



A caribou hunting drive at Nernartuut (Nuussuaq, Northwest Greenland)

Eine Karibu-Jagdanlage bei Nernartuut (Nuussuaq, Nordwestgrönland)

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ABSTRACT - This article provides information about the way of life of arctic hunter-gatherers which has long inspired Palaeolithic archaeology in many different ways. The inland of West Greenland is a cultural landscape created during centuries by Thule people and Greenlanders hunting caribou in summer. An important type of site of the cultural landscape is the long caribou hunting drive with many stone-built inussuit and shooting blinds. The example presented in this article is situated in the center of the local caribou habitat, in a central passage for migrating deer. The drive lane may have been used during ambush hunting or communal driving of the deer to concealed hunters or hunters in kayaks. The hunting drive is near a large inland summer camp and many smaller sites, all indicating intensive caribou hunting in the last 700 years. A brief report on the state of research on the immigration and social structure of the early Thule culture shows that immediately after arriving these maritime hunters regularly travelled inland to hunt caribou, rapidly creating a cultural landscape.

ZUSAMMENFASSUNG - Der Artikel ist ein Beitrag zur Information über die Lebensweise von arktischen Wildbeutern, die die Archäologie des Paläolithikums seit langem und in unterschiedlichster Weise inspiriert hat. Das Inland von Westgrönland ist eine Kulturlandschaft, die durch jahrhundertelange Karibujagd im Sommer von Grönländern und Menschen der Thule-Kultur entstand. Ein wichtiger Bestandteil dieser Kulturlandschaft ist die lange Karibufanganlage, die aus zahlreichen inussuit ('Steinmännchen') und Jagdansitzen besteht. Das in diesem Beitrag vorgestellte Beispiel befindet sich im Zentrum des lokalen Karibuvorkommens in einer zentralen Passage von wandernden Karibus. Die Fanganlage wurde von einzelnen Jägern zur Ansitzjagd und/oder von einer größeren Gruppe für kommunale Jagd benutzt, bei der Karibu zu ansitzenden Jägern oder in den See zu Jägern in Kajaks getrieben wurden. Die Karibufanganlage befindet sich in der Nähe eines großen Sommerlagers und weiteren Strukturen, die Zeugnisse intensiver Karibujagd der letzten 700 Jahre sind. Eine kurze Referierung des Forschungsstands zu Einwanderung und Sozialstruktur von Menschen der Thule-Kultur zeigt, dass diese auf maritime Ressourcen orientierten Jäger unmittelbar nach ihrer Ankunft in Westgrönland zur Karibujagd ins Inland kamen und schnell zur Entstehung der Kulturlandschaft beitrugen.

KEYWORDS - Thule culture, historic period, cultural landscape, cultural history
Thule-Kultur, historische Zeit, Kulturlandschaft, Kulturgeschichte

*„(...) the universe as Inuit people lived and understood it (...) was undoubtedly shot through with more belief and less system than archaeologists would normally be comfortable with“
(Whitridge 2016a, 827).*

Introduction

The prehistoric feature presented in this article was discovered during fieldwork in the inland of Nuussuaq (Figs. 1-3). This research was not a classic ethnoarchaeological investigation, which is „ethnographic field research conducted by trained archaeologists with living communities“ (Jordan & Cummings 2014a: 39) as the far inland of West Greenland is devoid of humans today, since it has not or only infrequently been used for summer subsistence hunting since the 1950s (Dahl 2000: 160-168; on the

post-colonial development in Greenland: Rud 2017: 120-128). Although there are no people to be found here today, this area is covered by archaeological structures which can be found and documented by systematic foot surveys (Grønnow 1986: 67). The archaeological structures represent the “built environment”, which is any physical alteration of the natural environment through construction by humans (Ingold 2000: 174). This built environment can be interpreted by using local ethnohistoric and ethnographic sources (e.g. Gulløv & Kapel 1979; Gulløv & Kapel 1980; Grønnow et al. 1983; Møbjerg

