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# THE LOST NORSE

Archaeologists have a new answer to the mystery of Greenland's Norse, who thrived for centuries and then vanished

By **Eli Kintisch**, *in Tasilikuloq, in Greenland*





Hvalsey Church was the site of a 1408 wedding, the last record of Norse life in Greenland.

ings, so long cut off from all intercourse with the more civilized world?” Egede wrote in an account of the journey. “Were they destroyed by an invasion of the natives ... [or] perished by the inclemency of the climate, and the sterility of the soil?”

Archaeologists still wonder today. No chapter of Arctic history is more mysterious than the disappearance of these Norse settlements sometime in the 15th century. Theories for the colony’s failure have included everything from sinister Basque pirates to the Black Plague. But historians have usually pinned most responsibility on the Norse themselves, arguing that they failed to adapt to a changing climate. The Norse settled Greenland from Iceland during a warm period around 1000 C.E. But even as a chilly era called the Little Ice Age set in, the story goes, they clung to raising livestock and church-building while squandering natural resources like soil and timber. Meanwhile, the seal-hunting, whale-eating Inuit survived in the very same environment.

Over the last decade, however, new excavations across the North Atlantic have forced archaeologists to revise some of these long-held views. An international research collective called the North Atlantic Biocultural Organisation (NABO) has accumulated precise new data on ancient settlement patterns, diet, and landscape. The findings suggest that the Greenland Norse focused less on livestock and more on trade, especially in walrus ivory, and that for food they relied more on the sea than on their pastures. There’s no doubt that climate stressed the colony, but the emerging narrative is not of an agricultural society short on food, but a hunting society short on labor and susceptible to catastrophes at sea and social unrest.

Historian Poul Holm of Trinity College in Dublin lauds the new picture, which reveals that the Greenland Norse were “not a civilization stuck in their ways.” To NABO archaeologist George Hambrecht of the University of Maryland in College Park, “The new story is that they adapted but they failed anyway.”

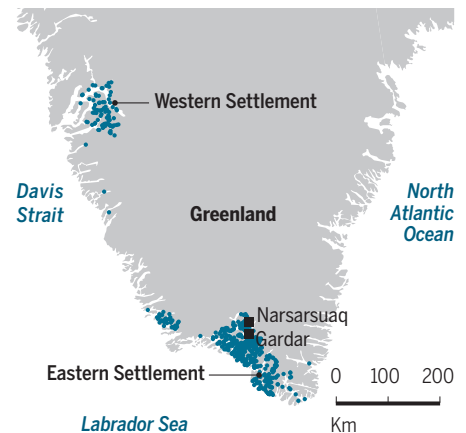
Ironically, just as this new picture is emerging, climate change once again threatens Norse settlements—or what’s left of them. Organic artifacts like clothing and animal bones, preserved for centuries in the deep freeze of the permafrost, are decaying rapidly as rising temperatures thaw the soil. “It’s horrifying. Just at the time we can do something with all this data, it is disappearing under our feet,” Holm says.

IN 1976, a bushy-bearded Thomas McGovern, then 26, arrived for the first time on the grassy shore of a fjord in southern Greenland, eager to begin work on his Ph.D. in archaeology. The basic Norse timeline had already been established. In the ninth century, the advances in seafaring technology that enabled Scandinavian Vikings to raid northern and central Europe also opened the way for the Norse, as they came to be known in their later, peaceful incarnations, to journey west to Iceland. If the unreliable Icelandic *Sagas*, written centuries later, are to be believed, an enterprising Icelander named Erik the Red led several ships to Greenland around 985 C.E. The Norse eventually established two settlements, with hundreds of farms and more than 3000 settlers at their peak. But by 1400, the settlement on the island’s western coast had been abandoned, according to radiocarbon dates, and by 1450 the inhabitants in the Eastern Settlement on the island’s southern tip were gone as well.

Data gathered in the 1980s by McGovern and others suggested that the colonies were doomed by “fatal Norse conservatism in the face of fluctuating resources,” as McGovern,

## The Arctic frontier

Norse colonists established settlements in southern Greenland, often siting their farmsteads on fjords.



now at Hunter College in New York City, wrote at the time. The Norse considered themselves farmers, he and others thought, tending hay fields despite the short growing season and bringing dairy cows and sheep from Iceland. A 13th century Norwegian royal treatise called *The King’s Mirror* lauds Greenland’s suitability for farming: The sun has “sufficient strength, where the ground is free from ice, to warm the soil so that the earth yields good and fragrant grass.”

