crothers, 445–474. Carbondale, IL: Center for Archaeological Investigations, Southern Illinois University.

[Whitridge](#), Peter. 2018. “The Government of Dogs: Archaeological (zo)ontologies.” In *Relational Engagements of the Indigenous Americas: Alterity, Ontology, and Shifting Paradigms*, edited by Melissa R. Baltus and Sarah E. Baires, 21–39. Lanham, MD: Lexington Books.

[Wygall](#), Brian T., Kathryn E. Krasinski, Jessica Z. Metcalfe, David McMahan, Charles E. Holmes, et al. 2022. “Archaeological Recovery of Late Pleistocene Hair and Environmental DNA from Interior Alaska.” *Environmental Archaeology*:1–16. <https://doi.org/10.1080/14614103.2022.2031836>.