

NORSE CULTURAL REACTION TO CLIMATE CHANGE DURING THE LITTLE ICE AGE  
AND THEIR SOCIETAL COLLAPSE IN GREENLAND

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NORSE CULTURAL REACTION TO CLIMATE CHANGE IN GREENLAND DURING THE  
LITTLE ICE AGE

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This study aims to understand the adaptations of the Norse Greenlanders to climate change in their new home. In hopes of understanding the changes thoroughly, a multi-disciplinary study will be used. The aim of this study is to understand the Norse's triumphs and failures in adaptation to ultimately discern what led to the Norse's disappearance in Greenland.

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## **INTRODUCTION**

Vikings are known for their thirst for new lands and their far reaching expansion into the North Atlantic. Travelling from Norway, Sweden and Denmark, their homeland, they created settlements in what is today the Faroe Islands, the British Isles, Iceland, Greenland, and, for a short time, North America (McGovern 1980). Neither the North American nor the Greenland settlements were to last, however. The sites were either deserted or the entire populations perished. Greenland in particular is an interesting case because the Norse were settled there from AD 985-ca.1500, roughly 500 years. The cause of the collapse of the Greenland settlements is attributed to many factors, the greatest of which was the Little Ice Age that occurred from AD 1250-1850 (McGovern 1990). Suddenly, a new set of problems was thrust upon the Norsemen. In order to survive, cultural adaptations needed to be made. What were these adaptations? In what ways did they fail to adapt to their changing environment?

## **BACKGROUND**

According to the Erik the Red's Saga, Eirikur Thorvaldsson (or Erik the Red) committed a double homicide in AD 982. After conviction, Thorvaldsson was banished from Iceland for three years. Upon receiving his sentence, Thorvaldsson decided to sail westward in search of Gunnbjorn, a land rumored to be west of Iceland, so he gathered a small crew together and sailed west. It wasn't long before Thorvaldsson and his crew found Gunnbjorn (or Greenland as it is known today) (Sephton 1880). The men sailed around the southern tip of Greenland and north

along the coast until they found a fjord relatively free of ice. It is within this fjord that the first Greenland settlement was founded and his homestead “Brattahlid” meaning “the steep incline” (Gad 1970, McGovern 1990).

After spending his remaining years in exile, Thorvaldsson returned to Iceland for the winter in hopes of gathering more individuals to populate his new settlement. Gathering a small following, Thorvaldsson returned to his settlement and began his colonization of Greenland.

The early years for Norse Greenlanders were rather successful. They easily adapted to the new environment and local resource economy. Finding the landscape unpopulated, the Norse branched out from their first settlement, now known as the Eastern Settlement, and formed the smaller Western Settlement 575 km north (Figure 1). So successful were the settlements that they requested a Bishop from the Norwegian court in AD 1125 and built Gardar, a cathedral whose ruins are still present in the Eastern Settlement today. It wasn't until AD 1150 that the Norsemen first encountered other peoples on the island. The Thule Inuit, who had lived in the extreme north of Greenland, had begun to move southward towards the Norse settlements. The Norsemen dubbed the Thule “Skraelings” and maintained the first contact between Europeans and North Americans for 300 years (McGovern 1980:246, Ogilvie et al. 2000).

By the year AD 1300, the Greenland settlements appear to be struggling although there is debate to the cause. As early as AD 1350, the Western Settlement, home to 1000-2000 Norse at its peak, had been completely abandoned. Episcopal Steward Ivar Baardsson, who travelled to the settlement to perform his religious duties, reported that the no human life was to be seen at the Western Settlement, only herding animals. Not long after this discovery, contact with other Norse settlements diminished (McGovern 1980). The last evidence that the Eastern Settlement still remained was in AD 1409 when a witch burning was documented at Hvalsey church

(Dugmore et al. 2007, Gad 1971). With no contact beyond 1409, the fate of the last Norsemen of Greenland is unclear.

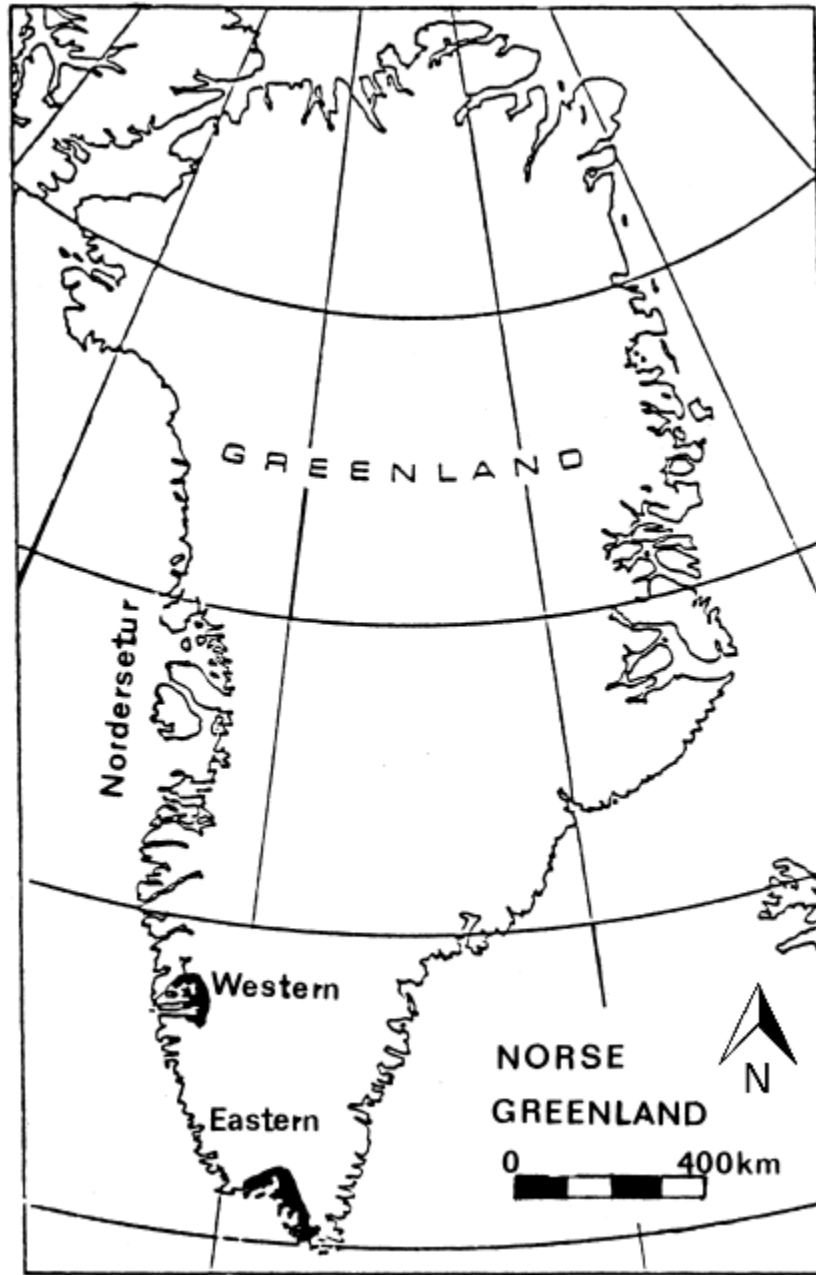


Figure 1. The Locations of the Eastern and Western Settlements (McGovern 1980:Figure 1).