Bone samples suggest that even small farms kept a cow or two, a sign of status

In 1721, missionary Hans Egede sailed a ship called *The Hope* from Norway to Greenland, seeking Norse farmers whom Europeans hadn’t heard from in 200 years in order to convert them to Protestantism. He explored icebergdotted fjords that gave way to gentle valleys, and silver lakes that shimmered below the massive ice cap. But when he asked the Inuit hunters he met about the Norse, they showed him crumbling stone church walls: the only remnants of 500 years of occupation. “What has been the fate of so many human be-



In the 10th and 11th centuries, the Norse crossed the stormy Atlantic to Greenland in vessels resembling this ninth century Viking ship found in Norway.





back in Norway, and written records mention dairy products including cheese, milk, and a yogurt called skyr as essential parts of the diet. “There were no activities more central to Norse identity than farming,” archaeologist William Fitzhugh of the Smithsonian Institution’s National Museum of Natural History (NMNH) in Washington, D.C., wrote in 2000.

Geographer Jared Diamond of the University of California, Los Angeles, popularized this view in his 2005 bestseller, *Collapse*. The Norse “damaged their environment” as they had done in Iceland, Diamond asserted, based on analyses of dust that suggested erosion caused by felling trees, agriculture, and turf cutting. While foolishly building churches with costly bronze bells, Diamond said, Greenland’s Norse “refused to learn” Arctic hunting techniques from the Inuit, who hunted seals and fish year-round. He noted grisly evidence of calamity at a few sites in the Western Settlement: bones of pet dogs with cut marks on them, suggesting hunger; and the remains of insects that feasted on corpses, suggesting too few survivors to bury their loved ones. “Every one of [the Norse] ended up dead,” Diamond said in 2008.

This narrative held sway for years. Yet McGovern and others had found hints back in the 1980s that the Norse didn’t entirely ignore Greenland’s unique ecology. Even Diamond had noted that bones of seals comprised 60% to 80% of the bones from trash heaps, called middens, found at small Norse farms. (He believed, though, that only the poorer settlers ate seal meat.) Written sources reported that the Norse routinely rowed up to 1500 kilometers to walrus migratory grounds near Disko Bay in western Greenland. They returned with countless walrus snouts, whose ivory tusks they removed and prepared for trade with Europe. The Norse paid tithe to the Norwegian king and to the Catholic Church in ivory, and traded it with European merchants for supplies like iron, boat parts, and wood. But McGovern dismissed the walrus hunt as “a curious adjunct,” he recalls, echoing the scholarly consensus that farming was central.

**THREE DECADES LATER** here at Tasilikuloq (TA-SEE-LEAK-U-LOCK), a modern Inuit farm of green pastures flanked by lakes, a couple of McGovern’s students and others are busy exploring the remains of a medium-sized farm that once housed sheep, goats, horses, and a few cows. Two graduate students in rubber overalls hose 700-year-old soil off unidentified excavated objects near a midden downhill from a collapsed

house. A brown button the size of a nickel emerges on the metal sieve. “They found one more of those buttons,” says archaeologist Brita Hope of the University Museum of Bergen in Norway, smiling, when word makes it back to the farmhouse the nine-member team uses as a headquarters for the monthlong dig. “We could make a coat,” a student jokes.

But the function of the button matters a lot less than what it’s made of: walrus tooth. Several walrus face bones have also turned up at the farm, suggesting that the inhabitants hunted in the communal Disko Bay expedition, says excavation leader Konrad Smiarowski of the City University of New York in New York City. These finds and others point to ivory—a product of Greenland’s environment—as a linchpin of the Norse economy.

One NABO dig in Reykjavik, for example, yielded a tusk, radiocarbon dated to about 900 C.E., which had been expertly

removed from its skull, presumably with a metal tool. The find suggests that the early Icelandic Norse were “experienced in handling walrus ivory,” NABO members wrote in a 2015 paper; it follows that the Greenlanders were, too. Although historians long assumed that the Norse settled Iceland and Greenland in search of new farmland, some researchers have recently suggested that the hunt for ivory instead drove the settlement of both islands. Walrus in Iceland were steadily extirpated after the Norse arrived there, likely hunted out by the settlers.

