The Inglefield Land Archaeology Project: Introduction and Overview

Genevieve M. LeMoine & Christyann M. Darwent

Abstract

Archaeological field research was undertaken in northwestern Greenland between 2004 and 2009 by the Inglefield Land Archaeology Project (ILAP). Over 2400 cultural features were recorded during foot survey, with additional sites located during helicopter reconnaissance. Focusing on the late prehistoric to historic transition, excavation of two Thule-Inughuit winter houses and adjacent middens was carried out at Iita, Foulke Fjord, western Inglefield Land, in 2006. Although constructed during the mid-1800s to early 1900s, the structures were dug into early through late Thule and Paleoeskimo deposits. At Cape Grinnell, in central Inglefield Land, three Thule sod-block houses, a Thule fall-winter qarmat, a Thule cache, a Late Dorset axial-feature, and an early Paleoeskimo axial-feature were excavated. Radiocarbon analysis revealed a tight cluster of dates, ca. AD 1200-1420, from the Late Dorset and Thule features. Preliminary analysis suggests near continual occupation of Iita for at least 1000 years. Cape Grinnell appears to have been inhabited, at least periodically since initial migration of Paleoeskimo into the region ca. 4000 years ago, with intensified Late Dorset-early Thule occupation followed by apparent abandonment coincident with the onset of climatic cooling.

Keywords

Greenland, Thule, Dorset, Paleoeskimo, historic archaeology.

Genevieve M. LeMoine (Corresponding author)
Peary-MacMillan Arctic Museum and Arctic Studies Center, Bowdoin College, Brunswick, Maine, USA
E-mail: glemoine@bowdoin.edu

Christyann M. Darwent
Department of Anthropology, University of California, Davis, USA

Geografisk Tidsskrift
Danish Journal of Geography 110(2):279-296, 2010

The Inglefield Land Archaeology Project (ILAP) is a multi-year research project focusing on the later prehistory of Inglefield Land in northwestern Greenland (Figure 1). The project began in 2004 with large-scale foot (occasionally supplemented by a small boat), and helicopter survey recording cultural features from ca. 4000 years of prehistoric and historic occupation (see Darwent et al., 2007; Darwent et al., 2008). Fieldwork continued through 2009 with excavations at four sites in western, central and eastern Inglefield Land over three field seasons; analysis of data collected from these sites is ongoing. The project is broadly collaborative, involving researchers from Bowdoin College, University of California, Davis, the Greenland National Museum and Archives, Laval University, and GeoArch Alaska. Students and researchers affiliated with each of these institutions, as well as with the University of Tromsø, Ilisimatusarfik (University of Greenland), SILA – Greenland Research Centre, National Museum of Denmark, and students and elders from the communities of Qaanaaq and Siorapaluk, have been involved at every stage of the project as well.

Background and summary of activities

The origin of ILAP can be traced back to 1999, when LeMoine conducted a photograph identification project in northwestern Greenland. Working with David Qaavigaq, Navarana Kavigaq Sorensen and Kiutikak Kiviok as interpreters, Bowdoin undergraduate student Matt Gallon and LeMoine interviewed elders in the communities of Qaanaaq and Qeqertat regarding photographs taken in the area by Arctic explorer Donald MacMillan and associates in the first half of the twentieth century. In one interview, a comment made by one of our informants was particularly striking. Looking at a map, he pointed out a location and

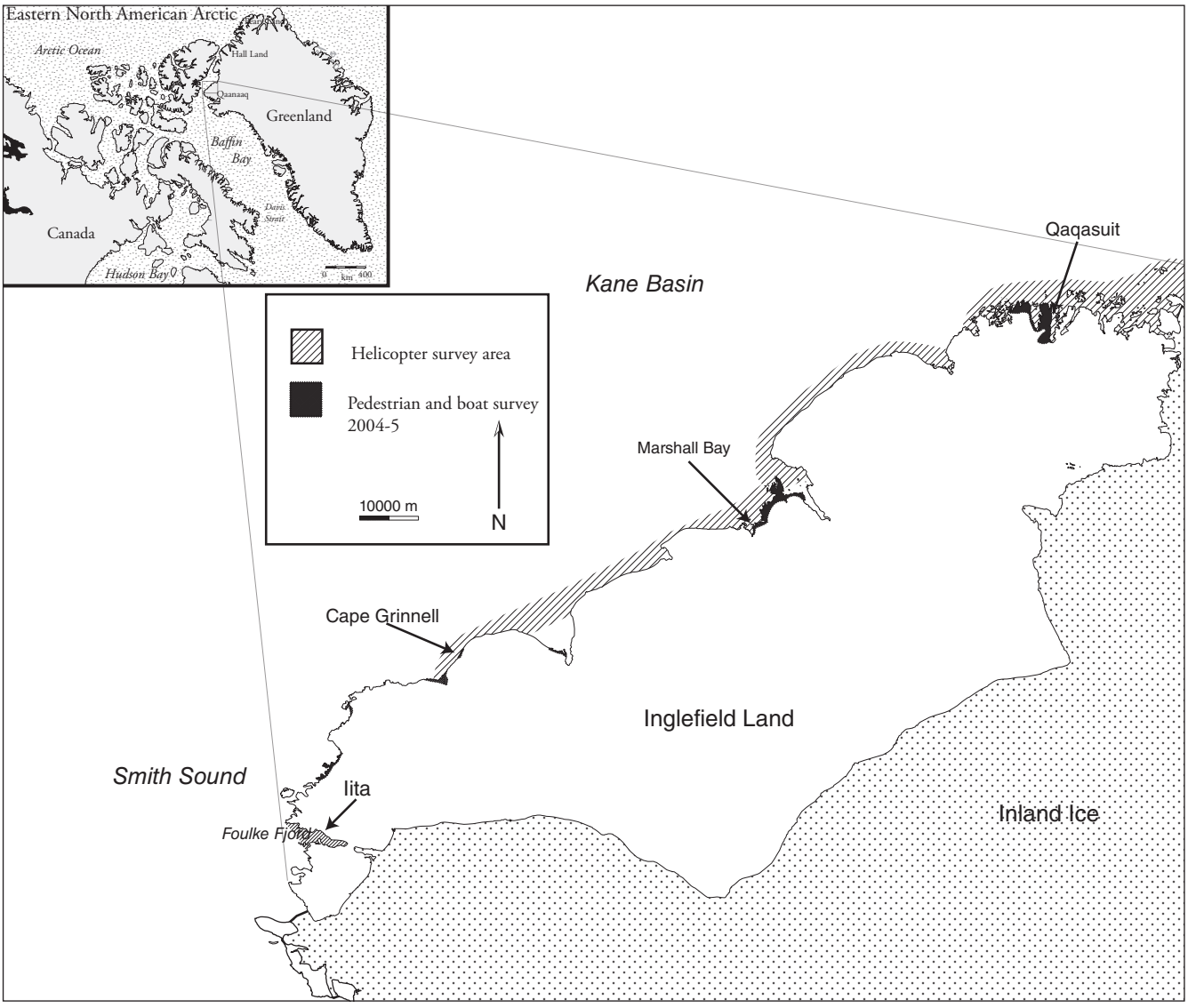

Figure 1: *Inglefield Land, Northwest Greenland, with the locations of sites where archaeological excavations took place in 2006, 2008 and 2009. Drawing: J. Darwent.*

indicated that it was where some of the Baffin Islander migrants had settled. Having pointed out the location, he said dismissively that scientists weren't interested in information such as that, that it was too recent (LeMoine, 1999). Despite, or perhaps in reaction to, this comment, we directed our attentions to developing an archaeological project focused on the late prehistoric to historic transition in this region.

These immigrants from the Pond Inlet area of Baffin Island in Arctic Canada had first arrived in Greenland sometime in the 1860s led by the shaman Qitdlarsuaq. They had a significant impact on the local community, marrying into a number of Inughuit (Polar Eskimo) families, and re-introducing a number of forgotten technologies, including bows and arrows, kayaks, caribou hunting and fishing (Gilberg, 1974/75; Ulloriaq, 1985; Mary-Rousselière, 1991). After some years many of the Baffin Islanders left to return to their home, but they encountered extreme difficulty and the survivors returned to Greenland, some settling at the location our informant had identified. Many residents of contemporary Qaanaaq are descendants of these immigrants,

testimony to the major impact the influx of a relatively small number of people can have on an isolated and even dwindling population (Gilberg, 1976).