Interest in the fate of the Norse Greenlanders has been around since the mid-1700s. As recent as the 1970s, fieldwork in Greenland increased and theories on loss of the settlements

have multiplied. There has been a shift from a monocausal explanation to a many-faceted explanation for the failure of the Norse. Their fate likely falls to a combination of their reactions to the Thule, climate change, and isolation from the greater Norse empire (McGovern 1990).

## **METHODS**

In order to understand how the Norse of Greenland adapted to their environments, many areas of study must be studied. This topic will, therefore, be viewed from multiple disciplines such as climatology, geography, archaeology, anthropology, and the like in order to gain a well-rounded understanding of the Norse's adaptations. The information gathered is sourced from public works such as essays, journal articles, and books. A site report such from Qassiarsuk (what was once the Eastern Settlement), will be used to gather data about changes in agriculture, housing, trade, etc. as well as midden analyses.

## **CLIMATE**

### **Ice Cores**

In circa AD 1000, roughly the same period as Norse settlement of Greenland, the climate of Greenland was relatively mild. One major factor in determining the climate of Norse Greenland is ice cores. Ice cores are cylinders of ice removed vertically from glaciers. The cores have layers called rings. Each ring represents a year and holds information based upon its contents (Buckland et al. 1995).

### Calcium and Sea-Salt Sodium



In the case of the GISP2 ice cores from Greenland, varying amounts of calcium and sea-salt sodium are directly correlated to fluctuations in climate. Greater concentrations of calcium are an indicator for stronger air circulation over landmasses and higher levels of sea-salt sodium is the result of increased storminess and cyclones over the ocean. These factors together should therefore indicate a warmer period while the inverse should denote cooler conditions. Based on this information, more mild temperatures existed before AD 1300, but from AD 1308-1319, the temperatures sank. For 11 years, the winters were far cooler than years prior to AD 1308 as is shown in low levels of calcium and sea-salt sodium found in the ice cores. Also, in AD 1343-1362, the Norse experienced approximately 20 years of low summer temperatures (Buckland et al. 1995).

Around AD 1400, the GISP2 ice core shows such a large increase of both sea-salt sodium and calcium that it is considered “the most abrupt and the largest climate change of the last 8000 years,” as temperatures began to rise from the cooler period of the 14<sup>th</sup> century (Buckland et al. 1995:94). Unfortunately, by this time, the change may have come too late as the last report of Norse Greenlanders was recorded in AD 1409 (Dugmore et al. 2007).

### Deuterium

Another means of studying ice cores is through the concentrations of deuterium over time. Deuterium is an oxygen isotope whose frequency varies depending upon the climate and weather patterns and is measured by comparing the amount of deuterium to, in this case, a 700-year average. Lower levels of deuterium correspond with lower temperatures. The reverse is also true (Ogilvie et al. 2000).

Again using the GISP2 ice-core, the levels of deuterium from AD 1300-1400 were calculated. The results showed that Greenland was experiencing comparatively lower temperatures to the 700-year average (Ogilvie et al. 2000). In Figure 2, positive values correspond with warmer temperatures while negative values correspond with colder temperatures. The amount of deuterium can be seen to fluctuate greatly and show periods of extremely low deuterium from AD 1300-1400, the time corresponding with the loss of the Western Settlement (AD 1341-1363) (ARCUS 1998, Ogilvie et al. 2000). It can be concluded, therefore, that the temperatures were far colder during those periods than in the past (Ogilvie et al. 2000).

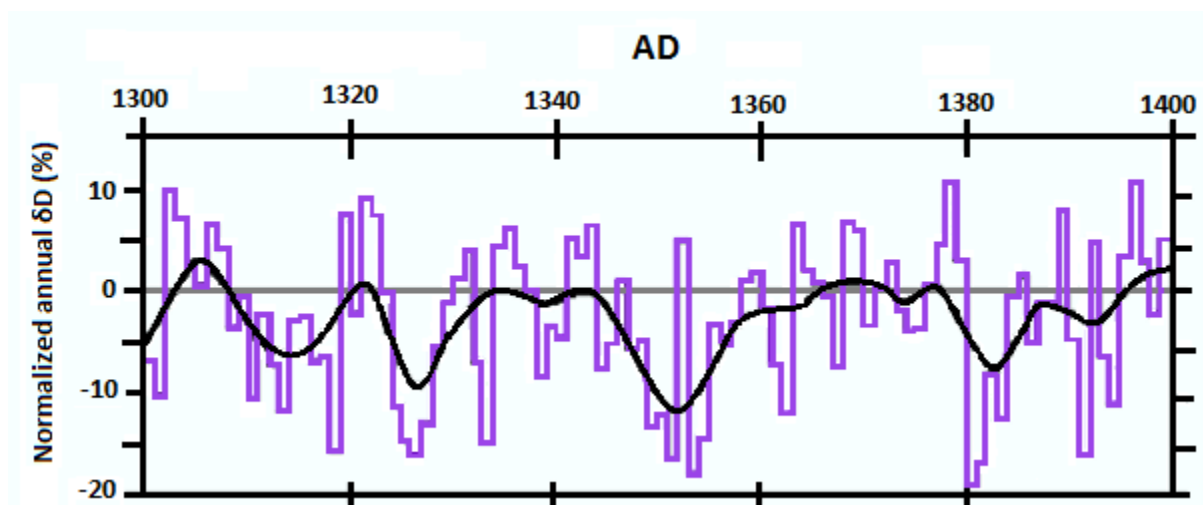


Figure 2. Normalized amounts of deuterium from AD 1300-1400 in GISP2 (Adapted from ARCUS 1998:Figure 21).