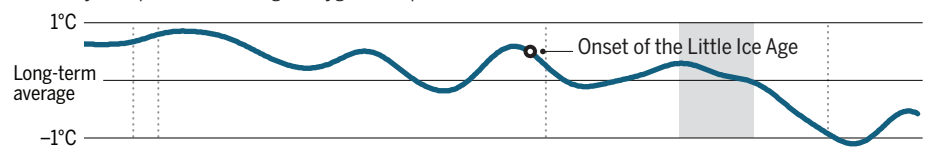
The high value that medieval Europe placed on walrus ivory would have provided plenty of incentive to pursue it in Greenland. Craftsmen used ivory in luxury ornaments and apparel, and in objects like the famous Lewis chess set, discovered in Scotland in 1831. In 1327, an 802-kilogram parcel of Greenland tusks was worth a small fortune—the equivalent of roughly

## Fighting the big chill

Environmental data show that Greenland’s climate worsened during the Norse colonization. In response, the Norse turned from their struggling farms to the sea for food before finally abandoning their settlements.

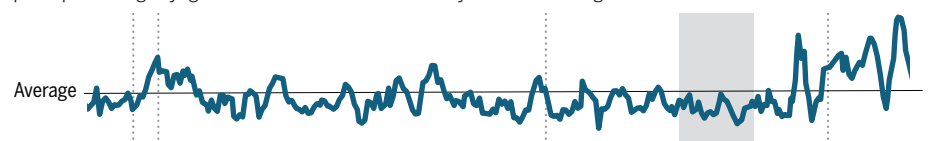
### Temperature

Winter temperatures dropped below the long-term average by more than a degree halfway through the 5-century occupation, according to oxygen isotope data in cores taken from the Greenland Ice Sheet.



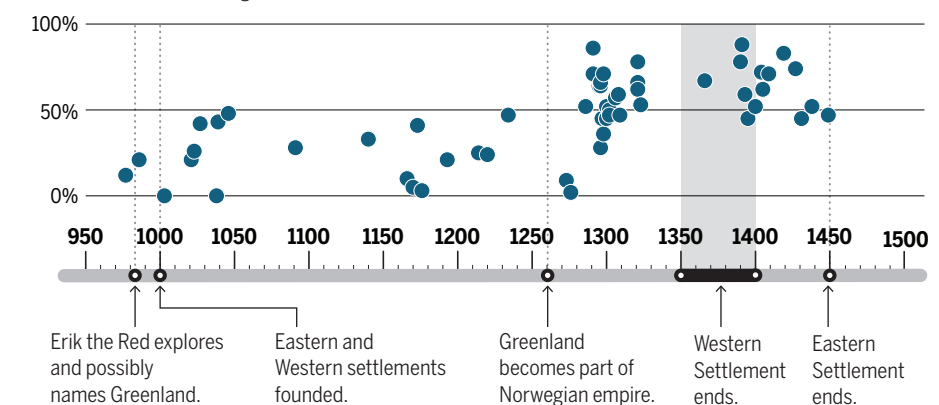
### Storminess

Measurements of salt particles in ice cores suggest that storminess rose toward the end of the occupation, perhaps making voyages to hunt and trade walrus ivory even more dangerous.



### Proportion of marine food in diet

As conditions for farming worsened, the Norse shifted to a more marine diet, as shown by carbon isotopes in bones found in archaeological sites in the Eastern and Western settlements.



# Growing Greenland's archaeologists

By **Eli Kintisch**, in *Tasilikuloq*, in Greenland

One warm afternoon at an ancient Norse site, now a modern Inuit sheep farm, archaeology graduate student Michael Nielsen lay on his stomach, contentedly sorting through thousands of tiny rocks and bones seeking artifacts. For archaeologists at a dig, the painstaking work known as picking is an everyday routine. What's unusual, however, is Nielsen's background: He is a native Greenlander.

"I just love the artifacts," he says. For Nielsen, born in the nearby town of Narsaq, an infatuation with archaeology started "from the first minute" he began working on a dig 3 years ago. Then an undergraduate at the University of Greenland in Nuuk, he enjoyed the physicality of the work. And the waves of occupation in Greenland—ancient indigenous populations who arrived then disappeared, followed by the Norse, and finally the Inuit—captured his interest.