The migrants were not the only change the Inughuit had to deal with through the nineteenth century. From 1818, when Captain John Ross (1819) first contacted them, Inughuit families experienced increasingly frequent and long visits from whalers and exploration parties, culminating in Robert E. Peary's decades-long involvement at the turn of the century, and finally the establishment of a permanent colonial presence, the Thule Trading Station. The history of this contact is well documented from a Euro-American perspective, (e.g., Ross, 1819; Kane, 1856; Hayes, 1867; United States Navy Department et al., 1876; Peary, 1898; Rasmussen, 1908; MacMillan, 1918), but we know relatively little about what happened from the Inughuit point of view since much of our understanding of these events comes exclusively from the writings of the Euro-American participants. Rasmussen's (1908, 1921) accounts may be a somewhat more reliable description of Inughuit culture, but his presence in the region was relatively late, at a time when significant change had already begun, and he was himself the agent of further change. To some extent oral histories, and limited written history (Ulloriaq, 1985) may be able to fill in this gap, but ultimately questions about early Inughuit response to contact can best be addressed with archaeological research.

Further complicating matters, during the last 1000 years there have been significant environmental fluctuations, documented in, for example, ice cap and freshwater lake cores (e.g., Douglas et al., 1994; Overpeck et al., 1997; Mudie et al., 2005). This environmental variability added a considerable layer of complexity for the Inughuit and their ancestors, living in the northernmost communities in the world at that time.

With these issues in mind, we developed plans for a long-term research program focused on the late prehistoric and historic archaeology of Inglefield Land. Issues of culture contact, both with indigenous immigrants and industrial/colonial expeditions were a key area of interest, to be evaluated through studies of technological change as well as changes in hunting patterns as documented through zooarchaeological remains. Faunal remains also have the potential to address questions of environmental change coupled with such techniques as geoarchaeology and archaeoentomology, which were also included in the research design.

Previous archaeological work in the region (Wissler, 1918; Rasmussen, 1921; Holtved, 1944, 1954; McCullough, 1989; Schledermann, 1990; Diklev & Madsen 1992; Appelt & Gulløv, 1999; Schledermann & McCullough, 2003) had laid some of the groundwork for our research, but most of the area had not been systematically surveyed, so our first goal was to develop a more comprehensive inventory of archaeological resources in the region. Thus the initial phase of ILAP, during the summers of 2004 and 2005, included extensive survey by helicopter, boat, and on foot. The results of this work have been published elsewhere and will not be covered in any detail here other than to say that this work documented 4000 years of occupations along the coast of Inglefield Land (Darwent et al., 2007). Additional limited surveys were conducted in subsequent seasons, and include the discovery of the longest Late Dorset longhouse in Greenland (Darwent et al., 2008).

As a result of our initial surveys we identified a number of locations that we believed warranted further investigation. Besides on-the-ground examination we used published records (Kane, 1856; Hayes, 1867; Peary, 1898; MacMillan, 1918) and oral tradition to select our sites. Our goal also was to maximize coverage of the region with excavations in western, central and eastern Inglefield Land: 1) Foulke Fjord, 2) Cape Grinnell and Glacier Bay, and 3) Paris Fjord. In 2006 we undertook excavations of two late-nineteenth and early twentieth century Inughuit sod-block winter houses at Iita in Foulke Fjord; artifact quantity and preservation is dramatically higher in heavily-built sod houses because they were lived in for up to nine months of the year, often reused, and their insulating qualities are such that they often have been frozen since abandonment by the past occupants. With renewed funding in 2008 and 2009 we excavated a variety of structures at Cape Grinnell, Glacier Bay, and Paris Fjord. Preliminary results of these excavations are discussed below while the following papers cover more detailed aspects of ILAP research.

Excavations at Iita, Foulke Fjord (2006)

Iita is a key location for ILAP as the people who occupied this location were the first to experience long-term, intensive contact with Euro-Americans. Iita's familiarity to southern audiences stems from its being the nearest Inughuit community to a number of early over-wintering expeditions, such as those led by American explorers Elisha Kent Kane (1856) in the early 1850s and a decade later by Isaac Israel Hayes (1867), as well as being the de facto headquarters for Peary's later expeditions (1898 -1902), and the base of operations for Donald B. MacMil-

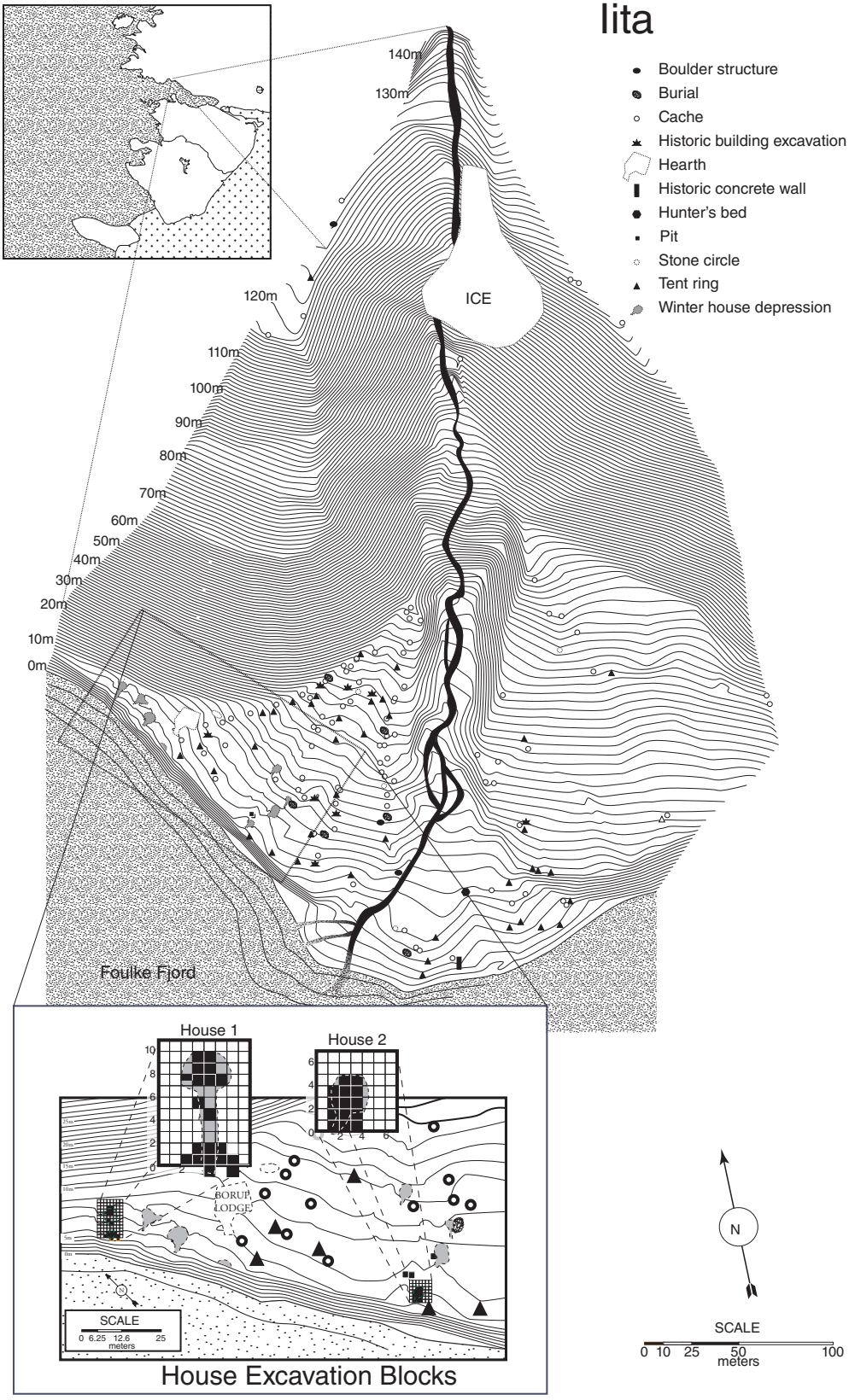

Figure 2: *Topographic map of Iita (Etah), Foulke Fjord, with the location of all archaeological features. Inset indicates location of excavation areas. Drawing: J. Darwent.*

lan's 'Crocker Land Expedition' (1913-1917). In historic documents, 'Etah' is often used in reference to much of Foulke Fjord. Peary's base between 1898 and 1902, for example, which he describes as being at Iita, was in fact situated on nearby Provision Point. Similarly, the contemporary settlement referred to as Iita by tourists and others is at the head of the fjord, where recently occupied houses or hunting cabins are still standing. Historic and prehistoric Inughuit occupations of Iita, however, are on an alluvial fan, some six kilometers from the head of the fjord and it was here that we undertook excavations. Over the course of six weeks, in the summer of 2006, ILAP participants mapped the entire site and excavated most of two winter houses and associated midden areas (Figure 2).

MacMillan (1918) constructed Borup Lodge here in 1913, which included dynamite blasting for the foundation. This had a significant impact on part of the site, but most of it remains intact. Thanks to the many photographs MacMillan took during his years there, we were able to identify houses that had already been abandoned by 1913. The most recent occupation by Inughuit in a traditional sod-block house was ca. 1925. A modern, above-ground house, wooden-frame structure was built sometime later, perhaps in the late 1930s to 1940s, but it was built on the foundation of MacMillan's lodge; this house is visible in photographs taken in 1947 on file at the Peary-MacMillan Arctic Museum.