### Historical Climate Data

Since the early years of Iceland's settlement, most everything was documented including weather and sea conditions (Gad 1970, Ogilvie et al. 2000). Historical data from Iceland during the first 150 years of the Little Ice Age provides some knowledge of those conditions. Figure 3

displays the frequency of mild and cold seasons as well as sea ice occurrences from AD 800-1600 as gathered from Icelandic sources (Ogilvie et al. 2000).

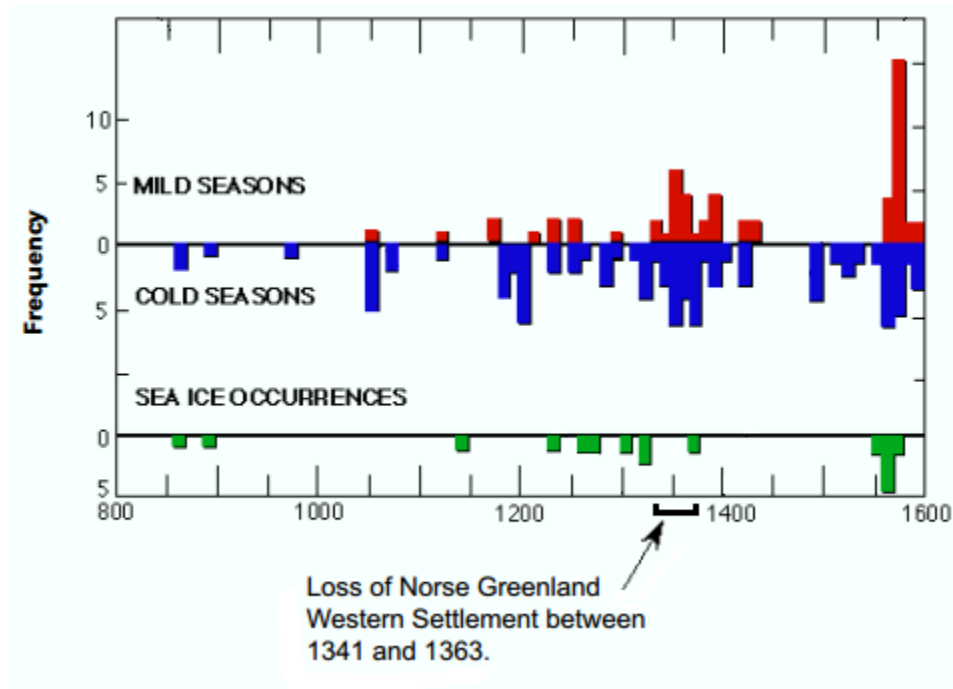


Figure 3. Historical climate data from Iceland (Adapted from ARCUS 1998:Figure 21).

The Little Ice Age did not affect Greenland alone. As is evident from AD 1300-1400 in Figure 3, climate in Iceland varies greatly, with periods of extreme mildness and coldness (ARCUS 1998). Between the years of AD 1341-1365, fluctuations between seasons were extreme in their differences. It is during this period of extremes that the Western Settlement was lost (ARCUS 1998, Ogilvie 1991). Historical data from Iceland describes remarkably cold winters during this period (Ogilvie 1991).

When comparing both the historical Icelandic data and deuterium data, it can be observed how closely the two relate (Figure 4). The comparison of the two shows highs and lows at corresponding intervals. From this data, it can be inferred with little doubt that the Little Ice Age

was a major factor in the loss of the Western Settlement, and, likely, the fate of all Norse Greenlanders.

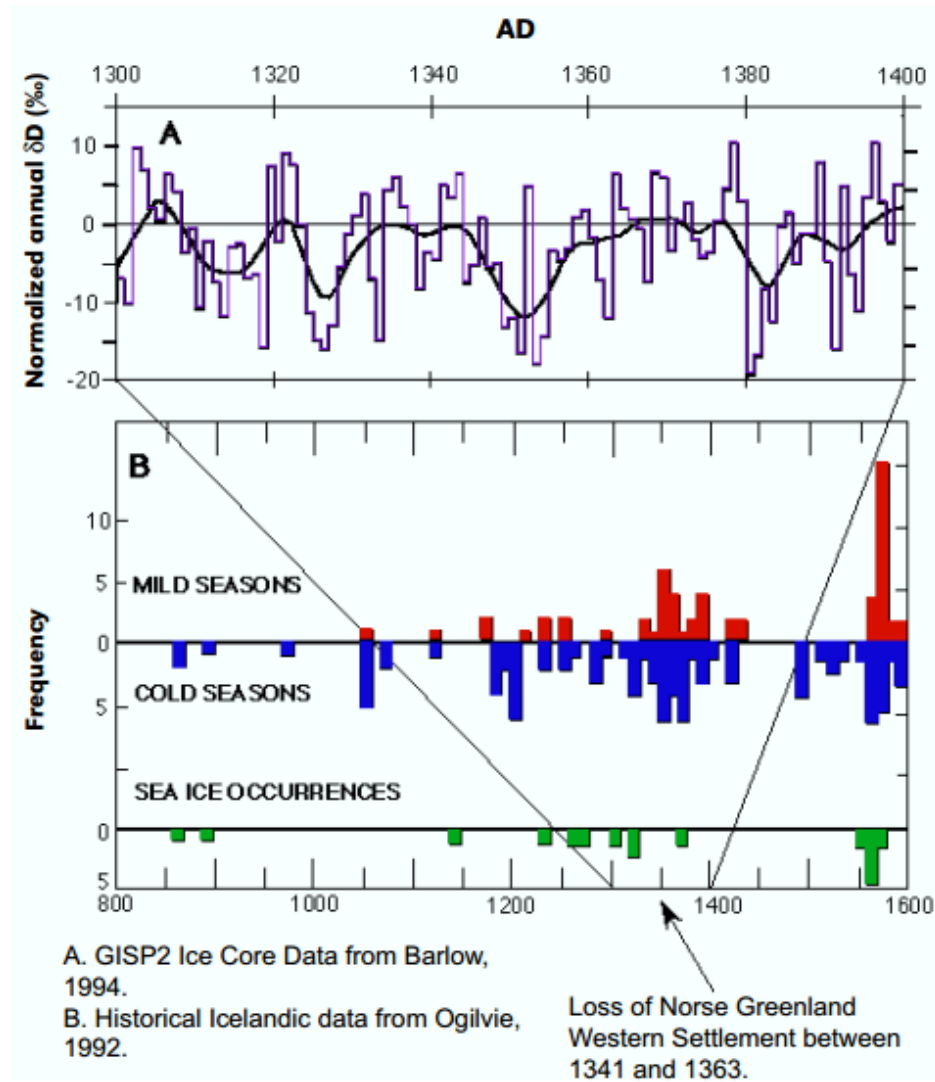


Figure 4. Comparison of deuterium data and historical Icelandic data (ARCUS 1998:Figure 21).