Yet even as researchers comb Greenland for clues to the Norse disappearance (see main story, p. 696), only a handful of homegrown archaeologists are on hand to help; most research is done by outsiders from Denmark or other Western countries. The paucity of local experts may explain why much of the island's rich record has been overlooked, with hundreds of known

archaeological sites unexcavated. "Having more homegrown archaeologists would be very important for Greenland so that they can set their own priorities," says Konrad Smiarowski, a graduate student at the City University of New York in New York City who leads the dig here. "The sites that have been excavated are those that the international community has prioritized, but you could see Greenlandic scientists targeting other ones, for example sites that are at risk of loss from climate change."

For now, budding archaeologists like Nielsen face challenges. The University of Greenland doesn't have an archaeology department. And parents and policymakers have other priorities, Nielsen says. "People want Greenlandic students to become doctors and lawyers."

All the same, "it's important for us to make our own research and write our own history," says Greenlander Mari Kleist, who got her Ph.D. in archaeology in Denmark in 2013 and is now based in Brussels. Both she and Nielsen intend to one day publish on Greenland archaeology in Greenlandic, an Inuit tongue. "Greenlanders don't know much about archaeology," Nielsen says. "I'd want to tell people about the prehistory of Greenland, the Norse, and the Inuit." ■



Greenlander Eva Luusi Marcussen-Mølgaard of the University of Greenland in Nuuk (left) washes soil off artifacts. She is one of a handful of students eager to study the archaeology of their homeland.

780 cows or 60 tons of dried fish, according to tithing records analyzed in 2010 by University of Oslo archaeologist Christian Keller. "The Norse had found a cornucopia in the North Atlantic, a marine ecosystem just teeming with walrus and other animals," says historian Holm.

They exploited it not just for ivory, but also for food, Smiarowski says as he huddles in a dimly lit side room here to review recent finds. One bag contains bones collected from a layer dating to the 1350s. A long, thin, cow bone had been split open, probably to eat the marrow. But most of the bones are marine: scraps of whale bone, jaw and skull fragments of harp seals, a bit of inner ear of a hooded seal. These two species of seal migrate north along Greenland shores in the spring, and Smiarowski thinks the Norse likely caught them with boats and nets or clubs.

In 2012, NABO researchers clinched the case that the Greenlanders ate a marine diet by analyzing human bones in Norse graveyards. Animals that live in the sea have ratios of carbon and nitrogen isotopes that differ from those found in terrestrial animals, and this isotopic signature is passed on to the people who eat them. The Norse bones show that as the settlement developed from the 11th to the 15th century, their diet contained ever more marine protein (see graphic, p. 699). Far from clinging to livestock as temperatures fell, the Norse instead managed a successful subsistence system with "flexibility and capacity to adapt," wrote the author of the 2012 paper, Jette Arneborg from the National Museum of Denmark in Copenhagen.

Nor were the Norse incompetent farmers, as Diamond and others have suggested. Soil geographer Ian Simpson of the University of Stirling in the United Kingdom says previous studies overestimated the Norse contribution to erosion in Greenland. New pollen and soil data show that the Norse allowed fields and what little forest existed to recover after tilling and turf cutting. And in analyses of soil and lake sediment cores, researchers have found chemical and paleoecological clues indicating that Norse farmers skillfully maintained pastures with manure fertilizer and irrigation ditches.

Such findings, along with the ivory evidence, have transformed ideas about Norse society, says McGovern, whose beard is now white. "You start to see old data, like the seal bones in the middens, in a new light. It's exciting to get a chance to revise your old thinking before a younger colleague can," he says. "We used to think of Norse as farmers who hunted. Now, we consider them hunters who farmed."



It was a sustainable lifestyle for hundreds of years. But in the 13th century, economics and climate began to conspire against the Norse. After 1250, a cooling climate posed multiple threats to a marine-oriented society reliant on seal and walrus. (Global average temperature fell by about a degree during the Little Ice Age, although scientists have struggled to quantify local cooling.) Even before the big chill set in, *The King's Mirror* describes ships lost and men who perished in ice. Historians and climatologists agree that as the cold spell continued, ice would have clogged the seas farther south and for longer each year, disrupting voyages. And concentrations of salt particles in glacier cores indicate that seas became stormier in the 15th century. Norsemen hunting migratory seals or walrus on the high seas would have been at increasing risk. The nomadic Inuit, by contrast, hunted seal native to the fjords, and rarely embarked on open-ocean hunts or journeys.

Not only did the climate disrupt trade, but the market did, too. Around 1400, the value of ivory in Europe fell as tusks from Russian walrus and African elephants flowed into the continent.