A highly accurate detailed map of the site recording the locations of 181 cultural features was created using a laser transit total station (Figure 2). The site has been densely occupied for a significant length of time, and there are a wide variety of archaeological features visible on the surface, including Thule and historic-period winter houses, tent rings, burials, caches, and snare lines. In addition the surface is littered with relatively recent artifacts, many attributable to the Crocker Land occupation, but also from later periods (some broken bottles on the site are no older than 1937, for example). Excavation revealed a buried Paleoeskimo component as well, although the extent and nature of the occupation during this period is still unclear.

Two houses were selected for excavation based on a number of factors, including photographic evidence that they had already been abandoned by 1913, their relatively good preservation, and their proximity to the actively eroding bank that forms the edge of the site – both houses are threatened by erosion, and some associated midden deposits had already been lost.

We excavated the complete interior of each of the houses, working first in a checkerboard pattern to preserve the stratigraphic profiles at 1 m intervals. We used a combination of natural and artificial stratigraphic levels, dividing thicker natural layers into 10 cm levels. All material was screened through 6.35 mm mesh, and soil samples were collected from a variety of contexts for archaeoentomological analysis. Bulk samples (fauna, metal debris, broken glass, wood, and lithic debitage) were collected by 50 cm quadrant and all other material was mapped to three-point (x-y-z) provenience. For both houses we also sampled the entrance tunnels, but were unable to excavate them completely as they were heavily frozen and did not melt sufficiently during the field season. Exterior midden areas adjacent to the houses were also sampled.

The two houses were well chosen with clear historic occupations; House 1 appearing to be more recent than House 2 based on the artifacts recovered in primary deposition. Both houses were semi-subterranean, originally excavated into the sloping surface of the alluvial fan, the walls reinforced with boulders and sod. Portions of the walls had collapsed, but they were largely intact. Each house would have been roofed with a combination of stone and sod. No roof-fall was present however. Historic and ethnographic accounts describe how Inughuit families would remove the roof of the house in the spring, to allow it to air out over the summer before rebuilding it in the fall (Ekblaw, 1927: 166). Thick turf across the site masks the presence of these discarded roof sods around the houses.

House 1 (KNK2643)

Prior to excavation, House 1 had well-preserved boulder walls, including the lintel over the cold-trap entrance to the tunnel. Wall collapse partly filled the interior, but the depth of the house depression suggested that there was little if any roof fall – most likely a family left the house one spring to let it air out over the summer and no one returned to reoccupy it.

We excavated a total of 6.5 m^2 inside the living area of House 1, with an additional 2 m^2 in the entrance tunnel, and 10 m^2 in the midden area in front of the house. As we began excavation of the house it became clear that it had a paved sleeping platform, but the floor was largely absent. Remnants suggested the floor had been made of recycled wood planks running parallel to the long axis of the house, nailed to supporting boards running cross-wise (Figure 3). The one remaining partial support board was held up from below by small rock slabs. Most of the wood was missing, however, and probably had been removed for reuse elsewhere. Below this remnant floor, we found

Figure 3: *Interior of House 1, facing south. Sleeping platform and remnant floor boards visible. Photo: G.M. LeMoine.*

some indication of an earlier stone pavement, but no clear evidence of earlier floors. Instead there was a jumble of rocks and a dense concentration of bone – primarily of little auk or dovekie (*Alle alle*), which dominate the entire faunal assemblages from both houses (ca. 50-70% of the identified bone specimens). The walls of the house were constructed of cobbles and small boulders, some of which had tumbled into the house, but many still in place.

Most of the finds from House 1 point to a late historic occupation, just prior to 1913. The remnant wood floor is clearly made of imported milled wood, possibly pieces of crates – in some cases paint was preserved. It appears that the walls and some parts of the sleeping platform were covered with burlap, and perhaps paper or cardboard. The sleeping platform also seems to have had a hide covering. Two 1-m square units were excavated in the tunnel, but extensive ice and permafrost, as well as massive boulders made complete excavation unfeasible. The tunnel, which originally may have been as long as seven meters, was constructed of large boulders. At the threshold where it joined the house, the wall was made of large, stacked, stone slabs, with a long stone-slab lintel, still in place.

Table 1: *Radiocarbon dates from archaeological deposits at Iita (Etah), Foulke Fjord, Inglefield Land, Greenland.*

Beta Analytic	Cultural Affiliation	Provenience	Material	d^{13}C Value	^{14}C age BP	2-sigma Calibration
Beta-233259	Thule-Inughuit House 2	F-2; 3N, 2E; SW Quad; Level 5	caribou humerus	-19.6	190 ± 40	AD 1644 – 1950
Beta-233260	Thule-Inughuit House 2	F-2; 3N, 3E; SE Quad; Level 5	hare radius	-22.2	300 ± 40	AD 1474 – 1662
Beta-233266	Thule-Inughuit House 1 midden	F-1; 1S, 6E; NW Quad; Level 5	caribou astragalus	-19.5	260 ± 40	AD 1492 – 1950
Beta-233265	Thule (buried deposit, under House 1 floor)	F-1; 7N, 4E; NW Quad; Level 8	caribou calcaneus	-18.1	440 ± 40	AD 1409 – 1619
Beta-233261	Thule house (buried sleeping platform, under House 1 midden)	F-1; 0N, 5E; NE Quad; Level 6	heather	-28.3	330 ± 40	AD 1465 – 1645
Beta-233262	Thule house (buried sleeping platform, under House 1 midden)	F-1; 1N, 5E; NW Quad; Level 7	hare tibia	-22.9	450 ± 40	AD 1405 – 1617
Beta-233263	Thule house (buried sleeping platform, under House 1 midden)	F-1; 1N, 4E; NW Quad; Level 9	hare radius	-22.9	360 ± 40	AD 1449 – 1635
Beta-233264	Thule house (buried sleeping platform, under House 1 midden)	F-1; 0N, 5E; NW Quad; Level 8	hare pelvis	-21.9	660 ± 40	AD 1273 – 1396

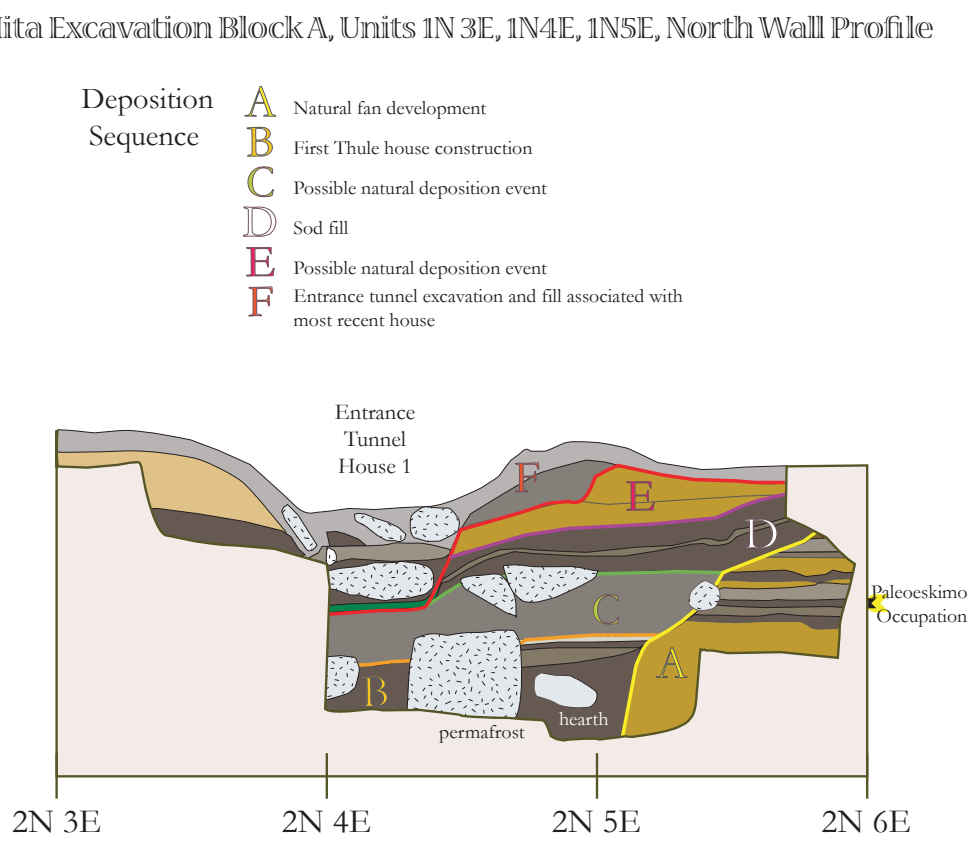

Figure 4: *Profile of the north wall, House 1 midden excavations, documenting the relative stratigraphic positions of House 1's entrance tunnel, the buried Thule house, and the Palaeo eskimo occupation.*

It was the midden in front of House 1 that was, in some ways the most intriguing. As a midden, it was less productive than we would have hoped, being rather thin. Below these deposits, however, and below a layer of nearly sterile sand (identified as 'E' in Figure 4, and presumably slumping from the steep but poorly consolidated slope above and behind the structure), we identified an earlier Thule occupation, indicated by paving stones with a layer of heather on top of them. This appears to have been part of a house, and considering the layer of heather, probably the sleeping platform (Figure 5). Several radiocarbon dates were run on bone and heather from this buried house, ranging in age from AD 1273 to 1645 (Table 1). The entrance tunnel for House 1 cut into this older house, leaving only portions intact, and they appear additionally to have dug down through an earlier Paleoeskimo occupation. This layer, indicated in Figure 4, contained numerous chert flakes seemingly in primary context, which would also account for the scattered flakes found throughout the excavations.