## DIET

Due to their Icelandic roots and the climate in which they lived, the Norse Greenlanders relied heavily on meat as subsistence (Gad 1970). In order to maintain their Icelandic lifestyle,

the Norse brought cattle, sheep, and goats to Greenland; however, the majority of their meat came from animals that they hunted, particularly caribou and seals. Interestingly, the Norse rarely hunted ringed seals which were obtainable year-round. Instead, they hunted harp seals, a migratory variety that was available only during early spring, heavily. The Norse also hunted common (harbor) and hooded seals to a lesser degree (McGovern 1980).

Interestingly, although not surprisingly, the Catholic Church was particularly concerned with what foods the peoples of the North Atlantic ate during fasting days. In Iceland, it was written law that “beef, [sheep], goat, pork, polar bear, brown bear, deer, reindeer, walrus, and seals” were forbidden to be consumed during fasts (Gad 1970:84). Luckily for the Norse, they were able to eat whale, which was considered a fish at the time, and birds with webbed feet, placing guillemot on the menu (Gad 1970).

## **Hunting**

During the summer, hunters would travel to Nordrsetr to hunt walrus, caribou, and polar bear, usually armed with a bow and arrow with either iron or bone arrowheads. They then had to carry the meat back more than 400 km either on their own backs or on the backs of the few scattered horses that had been brought to Greenland. These fatty meats were particularly essential to Norse diets as the cold weather demanded great amounts of energy from the body (Gad 1970, McGhee 1984)

Drying is the only means of preservation known to have been practiced by the Norse. They could not use salt-curing techniques as the sea waters surrounding Greenland do not yield much salt. It is possible that Norse smoked the meat, but there is no archaeological evidence to support this (Gad 1970).

## **Agriculture**

Corn and barley was grown on a small scale to supplement the Norse's diet. If the growing season lasted long enough for the grains to mature, they could be ground into flour on one of the surprisingly numerous grinding stones found throughout the Norse settlements. Typically, the flour was turned into bread. Because the amount of corn and barley grown was so minimal, it is believed that most of the flour for the bread was obtained through trade with Icelandic traders (Gad 1970).

Although not eaten by humans, hay was essential to the maintenance of cows, and, by extension, the livelihood of the Norse. Hay was used to feed all of the livestock and was particularly important during the winter months when grazing was impossible. The majority of the cropland was used to grow as much hay as possible, and the Norse were highly skilled at it. They used three types of fields to obtain the greatest amounts of hay (Diamond 2012).

The first fields, called infields, were near homes and were the most productive. These were located closest to homes, fenced to keep the animals out, and were fertilized with the manure of the nearby farm animals. Outfields, the second field type, were beyond the reaches of the fence and were not fertilized. The third field type was caused by melting snow. Once the snow had melted on a lower portion of a hill and the grass had grown, the Norse herders would bring their animals to graze. This young grass is particularly nutrient-rich and easily digestible for the cattle. As the snow melted, the Norse would slowly move their cattle up the hills and slopes. This field type, which is rather a system in this case, was known as shielings (Diamond 2012).

Late summers likely consisted of harvesting hay. It needed to be cut, dried, and stored in massive quantities. A cow needs several tons of hay to survive the brutal Greenland winters. If

there was not enough hay, many of the animals would be unable to withstand the winter. Once the hay crop was harvested, the farmers would have to determine the number of cattle they could sustain on their hay supply through the winter and cull those that they could not feed (Diamond 2012).

### **Changes in Diet**

As the climate slowly began to deteriorate, so did the hay crop. With the cooler climate came shorter summers thus diminished growing seasons. Because of the lack of hay, livestock herds shrank significantly. The particularly heavy reliance that the Norse had placed on their herd animals could no longer be sustained. To cope with this change, the Norse turned to the abundant marine resources, particularly seals (Edvardsson 2007). The diets of early Norse settlers generally came from 20% marine sources. By the late periods of occupation, the Norse had come to rely on marine resources for 80% of their diet (Arneborg et al. 1999).

### Midden Analyses

The location of Brattahlid, Eirik the Red's homestead, and the greater Eastern Settlement is located near the modern village of Qassiarsuk in Southwest Greenland; thus, the excavations carried out in this area are named for the village. The excavations at Qassiarsuk took place in 2005 and 2006 (Edvardsson 2007). All data discussed from this site come from midden analyses.

Caribou were a minor part of the Norse diet in Greenland. Although they were not eaten in large quantities or relied upon heavily, they were a consistent resource to the Eastern Settlement Norse. Caribou has a consistent frequency over the course of settlement of 2-5%. In the Western Settlement, this number is known to be as large as 27% likely due to geographical

differences in the two locations. Other mammals found in even lesser frequencies include whale and arctic fox. Surprisingly, no fish remains were recovered from the site. This could be in part due to taphonomic processes or simply because the Norse Greenlanders did not use fish (Edvardsson 2007).

Seals were perhaps the most important food resource to the Norse. They hunted and consumed a variety of seals including harp, harbor, and hooded seals. Because of the heavy use of seals by the Norse, certain seal types, particularly the harbor and hooded seals, may not have been able to recover their numbers after repeated Norse hunts. This, in combination with a changing climate, may have been enough to decimate the seal populations in Greenland. It is believed that this is the reason the Greenlanders began to rely so heavily upon the harp seal, as it remained greatly abundant (Figure 5).