Even as surviving from marine resources became more difficult, the growing season on land shortened, and the meager pastures yielded even less. But soil and sediment analyses show that the farmers, too, tried to adapt, Simpson said, often fertilizing and watering their pastures more intensively as temperatures dropped. "We went in with the view that they were helpless in the face of climate change and they wrecked the landscape," Simpson says. Instead, he says, these "pretty good managers" actively adapted to the cooling climate. In the end, however, their best efforts fell short.

**AT THE GRAND BISHOP'S SEAT** of Gardar, 35 kilometers away by boat from the modest farm at Tasilikuloq, grass grows around the ruins of a cathedral, the bishop's residence, and myriad other buildings probably built by stonemasons shipped in from Norway. Stone shelters here once housed more than 100 cows—a sign of power in medieval Scandinavia.

If the Greenland settlement was originally an effort to find and exploit the prized natural resource of ivory, rather than a collection of independent farmers, the society would have needed more top-down planning than archaeologists had thought, says Christian Koch Madsen of the Danish and

Greenlandic National Museums in Copenhagen. His work and other research support that notion by revealing orchestrated changes in the settlement pattern as the climate worsened.

Madsen carefully radiocarbon dated organic remains like wood from the ruins of 1308 Norse farms. The dates show that Gardar, like other rich farms, was established early. But they also suggest that when the first hints of the Little Ice Age appeared around 1250, dozens of outlying



Greenland was a key source of walrus ivory, which was carved into luxury goods such as the famous 12th century Lewis chessmen from Scotland.

farms were abandoned, and sometimes re-established closer to the central manors. The bones in middens help explain why: As temperatures fell, people in the large farms continued to eat beef and other livestock whereas those in smaller farms turned to seal and caribou, as Diamond had suggested. To maintain their diet, Greenland's powerful had to expand labor-intensive practices like storing winter fodder and sheltering cows. He thinks that larger farms got the additional labor by establishing tenant farms.

The stresses mounted as the weather worsened, Madsen suspects. He notes that the average Norse farmer had to balance the spring- and summertime demands of his own farm with annual communal walrus and migratory seal hunts. "It was all happening at once, every year," Madsen says. Deprivation in lower societal strata "could eventually have cascaded up through the system," destabilizing large farms dependent on tithes and labor from small ones. The disrupted ivory trade, and perhaps

losses at sea, couldn't have helped. The Greenland Norse simply could not hold on.

It adds up to a detailed picture that most archaeologists studying the Norse have embraced. But not everyone agrees with the entire vision. Fitzhugh of NMNH, for one, questions the reconception of the colony as an ivory-focused trading post and still thinks farming was more important. "They couldn't get enough ivory to maintain 5000 people in the Arctic," he says.

Fitzhugh does agree with Madsen and others on how the final chapter of the Greenland saga may have played out. Despite the signs of crisis at a few Western Settlement sites, those in the Eastern Settlement show no sign of a violent end. Instead, after farmhouses collapsed, remaining settlers scavenged the wood from them, suggesting a slow dwindling of population. The challenge for the average Greenlander to survive drove "a constant emigration" back to Iceland and Europe, Fitzhugh hypothesizes, "which could bring the Eastern [Settlement] to a close peacefully, without starvation or death by Inuit."

The NABO team hopes future grants will allow them to fill out that picture. They're eager to start new excavations in the Western Settlement, where artifacts could shed light on any contact between the Norse and Inuit, a historical possibility about which there are little hard data.

Time is running out. The Tasilikuloq excavation yielded well-preserved artifacts including wooden spoons, bowls, and a small wooden horse. But McGovern fears that its success may not be repeated. Thirty years ago most sites in the Eastern Settlement contained preserved bone, hair, feathers, and cloth. A NABO survey of 90 sites has found, however, that most organic samples "had pretty much turned to mush" as the permafrost thawed, Smiarowski says. Tasilikuloq was one of only three sites spared.

Hans Egede, the missionary, wrote that he went to Greenland 500 years ago to save its people from "eternal oblivion." Today's archaeologists fear a different oblivion—that Greenland's prehistory will be lost unless it is quickly unearthed. As pioneers who weathered climate change, the Greenland Norse may hold lessons for society today. But the very changes that make those lessons urgent could keep them from ever being fully deciphered. ■

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# Science

## The lost norse

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