Artifacts recovered from House 1 include a well-preserved ulu and skin scraper, both with iron blades and wooden handles, typical of the early twentieth century (note that artifacts are currently being conserved and so are unavailable for photography). Similarly an ivory and iron harpoon head from the excavations in front of the house is a classic Inughuit narwhal hunting type, seen in late nineteenth and early twentieth century collections. Other finds of note from House 1 include quantities of broken glass bottles and jars, tin cans – including a complete can for yeast, the remnants of a hand-sewn cotton anorak (see LeMoine & Darwent, in press, for a discussion of clothing from Iita), and, from the entrance tunnel, a well-preserved ivory foreshaft socket. House 1 appears to have been excavated into older deposits as caribou bone from under the floor of the house interior yielded radiocarbon date ranging from AD 1409 to 1619 (Table 1). Finally, at the very bottom of House 1, at the interface of the floor fill and a level of sterile sand, we recovered a single Late Dorset Type G harpoon head (Maxwell, 1985). Unfortunately time and permafrost prevented us from investigating further these deeper deposits.

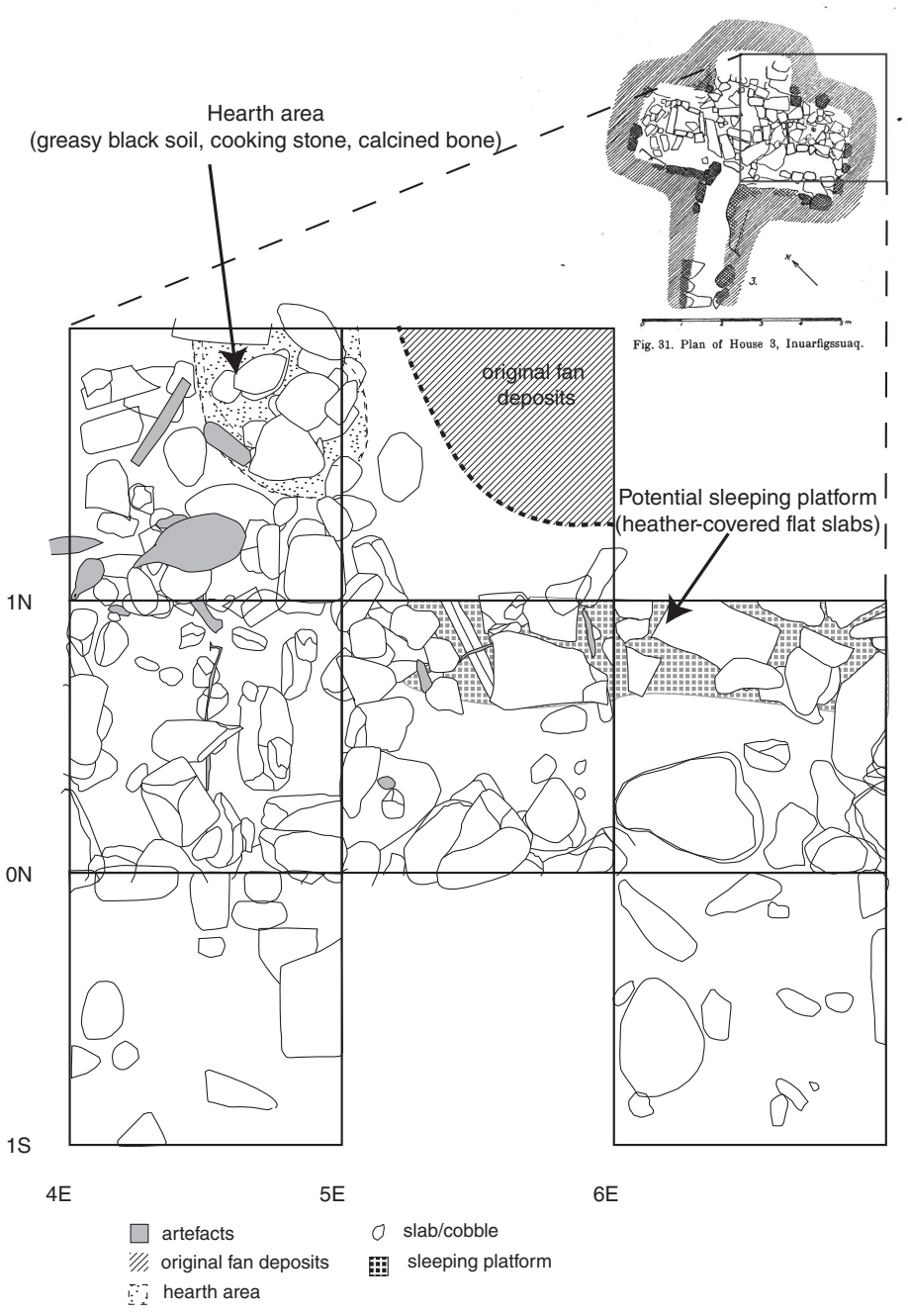

Figure 5: *Plan view of the buried Thule house under House 1's midden deposits compared to a Thule house excavated by Holtved (1944: Figure 31) at Innuarfissuaq, central Inglefield Land.*

House 2 (KNK2644)

House 2, although older than House 1, was also well preserved (Figure 6). Prior to excavation it was identified as a shallow depression ringed with boulders. We excavated 8 m^2 inside the house, 3 m^2 in the entrance tunnel, and 3 m^2 in the midden area in front of the house. The sod and stone walls were largely intact, as was part of the paved-stone sleeping platform and the stone-paved floor. Beneath the floor, remnants of two previous floor pavements were uncovered, with thin layers of fill, consisting largely of heather and other vegetation, between them. As with House 1, it seems that the roof of House 2 had been removed before it was abandoned.

Rubble and large, intact bones (primarily walrus) in the uppermost layers suggest that the house was used as a gar-

Figure 6: *House 2 facing north, with the topmost of three floors exposed. Only the eastern half of the sleeping platform remained. Photo: M. Hale.*

bage dump after abandonment, in part by the members of MacMillan's Crocker Land expedition, who lived at the site between 1913 and 1917. Artifacts likely associated with its use as a dump include motion picture film, pieces of 'Grape Nuts' cereal boxes stylistically dated to 1912 (identified by Becky Haglund Tousey, archivist with Kraft Foods, 2007), and a 'Sozodont' promotional tape measure – an x-ray of the artifact revealed the tape was still inside. Archival photographs show Sozodont products being delivered to MacMillan's ship prior to his departure for Greenland in 1913 (LOC, 2010). Artifacts recovered from the topmost pavement of the House 2 floor reflect the last Inughuit occupation of the house and are primarily industrial materials (glass, steel, wood), with increasingly earlier materials between and below the floors pavings. These include numerous glass and ceramic beads, a Civil-war era bayonet likely made between 1855 and 1870 between the topmost and middle floors, Carnegie Foundation souvenir ceramics, and ivory carvings typical of 19th century Inughuit trade goods, but also strongly reminiscent of earlier prehistoric carvings (see LeMoine, 2009, for a detailed discussion).

Excavations at Cape Grinnell (2008)

The archaeological site of Cape Grinnell is topographically quite distinct from Iita, being spread out along nearly one kilometer of beach terraces facing directly on Kane Basin. The site itself was first identified and named by Elisha Kent Kane (1856) who noted a recently abandoned Inughuit house there. Survey and mapping of the site in 2004 revealed a much longer and more complex occupation, ranging from recent campsites to early Paleoeskimo tent rings (Darwent et al., 2007). These are spread over a series of beach terraces cut by an active stream channel, and both erosion and down-slope movement are threatening many of the archaeological features.