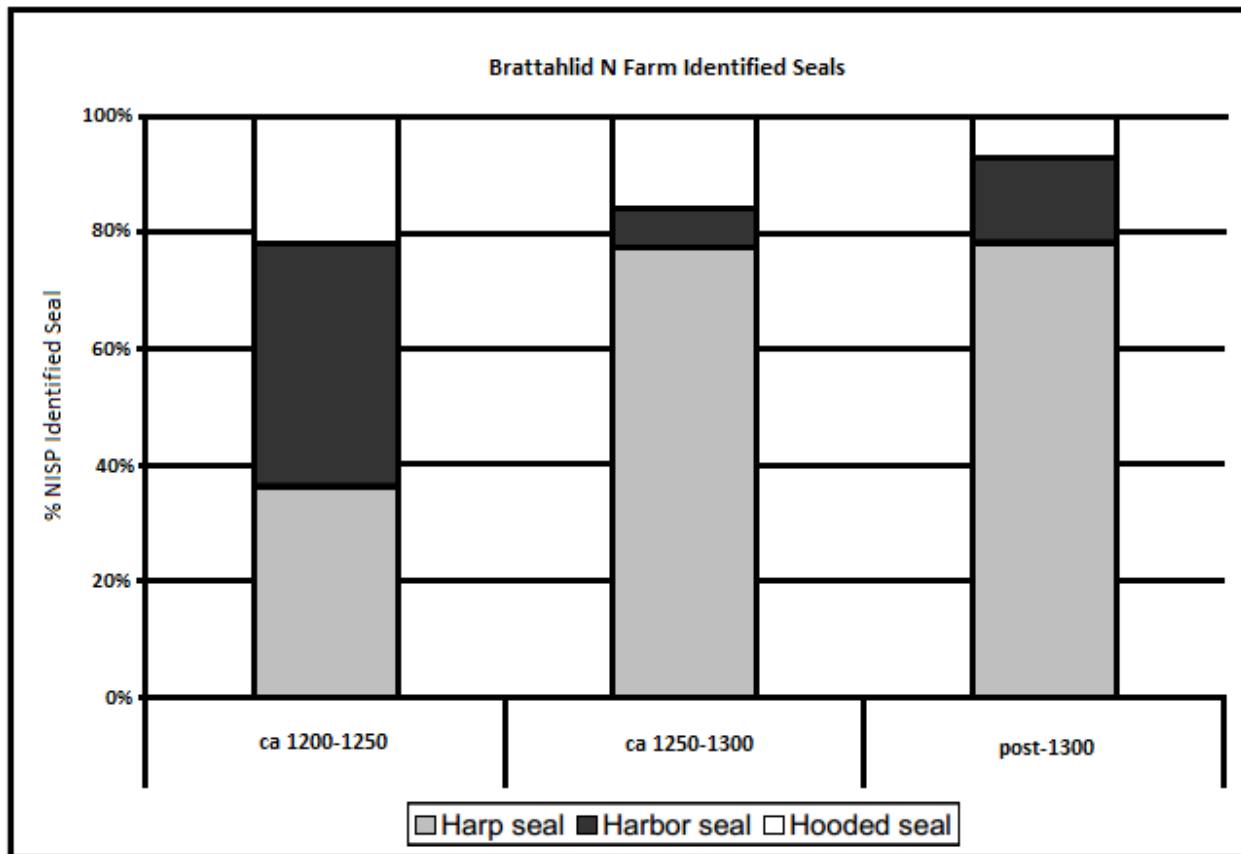




Figure 5. Relative proportions of seal bones (Edvardsson 2007:Figure 38).

The importance of the seal for subsistence cannot be overstated. Particularly as the settlements began to age, seals became the primary source of food. In earlier years, the seal composed less than half of the Norse diet, but as the climate shifted, so did the Norse diet. After AD 1300, middens displayed 3.5/1 marine (seal) bones to terrestrial bones on the Brattahlid farm. Figure 6 displays the change in marine resources over time. Greater height of the bars denote greater quantities of marine bone (Edvardsson 2007).

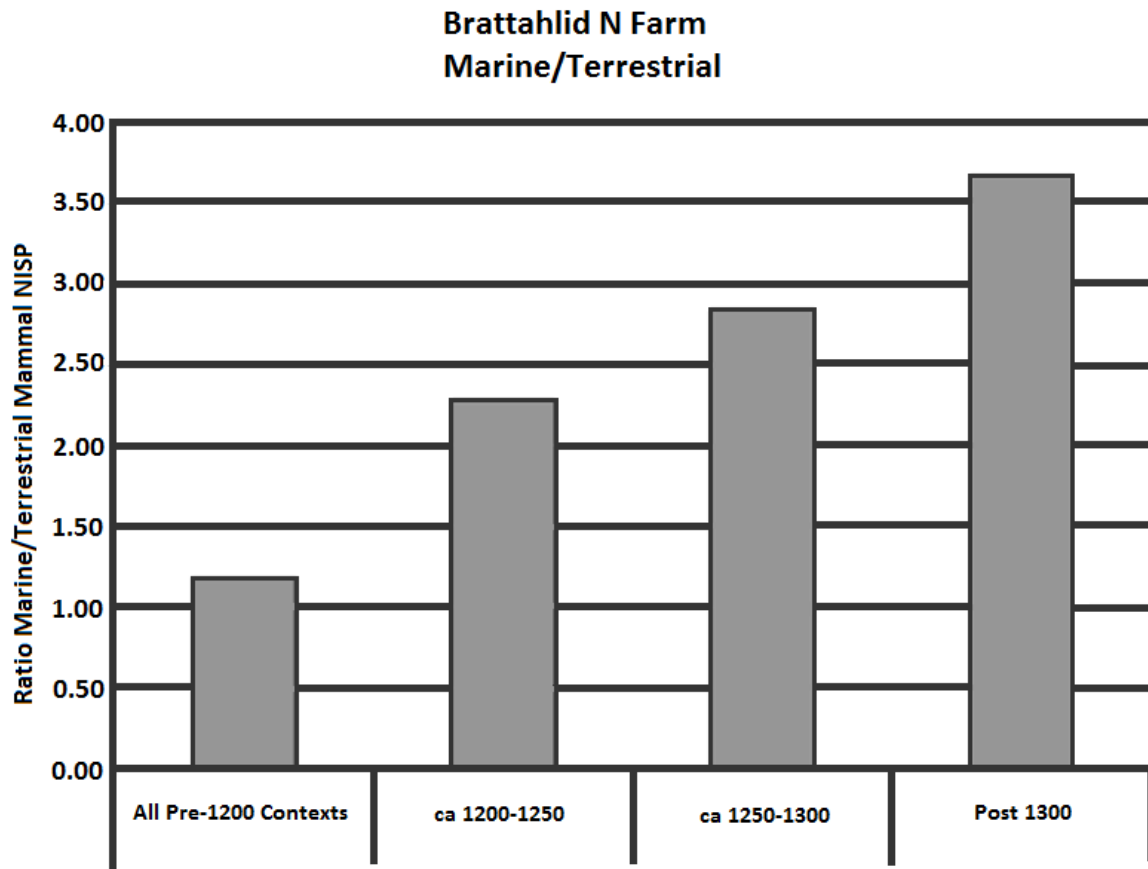


Figure 6. Ratio of marine/terrestrial mammal NISP (Edvardsson 2007:Figure 40).

### Osteological Analyses

Through archaeological excavations, many Norse remains have been found. The bones can be studied through  $^{14}\text{C}$  dating, to determine age, and  $\delta^{13}\text{C}$  (the change in  $^{13}\text{C}$ ) over time, to

determine the diet of the specimen.  $\delta^{13}\text{C}$  can be used to measure terrestrial versus marine food protein or the amounts of plants of  $\text{C}_3$  and  $\text{C}_4$  photosynthesis. For the purposes of this paper,  $\delta^{13}\text{C}$  will be used to compare the amounts of terrestrial versus marine food protein. In order to calculate  $\delta^{13}\text{C}$ , collagen must be extracted from the bones. The bone samples need to be 100-200 mg to be sufficiently large enough to obtain a sample (Arneborg et al. 1999).

Table 2 displays a sample of 27 individual bones from a total of 450 skeletons that have been excavated in both the Eastern and Western Settlements from 1921-1981. These samples were chosen based upon whether stratigraphic information was available or whether they could be connected to stratigraphic information in association with other datable finds. It was also the goal of the study to obtain samples from all periods of occupation in hopes of viewing any major shifts in diet (Arneborg et al. 1999).

14C Dates and $\delta^{13}\text{C}$ Values for Bone Collagen							
Location	Lab Number	Sex, Age	14C Date (year BP)	Calendar Age (AD)	$\delta^{13}\text{C}$ (%VPDB)	Percent marine diet	
<b>Eastern Settlement</b>	Herjolfines	1271	U, 10-15	767±45	1430	-16.3	55
		1269	F, 20-25	899±84	1418	-14.4	78
		1270	F, 45-50	750±56	1437	-16.2	57
	Brattahlid	1275	M, >35	1229±41	976	-18.5	29
		1571	F, 25-35	1225±51	985	-18	35
		1267	M, adult	1155±46	1020	-18.1	34
		1268	M, adult	1112±51	1065-1115	-17.5	41
		1568	F, 35-40	997±51	1165	-19	24
		1272	F, adult	980±49	1169	-19.1	22
		1570	F, >35	1092±55	1172	-16.8	49
		1569	F, 35-40	985±45	1175	-18.9	25
		1276	M, 50-55	1025±50	1192	-18	35
		Gardar	1437	M, 30-35	1030±65	1233	-16.8
	1439		M, adult*	880±55	1272	-18.8	25
	1438		F, adult	880±90	1295	-17.6	40
	Undir Hofda	1442	M, 30-35	890±45	1297	-17.3	44
		1441	F, 25-30	880±55	1392	-15.8	61
	Convent	1265	F, 35-40	886±48	1322	-16.3	55
		1264	M, adult	937±53	1389	-14.8	73
1266		U, 15-20	852±44	1399	-16	59	
1263		M, 25-30	845±50	1404	-15.9	60	
1143		M, 35-40	1030±45	1297	-14.8	73	
<b>Western Settlement</b>	Sandnes	1145	F, 40-45	940±45	1301	-16.2	57
		1147	F, 40-45	940±40	1301	-16.2	57
		1148	F, 25-30	970±40	1307	-15.4	66
		1146	F, 20-25	970±40	1390	-14.1	81
		1144	F, 20-25	865±40	1413	-15.2	68

Table 1. Displays the  $^{14}\text{C}$  and  $\delta^{13}\text{C}$  data and diet statistics. \*=bishop (Adapted from Arneborg et al. 1999:Table 2)

The percentages of  $\delta^{13}\text{C}$  directly correlate with diet. A  $\delta^{13}\text{C}$  of -12.5‰ represents a 100% marine diet; 22‰ represents a 100% terrestrial diet. The samples from Brattahlid are the oldest gathered. The earliest samples (1275, 1571, 1267) display a minimal reliance on marine resources in their diets. Gradually, diets shift towards 50% marine by AD 1250. After AD 1250, there is a sudden spike in the reliance on marine resources. By the latest stages of settlement, diets had reached 70-80% marine (Arneborg et al. 1999).

As would be expected, there is some difference between the diet of the Norse of the Western Settlement and that of the Eastern Settlement. Because the Western Settlement is known to have fallen around AD 1340-1350, it is reasonable to suggest that they would be relying more heavily on marine resources before their counterparts in the Eastern Settlement. By approximately AD 1300, those from the Western Settlement were relying upon marine resources for 60-70% of their diets, roughly 10-20% more than the average person from the Eastern Settlement during the same period (Arneborg et al. 1999).

An interesting case to study is the bishop found at Gardar (1439). Because of his elite status in society, the bishop had a different diet than the average Norse Greenlander. He was not forced to rely heavily upon marine resources as others were. For that reason, his levels of  $\delta^{13}\text{C}$  were comparatively higher than the average Greenlander around AD 1250. His diet consisted of only 25% marine resources, about half of what the average Greenlander exhibited. Another possible explanation for his low-marine diet could be that the bishop arrived in Greenland not long before his death. All bishops sent to Greenland originated in Norway (Arneborg et al. 1999).

## **THULE INUIT**

The Inuit also inhabited Greenland during the time of the Norse. The Thule are an archaeological culture who reached Greenland as part of several centuries expansion by Inuit groups from northwest North America by crossing the ice-bound North Atlantic and Arctic Oceans. Early in Norse settlement, the Thule lived far in the northwestern areas of Greenland (McGhee 1984).

During summer expeditions northward along the coast, the Norse Greenlanders reached an area known as Nordrsetur which is located approximately 400 km north of the Western Settlement (McGhee 1984, McGovern 1980). This region became a major area of importance for the Norse as they discovered walrus, polar bear, and other animals whom they would hunt and later trade the luxury goods, such as walrus tusks, with others from the greater Norse empire (McGhee 1984). It was also in this region that, in AD 1150, the Norse first encountered the Inuit who were migrating southward (McGhee 1984, McGovern 1980). The Inuit had set up sporadic camps in the center of Nordrsetur. Immediately, they were viewed as competition for important resources (McGovern 1980).

The Inuit were maritime hunters who had created technologies such as umiaks (large skin boats possibly used in whale hunting), float harpoons, and sinew-backed bows. They also had kayaks made from animal skins for single-man transportation. Umiaks were of particular importance because they were able to bear enough weight to transport an entire camp thereby allowing the Inuit to maintain a nomadic lifestyle (McGhee 1984). Accounts from the Norse Greenlanders describe the Inuit as lacking iron tools. Instead, they “[used] walrus tusks for missiles and sharpened stones instead of knives (Gad 1970:88).”