Over the course of six weeks in 2008 we excavated three Thule winter houses (Features 16, 18, 20), a Thule spring/fall structure or qarmat (Feature 78), a Thule cache (Feature 107), a Late Dorset axial-passage structure (Feature 88), and an early Paleoeskimo axial-passage structure (Feature 38). John Darwent undertook extensive total station mapping of Cape Grinnell (Figure 7) recording a total of 154 archaeological features. In addition, Owen Mason conducted geomorphological studies of the beach terraces (Mason, 2010) and Frédéric Dussault collected modern insect specimens and soil samples for archaeoentomological analysis.

Early Paleoeskimo Axial-passage Structure (Feature 38)
To expand our understanding of earlier occupations of this region, we undertook excavation of a well-preserved early Paleoeskimo axial passage structure situated approximately 20 m above sea level (Figure 8). Based on stylistic similarities to structures excavated by Eigil Knuth (1967) in Peary Land, and it's elevation above sea level, this house likely dates to initial occupation of Cape Grinnell approximately 4000 years ago. The structure is 3.5 m in diameter, defined by extensive floorpaving stones and the remains of upright stones delineating an axial passage. The axial stones were oriented N-S, perpendicular to the shoreline. Neither artifacts nor datable material was recovered, but a few burned and unburned small-seal bones were recovered from under the central mid-passage uprights.

Late Dorset Semi-Subterranean Axial-passage Structure (Feature 88, KNK2670)
This Late Dorset, or late Paleoeskimo, semi-subterranean mid-passage structure is roughly reminiscent of some of those excavated by Helmer and LeMoine (LeMoine et al., 2003) on Little Cornwallis Island in the Canadian High Arctic, being rather roughly constructed of boulders lacking a floor pavement (Figure 9). A total of 24, 1x1-m units were excavated in the house and adjacent midden area. A small assemblage of typically Late Dorset tools was recovered, including ivory carvings (e.g., bear head), a harpoon head with an iron endblade, and twelve additional pieces of iron, all of which have been identified as meteoritic (LeMoine et al., n.d.). Preliminary lithic analysis by John Darwent suggests extensive tool re-use, indicating, perhaps, a stressful

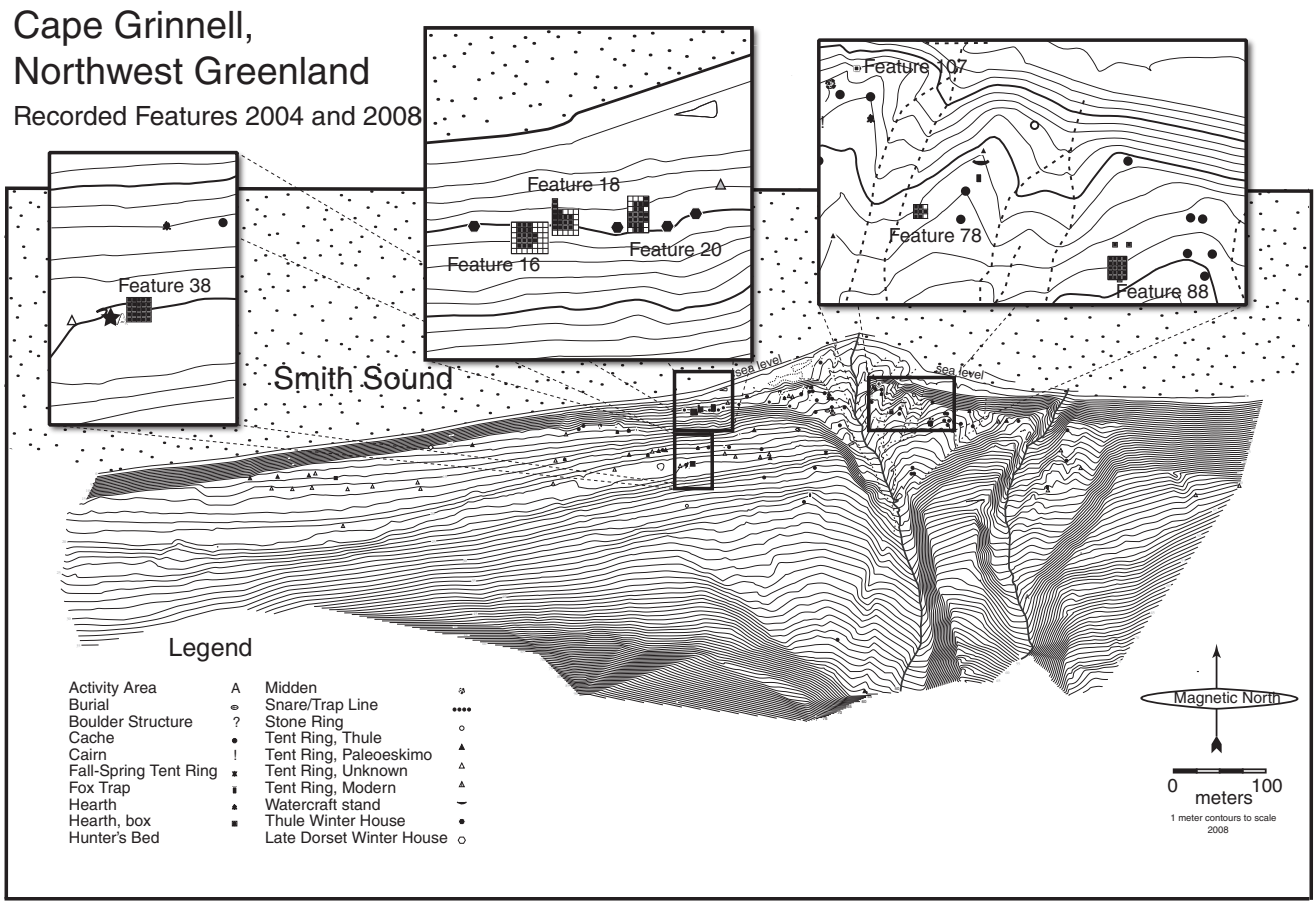

Figure 7: *Topographic map of Cape Grinnell with the distribution of archaeological features and location of excavation blocks. Drawing: J. Darwent.*

Figure 8: *Completed excavation of the early Paleoeskimo axial-passage structure (Feature 38). Photo: F. Dussault.*

Figure 9: *Completed excavation of the Late Dorset axial-passage structure (Feature 88). Photo: T. B. Johansen.*

period for the inhabitants, with limited useable raw material at their disposal, the nearest known sources being far to the north in Washington Land.

Thule winter houses

We selected three Thule winter houses to excavate. All were located close together, part of a cluster of eight similar houses, on a terrace 2-3 m above sea level, with a much steeper slope behind it. In front of the houses the ground slopes gently to a sharp bank above the modern beach. It is possible that erosion of this bank has removed some cultural material (as it clearly has a short distance away), but in this case it is slumping from the steep slope behind the houses that provided the greatest force of destruction. Although all eight houses were suffering the ravages of time, the three chosen for excavation appeared to be the most intact. Radiocarbon dates from these houses place them early in the eastern Arctic Thule sequence (Table 2).

House 16 (KNK2667)

A total of 17, 1x1-m units were placed over what was initially thought to be a late Thule (post 1700s) winter house structure. Unfortunately, severe slumping of the steep slope behind the house had inundated the structure from above, while sand from coastal storms served to both destroy and protect this particular winter house. Although the slumping entirely destroyed the back of the house, the living area in front, and to the west, of the tunnel were intact (Figure 10). Destruction of the rear of the house was likely exacerbated by the apparent absence of structural stones. These may have been removed for use on later structures. The living floor and entrance tunnel were preserved, but buried under shell-laden beach terrace deposits from above and overlain by sand washed up from the beach below. The front part of the house, east of the entrance, yielded the remains of burned bone and fat, which gave the sand beneath a cement-like consistency. Scraps of baleen and wood dominate the assemblage, but a variety of artifacts were also recovered. Key among these artifacts were eight fragments of crude,

Table 2: *Radiocarbon dates from archaeological deposits at Cape Grinnell, Inglefield Land, Greenland.*

Arizona AMS	Cultural Affiliation	Provenience	Material	$d^{13}C$ Value	^{14}C age BP	2-sigma Calibration
AA83639	Late Dorset dwelling	F-88; 3N, 3E; NW Quad, Level 2	caribou/musk-ox long bone	-21.3	726 ± 42	AD 1217 – 1386
AA83640	Late Dorset midden	F-88; 7N, 4E; SW Quad; Level 1	caribou/musk-ox long bone	-21.6	828 ± 42	AD 1205 – 1276
AA83637	Thule house (floor)	F-16; 3N, 2E; NE Quad; Level 4	caribou rib	-19.6	603 ± 42	AD 1291 – 1412
AA83638	Thule house (floor)	F-16; 3N, 1E; NE Quad; Level 6	caribou thoracic vertebra	-18.9	613 ± 42	AD 1289 – 1408
AA85146	Thule house (tunnel)	F-18; 4N, 0E; SE Quad; Level 7	caribou lumbar vertebra	-19.2	606 ± 58	AD 1283 – 1420
AA85147	Thule house (floor)	F-18; 1N, 3E; NW Quad; Level 8	musk-ox femur	-18.9	672 ± 59	AD 1251 – 1409
AA85148	Thule house (threshold)	F-18; 3N, 0E; NE Quad; Level 9	caribou rib	-19.8	655 ± 58	AD 1264 – 1409
AA85149	Thule house (floor)	F-20; 2N, 3E; SW Quad; Level 3	caribou rib	-19.5	659 ± 58	AD 1262 – 1409
AA85150	Thule house (floor)	F-20; 1N, 3E; Level 3	caribou rib	-19.8	714 ± 59	AD 1209 – 1398
AA85151	Thule house (under flagstones)	F-20; 2N, 2E; Level 3	caribou rib	-18.9	605 ± 59	AD 1262 – 1421
AA83641a	Thule cache	F-107; Level 1	caribou premolar	-17.5	658 ± 53	AD 1268 – 1404

Figure 10: *Completed excavation of Thule winter House 16 (KNK2667). The large uprights line the entrance passage. To the left are two smaller uprights associated with the hearth area. Photo: C.M. Darwent.*

coiled Ruin Island-type pottery fragments (Holtved, 1944; McCullough, 1989), which were recovered both from the burned area and from the tunnel, and a Thule Type-4 closed socket, harpoon head (Mathiassen, 1927).

House 18 (KNK2668)

This is a poorly preserved Thule house, with only the entrance tunnel intact (Figure 11). A total of 16, 1x1-m units were excavated. As with House 16, slumping from the steep slope behind had obscured the walls and floors of the house although artifact distribution and burned bone suggest the location of key activity areas such as cooking. Again, structural stone from the rear portion of the house was missing. The well-preserved tunnel walls, on the other hand, were lined with large (~1m long) stone slabs, while the tunnel floor was covered with numerous long strips of baleen, as well as burned and unburned bone, dog hair, scat, and feathers. Scraps of baleen and wood dominate the assemblage, but a variety of artifacts were recovered including a Thule Type-4 harpoon head, a caribou metacarpal 'beamer' or hide-scraping tool, a soapstone pot-rim fragment, a whale-bone sled shoe, an ulu handle, a small ulu with an iron blade inset, one square iron nail, and a single ring of chainmail. The nail and chainmail ring appear to be Norse in origin based on preliminary elemental analysis (Buchwald et al., 1985; LeMoine et al., n.d.), although other fragments of iron from the site are most likely meteorit. The ulu is currently undergoing conservation and has not yet been analyzed.

Figure 11: *The entrance tunnel of House 18 (KNK2668), looking from the interior toward the shoreline. Photo: M. Wampler.*

House 20 (KNK2669)

This was the best preserved of the Thule structures excavated at Cape Grinnell. The house was identified on the surface as a shallow amorphous depression with a slightly raised berm and numerous large, rock slabs, some upright, around the perimeter. No entrance tunnel was visible, although a gap in the berm and ring of slabs indicated where it should be. The entire structure was heavily vegetated and in the early part of the summer very wet (Figure 12).

Excavations confirmed that House 20 was a typical semi-subterranean Thule winter house (e.g., Holtved, 1944), which had been dug into a sandy bank or slope near the shore. The house consisted of a main room with a paved floor and raised sleeping platform, perhaps with storage

Figure 12: *House 20 (KNK2669) after excavation, looking up the entrance passage. To the left is an alcove lined with upright slabs. The sleeping platform is missing although supports for it are still visible. A whale mandible remnant, probably a roof support is visible at the corner between the alcove and the sleeping platform. Photo: G.M. LeMoine.*

lockers below, a smaller side room, and a slab-lined entrance tunnel opening toward the shore. The interior walls were also lined with upright slabs (still present primarily in the smaller room, with slumped examples in other places, notably the rear). The roof was supported at least in part by whale bone uprights, including the remains of a bowhead mandible oriented vertically in the southeast corner of the house. Given the thinness of the deposits, particularly in the center of the house, it seems likely that the roof had been removed when the house was abandoned as was typically done in the spring. Large stone uprights at the back of the house suggest that it once had a raised, paved, sleeping platform with storage lockers below, although the platform stones were missing.

As with the other houses, the assemblage from House 20 is dominated by scraps of baleen and wood. Artifacts recovered from this house include typical Thule implements, ranging from soapstone lamp and pot fragments to components of hunting equipment (e.g., Thule Type-4 harpoon head and socket), a tiny iron ulu (presumably meteoritic iron) inset into an antler handle, a toy sledge and doll made from baleen, a number of drilled fox and seal canines, a caribou metacarpal beamer, and numerous knotted baleen cords.

Currently, House 20 is the only location for which we have results of archaeoentomological analysis. All three species of human lice (body, head and pubic) were identified, but even more interesting is the spatial distribution of the insects. Rather than being found in the sleeping platform area, or in the main living area, insect remains are concentrated in the entrance tunnel, indicating the inhabitants paid careful attention to hygiene, regularly de-lousing clothing, and removing the remains from the living area (Dussault & Bain, 2009a, 2009b).

Qarmat (Feature 78) and cache (Feature 107)
Test excavation of one boulder qarmat (spring/fall house) revealed no artifacts and no faunal remains. Similarly, investigation of a cache resulted in the recovery of only a few bone fragments, including one caribou premolar, dated to AD 1268 – 1404 (AA83641a; Table 2).

Radiocarbon dates

Figure 13 and Tables 1 and 2 present the entire suite of radiocarbon dates from excavations at Iita and Cape Grinnell (dates from beach terraces are presented by Mason, 2010). Dates were run at two labs, Beta Analytic and University of Arizona AMS Facility, and calibrated with OxCal 4.1 (Reimer et al., 2004; Bronk Ramsey, 2009). Not surprisingly, the earliest dates are from the Late Dorset structure (Feature 88) at Cape Grinnell. These dates, firmly in the thirteenth century, are somewhat earlier than the Thule dates from the site, but there is overlap, so we cannot dismiss the possibility of simultaneous occupation by Dorset and Thule people. These late dates are comparable to other Late Dorset sites in the region (Appelt & Gulløv, 1999), and in other parts of the Arctic (Friesen, 2004).

Radiocarbon dates from the three excavated Thule houses and a cache (Feature 107) at Cape Grinnell cluster tightly between AD 1205 and 1421 with no significant difference between the three houses, placing them squarely in the early Thule, or Ruin Island, period for this region (see McCullough, 1989). It is unlikely that these houses were occupied simultaneously, however. Considering the missing structural stones from Houses 16 and 18, and to a lesser extent 20, it seems likely that each was abandoned, and served as a source of building material for subsequent inhabitants. House 16, the only one with Ruin Island ceramics, seems a good candidate for the earliest of the houses. Similarly, the Norse iron from House 18 suggests a relatively early date, while the preservation and lack of either pottery or Norse iron seems to indicate that House 20 was the more recently occupied house. None of the houses had evidence of reoccupation (i.e., floor renewal episodes) and, while it is not possible to say they were each occupied for

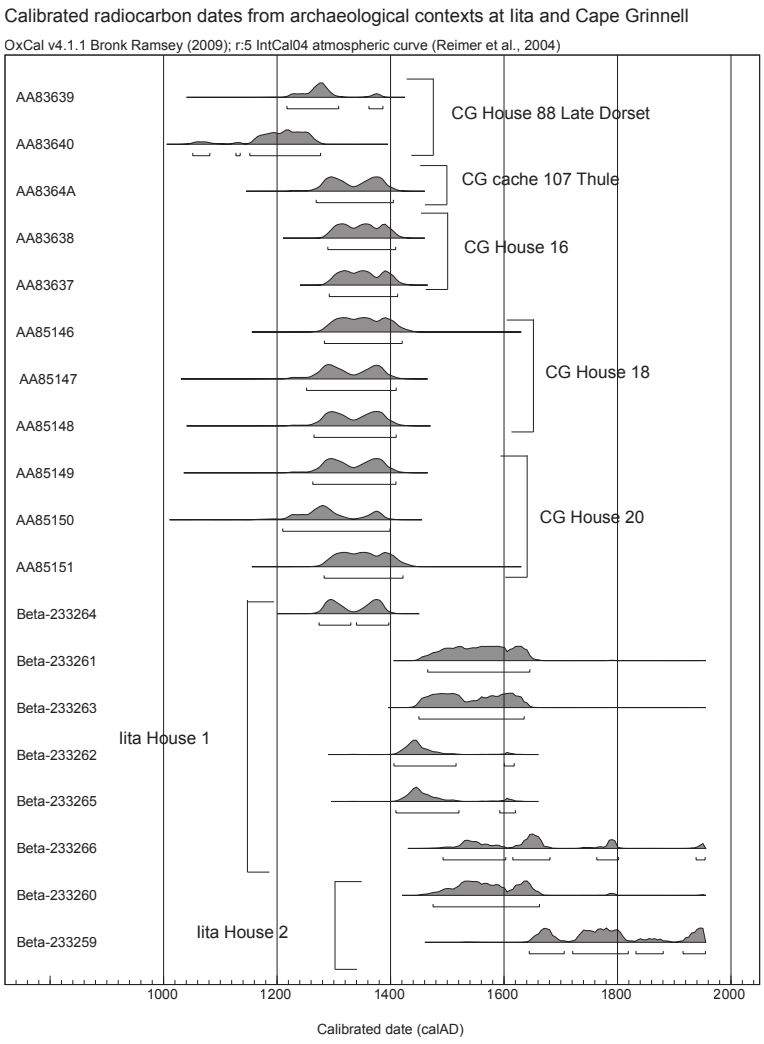

Figure 13: *Plots of radiocarbon dates from Iita and Cape Grinnell, calibrated with OxCal (Reimer et al., 2004; Bronk Ramsey, 2009).*

only one winter, neither is it likely that they were reoccupied repeatedly.