Early contact with the Inuit was peaceful, although the Norse did not desire any interaction with the Inuit (Gad 1970, McGovern 1980). After roughly 100 years, climate conditions began to decline. As a result, the Inuit decided to migrate southward and set up a new settlement. It happened to be that their new location was on a fjord that was an important and strategic hunting ground for the Norsemen of the Western Settlement. This created tensions between the Norse and the Inuit (McGovern 1980, Dugmore et al. 2007). Although there is no historical evidence of violence between them in the Western Settlement, there is a historical

record of bloodshed from the Eastern Settlement. An Icelandic document from 1379 describes an assault by the Inuit (whom are referred to indiscriminately as Skraelings, a term the Norse used for any group of Native peoples) that resulted in the deaths of eighteen Norsemen and the capture of two youths and a bondsman (Gad 1970).

Yet, there were instances when the two groups aided each other in some way. From the Icelandic annals, there is a chronicle about Bjorn from Vatns Fjord and his faithful Skraeling servants. Bjorn came to Greenland sometime around 1385 with four ships from Iceland. After being elected sheriff by the locals, Bjorn found two Inuit children, a boy and a girl, stranded on a rock in the sea. He rescued them, so the children decided to stay with him and his family as his servants. The young girl took exceptionally good care of Bjorn's son and refused to let him leave her sight. Bjorn and his family stayed in Greenland for two years before they decided to return to Iceland. When he returned, leaving the Inuit children behind, the children "took their own lives (Gad 1970:148)."

Inuit of Greenland maintained some traditional accounts of their ancestors' contact with the Norse. A story passed on to Niels Egede in 1769 by the Inuit states that the Inuit wanted to establish a home near Norse farms, but the Norse refused; however, they were willing to trade (Gad 1970, McGhee 1984). Over time, the Norse and Inuit developed a friendly relationship (McGhee 1984).

Interestingly, the legend states that "the Norse were attacked from the sea and their settlements plundered (McGhee 1984:12)." This happened not once, but three times over the course of three years. The first attack was fought by only a handful of small boats, but, by the third, the group had returned with an entire fleet. In hopes of aiding their friends during the third attack, the Inuit brought Norse women and children to fjords in Inuit territory in order to

safeguard them. When the Inuit returned in Autumn, they found the homesteads pillaged, burned, and destroyed. Rather than stay in the area to tempt the raiders yet again, the Inuit returned to their territory taking the remainder of the Norse women and children. There, the women were married and were integrated into Inuit society (Gad 1970).

Although there is little, if any, evidence for the described attacks on the Norse, the legend does the important job of confirming some sort of positive relationship between the Norse and local Inuit bands, if only for a short while. Although it may not have always been particularly friendly, there was interaction and perhaps even trade (Gad 1970).

### **NORSE PREJUDICE AND CULTURAL RIGIDITY**

As has already been stated, the Norse referred to Inuit as Skraelings (heathens). By referring to them in such a derogatory manner, it is clear that the Norse felt themselves superior (Gad 1970). The Norse justified their self-defined superiority mostly by means of religion (McGovern 1980).

Christianity, particularly Catholicism, was the main religion of the Norse and all of Europe during the Middle Ages. When heathen spirits or gods were worshipped, it was believed that Christianity was being threatened in some way. Most European cultures had strict societal rules against interacting with those who practiced “heathen religions.” To be linked to heathens in any way likely meant severe punishment or death (McGovern 1980).

When the Norse came across the Inuit, they were unsure of their way of life. Norse documents of Norse-Inuit contact describe the Inuit as “uncanny, unbleeding, [and] troll-like” (McGovern 1980). The Inuit maintained an egalitarian society with a shamanistic religion;

therefore, they were completely alien to the Norse who were in a strictly stratified Christian society (McGovern 1980).

Still, it would seem feasible that the Norse may have at least tried to learn from the Thule who had an efficient, successful way of life in Greenland, especially when the Norse practices failed. Unfortunately, most actions, such as hunting ringed seals over breathing holes, would have been shunned as the Inuit had rituals in place to honor passed animal spirits. Even if a hunter learned harpooning skills from the Inuit, he would also be learning shamanistic rituals, and that was a punishable offense. To learn anything from the Inuit or to be found in connection with them in any way gave enough cause to accuse the person of witchcraft, a crime punishable by death. Norse Greenlanders were not opposed to burning accused witches, a common practice among Europeans, as is evident from the last records of the Greenland settlements (McGovern 1980). The document describes both a Christian wedding and a witch-burning taking place at Hvalsey Church in the Eastern Settlement in AD 1409 (Gad 1970). The combination of the Norse's superiority complex and disdain for shamanism would have easily been enough to keep the Norse from adopting Inuit practices (McGovern 1980).

It is clear that the two regarded each other differently. For one thing, there is a complete lack of Thule artifacts in Norse archaeological contexts. As stated previously, the Norse would have nothing to link them to the Inuit, and, by extension, witchcraft. The Inuit, however, embraced Norse objects that might be useful to them. Some Norse objects found at Thule sites include: "fragments of chain mail armor, pieces of woolen cloth, knife blades of smelted iron, iron boat rivets, the base of a wooden barrel, pieces of oak wood, and fragments of smelted iron and copper" (McGhee 1984:15). Also, and perhaps most importantly, a carved, wooden figure made in the "silhouette" style of the Thule features a person with short arms and a featureless



face. It is unlike other figurines in that the person is wearing a long robe with a slit up the front and a cross on its chest which is typical of the European style of the period it was made (Figure 7). The figure likely represents a European or a person wearing the clothes of a European. While the Norse found anything originating with the Inuit taboo, the Inuit were more comfortable with the differences of the Norse (McGhee 1984). The Norse's failure to understand the Inuit and learn their practices almost certainly had a major impact on their survival in Greenland.



Figure 7. Illustration of European clothing on Thule figurine (McGhee 1984:Figure 3).

The early Norse came to Greenland with the mindset of Europeans generally and Icelanders in particular. After settling the landscape, however, they found many of the practices that Icelanders relied upon would not be useful in this new land. Because of this, the early Norse Greenlanders are believed to be remarkably adaptable (Gad 1970).

A prime example of their adaptability can be seen in the use of soapstone in both the Eastern and Western Settlements. The Norse, due to their European background, had been using clay vessels for centuries. Unfortunately, upon their arrival in Greenland, the Norse found the land devoid of any clay. There was, however, an abundance of steatite, or soapstone. Soapstone is a relatively soft stone that is easily carved. The Norse Greenlanders began carving bowls, cups, pots, and ladles out of the stone; even large objects, such as a vessel with a capacity of up to 39 liters were made. Rather than wait until traders came to exchange walrus tusks for clay pots, the Greenlanders simply improvised thereby adapting to their environment (Gad 1970).