One date (Beta-233264), from the lower levels of the midden in front of House 1 at Iita falls into the Ruin Island phase as well. Other dates from the midden, including the heather from the possible sleeping platform (Beta-233261), cluster somewhat later, in the AD 1465 to 1645 range, as does one date from the lower levels of the interior of the house (below the historic floor), Beta-233265. One date, on a caribou astragalus from the lower level of the midden intersects the calibration curve at four places, giving an extremely wide range of possible dates, although given that it is stratigraphically above the heather layer, most likely the bone is younger than the deeper deposits, and may even reflect material tossed from House 1 during its main or earlier occupations. No samples from the upper levels of House 1 were submitted for dating, given the problems of dating material younger than ca. 200 years. Dating of these levels is based on the historic objects recovered from them.

From the lowest level of House 2, one of the dates (Beta-233259) intercepts the calibration curve in four places, giving a 200-year range of calibrated dates. The second date, from the same level of the house (Beta 233260) places this early occupation of House 2 in the same range as the buried house below the House 1 midden. This level also contained a variety of nineteenth century historic materials, however, making it difficult to interpret.

Excavations at Glacier Bay and Qaqaitsut, Paris Fjord (2009)

In 2009, ILAP returned to central and eastern Inglefield Land. Qaqaitsut on Paris Fjord in eastern Inglefield Land was most recently inhabited, by at least four families, in the mid-1980s as part of an initiative by the community of Qaanaaq to "live on the land." Inughuit hunters reported the presence of archaeological remains to the Greenland National Museum at that time. We camped near this site in 2005, surveying and recording hundreds of features in the area, including what appeared to be late-prehistoric/early-historic winter houses. The area is currently littered with modern garbage, often with old houses having been used as dumps.

We identified four Thule winter houses that were well preserved, but that did not date to the late historic/modern period (based on artifacts exposed in the ruins). Excavation of these four structures and an adjacent cache resulted in recovery of numerous pieces of knotted baleen and other artifacts, including a decorated ivory comb, a linked ivory chain, a child's spinning top, an ivory carved fish, and a needle case made of baleen. A few pieces of metal recovered from two of the houses are currently undergoing elemental analysis. Preliminary faunal analysis from one house suggests that there may have been stressful periods; at least six dogs were killed and consumed. Ancient DNA analysis of these dogs by Sarah Brown (UC Davis Veterinary Genetics Lab) is ongoing, but indicates that the 'Inuit-Eskimo' breed of dog was well established prior to historic contact.

Excavation also took place at Glacier Bay in central Inglefield Land where we identified an early, Ruin Island-style (Holtved, 1944) Thule winter house in 2004. Although there was no indication on the heavily vegetated surface, this house turned out to have been built into the remains of a Late Dorset axial-passage structure. Detailed mapping and careful excavation has enabled the separation of bone and artifacts from these two occupations. Thule habitation was exceedingly short; only three artifacts were recovered including a wooden doll (anatomically female) and a broken whale-bone mattock. No radiocarbon dates have been processed yet from any of these houses.

Discussion

In summary, initial occupation of Iita was during the Paleoeskimo period, or before AD 1200. This was followed by early-middle Thule house construction and occupation, indicated by the possible sleeping platform buried under the midden of House 1. Initial occupation of House 2 was during the middle-late Thule period, with multiple floors and reuse, culminating in an early contact (ca. mid-1800s) occupation. House 1 appears to have been built into middle Thule deposits, but was the most recently occupied winter structure (ca. early 1900s but abandoned before 1913).

By comparison, initial occupation of Cape Grinnell was approximately 4000 years ago with extensive reoccupation of the beach terraces over the Paleoeskimo and early Thule periods. Our excavations revealed a possible overlap in occupation by Late Dorset and early Thule inhabitants, but also seems to indicate that the Cape was rarely used, if at all, in late Thule times. This apparent abandonment of the site, although some structures were obviously still well preserved by the time Kane arrived, may have been due to changing climatic conditions (i.e., the Little Ice Age). As temperatures cooled and sea ice expanded, these changes forced people to overwinter in western Inglefield Land, closer to the margin of North Water Polynya at the northern end of Baffin Bay, where resources would have been more plentiful than at Cape Grinnell, a rather barren spit of land.

Analysis of various materials recovered from three seasons of excavations is ongoing. To date faunal analysis of the more than 22,000 identified bone specimens from Iita (ca. 18,000 of which are dovekies) is nearly complete and will form part of Trine Johansen's doctoral dissertation. Conservation of metal and organic artifacts is underway, and has already led to some intriguing discoveries (such as the identification of the tape measure described above). Archaeoentomological analysis, zooarchaeological studies of faunal remains from Qaqaitsut and Glacier Bay, material and technological studies as well as more extensive dating are also under way. The papers that follow explore a variety of topics:. John Darwent and Trine Johansen examine the long history of settlement in the Foulke Fjord region of western Inglefield Land, comparing the results of 2006 survey in this area to that documented in central and eastern Inglefield Land during previous seasons (Darwent et al., 2007; Darwent & Johansen, 2010). Christyann Darwent and Jeremy Foin compare the species composition, spatial distribution and taphonomy of faunal remains from an early Thule and a Late Dorset dwelling excavated at Cape Grinnell in 2008 (Darwent & Foin, 2010). Finally, Owen

Mason describes the results of a geomorphological analysis of Cape Grinnell and its implications for understanding past climatic conditions in the region (Mason, 2010). Together these studies are developing a more detailed understanding of why certain parts of Inglefield Land may have been more heavily reused and attractive to long-term habitation, focusing on both ecological and social factors.

Acknowledgements

Funding for the Inglefield Land Archaeology Project was provided by grants from the National Science Foundation's Office of Polar Programs in 2003-2006 (Darwent #0732850; LeMoine #0732620) and 2008-2011 (LeMoine #0328773; Darwent #0330981), and by the National Geographic Society in 2006 (#8049-06). Much thanks to our senior co-researchers without whom this project could not have gone as smoothly, John Darwent (UC Davis) and Hans Lange (Greenland National Museum). Thank you to our field crew members: Avijaja Absolonsen, Qitdlaq Alataq, Eli Bossin, Frédéric Dussault, Jeremy Foin, Joanne Goodsell, Micah Hale, Trine Johansen, Pauline Knudsen, Hans Lennert, Ulla Odgaard, Louise Qaerngaar, David Qaavigaq, Dorian Sabenorio, Erika Sakrison, Martha Simigaq, Qulutanguaq Simigaq, Navarana Sorensen, Mike Tillotsen, Morgan Wampler, and Alison Weisberger. Thanks also to Allison Bain (Laval University), Susan Kaplan (Bowdoin College), Anna Kerttula de Echave (NSF), Owen Mason (GeoArch Alaska), and Scott MacEachern (Bowdoin College). Thanks also to the organizers of the very productive GeoArk workshop in Copenhagen in May, 2009, Mikkel Sørensen, Jørn B. Torp Pedersen and Anne Birgitte Gotfredsen (Gitte), and to Gitte and three anonymous reviewers, who all provided thoughtful comments that have improved this paper.

References

Appelt, M. & Gulløv, H.C. (eds.) (1999): Late Dorset in High Arctic Greenland: Final Report of the 'Gateway to Greenland' Project. Copenhagen, Danish Polar Center.

Bronk Ramsey, C. (2009): Bayesian analysis of radiocarbon dates. Radiocarbon 51: 337-360.

Buchwald, V.F. & Mosdal, G. (1985): Meteoritic iron, telluric iron, and wrought iron in Greenland. Meddelelser om Grønland Man and Society 9. Copenhagen, The Commission for Scientific Research in Greenland.

Darwent, C.M. & Foin, J.C. (2010): Zooarchaeological Analysis of a Late Dorset and an Early Thule Dwelling at Cape Grinnell, Northwest Greenland. Geografisk Tidsskrift-Danish Journal of Geography 110(2).

Darwent, J., Darwent, C., LeMoine, G. & Lange, H. (2007): Archaeological survey of eastern Inglefield Land, Northwest Greenland. Arctic Anthropology 44: 51-86.

Darwent, J., Lange, H., LeMoine, G.M. & Darwent, C.M. (2008): The longest longhouse in Greenland. Antiquity 82**:** March 2008 Project Gallery. http:www.antiquity.ac.uk/ProjGall/darwent/index.html

Darwent, J. & Johansen, T.B. (2010): Archaeological Survey in the Foulke Fjord Region, Inglefield Land, Northwestern Greenland. Geografisk Tidsskrift-Danish Journal of Geography 110(2).

Diklev, T. & Madsen, B. (1992): Arkaeologisk berejsning I Thule 1991. Qaanaaq, Thule Museum. [in Danish]

Douglas, M.S.V., Smol, J.P. & Blake, W., Jr. (1994): Marked post-18th century environmental change in High-Arctic ecosystems. Science 266: 416-419.

Dussault, F. & Bain, A. (2009a): Archaeoentomology at the top of the world: the Inglefield Land Archaeology Project 2008. Poster presented at the 74th Annual Meeting of the Society for American Archaeology, Atlanta.

Dussault, F. & Bain, A. (2009b): How entomology can help us interpret archaeological sites: archaeoentomology in Greenland. Bulletin, Entomological Society of Canada/Société d'entomologie du Canada 41: 73-74.

Ekblaw, W.E. (1927): The material response of the Polar Eskimo to their far Arctic environment. Annals of the Association of American Geographers 17**:** 147-198.

Friesen, T.M. (2004): Contemporaneity of Dorset and Thule cultures in the North American Arctic: new radiocabon dates from Victoria Island, Nunavut. Current Anthropology 45**:** 685-691.

Gilberg, R. (1974/75): Changes in the life of the Polar Eskimos resulting from a Canadian immigration into the Thule District, North Greenland, in the 1860's. Folk 16-17: 159-170.

Gilberg, R. (1976): The Polar Eskimo population, Thule District, North Greenland. Meddelelser om Grønland 203(3).

Hayes, I.I. (1867): The Open Polar Sea: A Narrative of a Voyage of Discovery Towards the North Pole in the Schooner "United States". New York, Hurd and Houghton.

Holtved, E. (1944): Archaeological investigations in the Thule District, I-II. Meddelelser om Grønland 141.

Holtved, E. (1954): Archaeological investigations in the Thule District III: Nûgdlît and Comer's Midden. Meddelelser om Grønland 146(3).

Kane, E.K. (1856): Arctic explorations: The Second Grinnell Expedition in search of Sir John Franklin, 1853, '54, '55. Philadelphia, Childs & Peterson.

Knuth, E. (1967): Archaeology of the Musk-ox Way. Contributions du Centre d'Études Arctiques et Finno-Scandinaves 5. Paris, Ecole Pratique Des Hautes Études – Sorbonne.

LeMoine, G.M. (1999): Field notes and interview transcripts, Qaanaaq, 1999. On file at the Peary-MacMillan Arctic Museum and Arctic Studies Center, Bowdoin College.

LeMoine, G.M. (2009): Figuring out culture contact: prehistoric and historic miniature ivory carvings from Northwest Greenland. Pp. 177-184 in: Grønnow, B. (ed.): On the Track of the Thule Culture from Bering Strait to East Greenland: Proceedings of the SILA Conference "The Thule Culture – New Perspectives in Inuit prehistory": Papers in Honour of Hans Christian Gulløv. Publications from the National Museum. Studies in Archaeology and History 15. Copenhagen, National Museum of Denmark.

LeMoine, G.M. & Darwent, C.M. (in press): Furs and satin: understanding Inughuit women's role in culture contact through clothing. In: Peck, R. & S.A. Kaplan (eds.): North By Degree: Arctic Exploration and its Impact on Society. Philadelphia, American Philosophical Society.

LeMoine, G.M., DelToro, J. & Beane, R. (n.d.): Preliminary results of SEM/EDS analysis of iron from Cape Grinnell. Report on file, The Peary-MacMillan Arctic Museum, Bowdoin College.

LeMoine, G.M., Helmer, J. & Grønnow, B. (2003): Late Dorset architecture on Little Cornwallis Island. Etudes/Inuit/Studies 27: 255-280.

Library of Congress (LOC) (2010): DIANA – Arctic expedition, just before sailing [MacMillan's ship], July 2, 1913 http://hdl.loc.gov/loc.pnp/ggbain.12658, viewed February 1, 2010.

MacMillan, D.B. (1918): Four Years in the White North. New York, Harper and Brothers.

Mary-Rousselière, G. (1991): Qitdlarssuaq: The Story of a Polar Migration. Winnipeg, Wuerz Publishing Ltd.

Mason, O.K. (2010): Beach Ridge Geomorphology at Cape Grinnell, northern Greenland: A Less Icy Arctic in the Mid-Holocene. Geografisk Tidsskrift-Danish Journal of Geography 110(2).

Mathiassen, T. (1927): Archaeology of the Central Eskimos. Report of the Fifth Thule Expedition, 1921-24, 4. Copenhagen, Glydendalske Boghandel.

Maxwell, M.S. (1985): Prehistory of the Eastern Arctic. Orlando, Academic Press.

McCullough, K.M. (1989): The Ruin Islanders: Early Thule Culture Pioneers in the Eastern High Arctic. Canadian Museum of Civilization Mercury Series, Archaeological Survey of Canada Paper 141. Hull, Canadian Museum of Civilization.

Mudie, P.J., Rochon, A. & Levac, E. (2005): Decadal-scale sea ice changes in the Canadian Arctic and their impacts on humans during the past 4,000 years. Environmental Archaeology 10: 112-126.

Overpeck, J., Hughen, K., Hardy, D., Bradley, R., Case, R., Douglas, M., Finney, B., Gajewski, K., Jacoby, G., Jennings, A., Lamoureux, S., Lasca, A., MacDonald, G., Moore, J., Retelle, M., Smith, S., Wolfe, A. & Zielinski, G. (1997): Arctic environmental change of the last four centuries. Science 278: 1251-1256.

Peary, R.E. (1898): Northward Over the "Great Ice": A Narrative of Life and Work along the Shores and upon the Interior Ice-cap of Northern Greenland in the Years 1886 and 1891-1897. New York, Frederick A. Stokes & Co.

Rasmussen, K. (1908): The People of the Polar North, a Record. London, Kegan, Paul, Trench, Trübner & Co. Ltd.

Rasmussen, K. (1921): Greenland by the Polar Sea: The story of the Thule Expedition from Melville Bay to Cape Morris Jessup. London, William Heinemann.

Reimer, P. J., Baillie, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Bertrand, C.J.H., Blackwell, P.G., Buck, C.E., Burr, G.S., Cutler, K.B., Damon, P.E., Edwards, R.L., Fairbanks, R.G., Friedrich, M., Guilderson, T.P., Hogg, A.G., Hughen, K.A., Kromer, B., McCormac, G., Manning, S., Bronk Ramsey, C., Reimer, R.W., Remmele, S., Southon, J.R., Stuiver, M., Talamo, S., Taylor, F.W., van der Plicht, J. & Weyhenmeyer, C.E. (2004): IntCal 104 terrestrial radiocarbon age calibration, 0-26 cal kyr BP. Radiocarbon 46: 1029-1058.

Ross, J., Sir (1819): A Voyage of Discovery, Made Under the Order of the Admiralty, in his Majesty's Ships Isabella and Alexander, for the Purpose of Exploring Baffin's Bay, and Inquiring into the Probability of a Northwest Passage. London, J. Murray.

Schledermann, P. (1990): Crossroads to Greenland: 3000 Years of Prehistory in the Eastern High Arctic. Calgary, Arctic Institute of North America, University of Calgary.

Schledermann, P. & McCullough, K. (2003): Late Thule Culture Developments on the Central East Coast of

Ellesmere Island. Copenhagen, SILA – The Greenland Research Centre at the National Museum of Denmark and the Danish Polar Center.
Ulloriaq, I. (1985): Beretningen om Qillarsuaq og hans lange rejse fra Canada til Nordgrønland i 1860erne. København, Gullanders Bogtrykkeri. [in Danish]
United States Navy Department, Hall, C.F. & Davis, C.H. (1876): Narrative of the North Polar Expedition. U.S. Ship Polaris, Captain Charles Francis Hall Commanding. Washington, Government Printing Office.
Wissler, C. (1918): Archaeology of the Polar Eskimo. New York, American Museum of Natural History.