The Norse failed to change their clothing to adapt to Greenland's environment. Rather than adopt the fitted skin clothing and boots of the Inuit that were particularly well-adapted to the tough North Atlantic climate, the Norse maintained the European fashions, keeping up with the latest styles. Clothing found in the permafrost during archaeological excavations provide examples of woolen gowns, caps, and liripipe hoods with trailing tails that would have been the common garb of Europeans during that period (McGovern 1984).

## **TRADE**

Trans-Atlantic trade was important to Norse Greenlanders. One of the many reasons summer trips to Nordrsetr were of such high importance was because of the trade goods that could be obtained in that region. The most important goods were walrus tusks, but traders also demanded walrus and seal skins as well as cow, sheep, and goat hides. The walrus hide used for making ropes that were so strong they could be used as mooring cables (Gad 1970). Despite the

dangerous voyage to Greenland, traders came for the Greenlanders goods because they were of great value yet had low bulk (McGovern 1980).

The export goods were exchange for goods unavailable in Greenland. Such goods included: “iron and wood, stained glass, churchbells, and rich church vestments (McGovern 1980:258).” Flour was another commonly imported item (Gad 1970).

Unfortunately for the Greenlanders, the voyage to Greenland became less attractive when the luxury goods the Greenlanders were providing became less useful or less lucrative. Walrus hide needed for making ropes, for example, became obsolete with the advent of hemp ropes. Not only was hemp a cheaper alternative, it was also easy to obtain. When the Black Death reached Norway in AD 1347-1351, the price of silver dropped by a third, as did food and land. It is fair to assume that the price of walrus ivory would also have dropped by the same increment (Dugmore et al. 2007).

The lack of traders coming to Greenland would surely have had an adverse effect on their lifestyle. For one, wood was a very important resource to the Norse as it provided heat throughout the harsh, long winters (Dugmore et al. 2007). Wood was difficult to obtain as there was little in the way of forest on Greenland (McGovern 1980). Men were often sent far inland to find forests or were sometimes sent on long journeys to Markland, what is believed to be modern Labrador, in order to obtain fuel for the winter fires (McGhee 1984). Trading for wood resources was much easier and was a critical part of the Norse way of life.

Another issue with trade may have come about far before the Black Death plagued Europe. Dried cod and other fish became a major industry in Europe. The preparation of these fish happened in most Norse occupied islands, but not in Greenland. This new high-bulk, low-

value trade was not something the Norse Greenlanders could contribute to. Because of this, they became largely ignored by traders in the greater North Atlantic (Dugmore et al. 2007).

## **DISAPPEARANCE**

### **Western Settlement**

The Western Settlement was the first of the Greenland settlements to fail. Anywhere from 1341-1363, Episcopal Steward Ivar Baardsson travelled to the Western Settlement from the Eastern Settlement (McGovern 1980). Upon his arrival, Baardsson found the settlement, some 90 farms, completely deserted. His report states, “Now the Skraelings have the entire Western Settlement, but there are horses, goats, cows, and sheep, all wild. There are no people, neither Christian nor heathens” (Gad 1970:141). The scribe who recorded Baardsson’s statement added that Baardsson and others had travelled to the Western Settlement to help aid in the expulsion Thule from the settlement area. When the Greenlanders found the settlement deserted, they killed all the cattle they could hold in their ships and returned to the Eastern Settlement (Gad 1970).

Excavations in the Western Settlement do not display any signs of disaster or warfare. One farm was found burnt down, but this was an anomaly rather than the norm (Gad 1970).

### **Loss of Eastern Settlement**

Historical evidence of a populated Eastern Settlement stops after AD 1409. In that year, an Icelandic document chronicles a wedding and a witch burning occurring at the Hvalsey Church (Gad 1970). Some artifactual evidence from the southernmost areas of the Eastern Settlement suggest that the settlement may floundered for 75 more years (McGovern 1980).

It wasn't until circa AD 1720, that any Europeans returned to Greenland. After the Reformation in Norway, the king decided that Greenlanders, which had heard nothing of the Reformation, should no longer remain Catholic. Hans Egede along with a few merchants were sent on a mission to Greenland. Upon arrival, Egede found only ruins and no Europeans. He was informed by the Thule that the ruins were those of the Norse. The fate of the Norse Greenlanders was unclear (Gad 1970).

### **Possible Scenarios**

Many varied scenarios have been suggested as to the fate of the Norse Greenlanders. Some suggest that they sailed to Iceland. This scenario is unlikely, however, as the Icelandic peoples kept such detailed documents, and there is no mention of returning colonists. The desertion of the Greenland settlements would not have been forgotten so easily. Another suggestion is that they perhaps sailed to North America. There is no archaeological evidence, however, to support such a claim (McGovern 1980). Some argue that the Norse died from Inuit attacks, disease, starvation, or drowning at sea (Gad 1970). Unfortunately, at this time, the answer remains unclear as to the exact fate of the Norse Greenlanders.

### **CONCLUSIONS**

The Norse Greenlanders had no chance of knowing that their settlements were doomed to fail after 500 years. Although it is as of yet unknown what caused the final blow to the Norse settlements, there were many factors involved that weakened them greatly.

The climate in Greenland shifted from relatively mild circa AD 1000 to uncharacteristically cold and harsh, even for Greenland. The Little Ice Age was an unpredictable occurrence that the Norse could only adapt to. Unfortunately, with their strict societal rules, they

refused to learn anything from the Thule, even if it meant suffering through cold winters with less than enough food resources.

The cold from climate change also affected hay and other crops that the Norse grew. The failure of these crops, particularly hay, due to shortened growing seasons would have greatly decreased the size of the cattle herds that the Norse so desperately relied upon. Without the hay, there would be little to no milk or meat from domestic sources.

The Greenlanders were particularly reliant on wood resources obtained through trans-Atlantic trade to supplement their supplies. When traders stopped visiting the settlements, the Norse were forced to spend vast amounts of time gathering all of their wood from distant locations causing them to make extremely frequent excursions to Markland, now known as Labrador, and inner Greenland. The Greenlanders loss of connection with the Norse Empire was also critical as they were mostly forgotten for at least a century in which time they may have been aided.

The Norse most severely failed in their actions related to the Inuit. The Inuit possessed skills allowing them to survive well before and after the Norse settlements. Had the Norse rejected their prejudices brought on by Christianity, they may have obtained expertise in Greenland survival from the Inuit bands. Due to the Norse's cultural inflexibility, their ability to learn new skills was limited which significantly affected the fate of the Norse settlements.

In order to fully understand the Norse Greenlanders and their eventual fate, further research must be completed. Perhaps new research will uncover the answer to the most intriguing question related to the Norse: What was their fate?

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