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1983; Grønnow 1986; Møbjerg & Caning 1986; Gulløv 1997). This approach is a research strategy which David & Kramer (2001: 2-13) incorporate into their definition of ethnoarchaeology. Much has been written on how to use these observations for interpretation and discussion of the European archaeological record (in general: David & Kramer 2001: 33-62; recent debates and overviews: Gosselain 2016; Roux 2017; Cunningham & MacGeough 2018; Lyons & David 2019; Veit 2020; for Greenland: Grønnow 1993; for a review of ethnoarchaeological studies relevant for hunter-gatherer archaeology: David & Kramer 2001: 228-239, 258-266, 286-291; Lane 2014). Ethnoarchaeology and anthropology provide diverse information on the way of life of historic and modern hunter-gatherers (e.g. Kelly 1995). Archaeologists often follow these themes without taking in consideration that prehistoric remains, "landscapes and things possess their own (...) qualities and competences" (B. Olsen 2010: 10). The aim of this article is to present the 'qualities and competences' of a stone-built caribou hunting drive lane from Greenland to inform Palaeolithic archaeologists about its interpretation and its ecological and cultural context.

The setting

Several millennia of human life have left a substantial material record in Greenland (Fig. 1), the most eastern part of the North American Arctic: in West Greenland Paleo-Inuit were present during the Saqqaq period from c. 2,500-800/500 calBC (Grønnow 2016: 715) and during the Greenlandic Dorset period from c. 800-1 calBC (Jensen 2016: 739). After the Norse occupation between c. AD 1000-1450 (Madsen 2019: 119), Neo-Inuit humans of the Thule period appeared first in northern Northwest Greenland in the 13th century (Lemoine & Darwent 2016: 876) and south of Disko Bay up from the 14th century (Gulløv 2016: 899, 901). These humans were the predecessors of today's Greenlanders who experienced constant European presence during the historic period, AD 1721-1953 (Gulløv 2016; Rud 2017). In West Greenland human subsistence during Paleo- and Neo-Inuit times had a clear focus on maritime resources but was supplemented by caribou (Grønnow 2016: 716-720; Gulløv 2012; Jensen 2016: 751-753). Caribou occur more or less everywhere in the far inland of West Greenland (Meldgaard 1986; Cuyler et al. 2002). Whereas human subsistence on caribou is not well-known for the Paleo-Inuit period (Gotfredsen & Møbjerg 2004; Grønnow 2004: 100; Meldgaard 2004; Jensen 2006: 165; K. Pasda 2015: Tab. 2; Jensen et al. 2017: 39, 45; K. Pasda 2018), inland hunting over 700 years by Thule humans and descendant Greenlanders left a diverse archaeological record, mostly preserved as stone-built features, ranging from summer tent

houses to tent rings, used rock shelters, meat caches and graves (Jensen et al. 2017: 16). One of these features is the stone-built caribou hunting drive.

Structures built for the hunting of herds of ungulates by humans are a global phenomenon (for a recent summary: Lemke 2021). In the North American Arctic these structures are stone-built drive lanes, often combined with hunting blinds, used for communal hunting of caribou (Jenness 1923: 148-150; Spiess 1979: 103-111; Ingold 1980: 54-64; Blehr 1990; Gordon 1990; Stewart et al. 2000; Stewart et al. 2004; Benedict 2005; Brink 2005; Binford 2009; Burch 2012: 40; Friesen 2013; Whitridge 2013: 233-234). In Greenland communal hunting of caribou was first mentioned in historical sources in AD 1729 (Grønnow et al. 1983: 30) but it took over 200 years before two stone-built drive lanes were published (Nellemann 1955; Rosing 1956; Rosing 1958; Nellemann 1969/70; Nellemann 1970; Rosing 1988). These two sites are situated southwest of Itinnera (Nuuk Municipality, West Greenland), one on top of the 1,100 m high Qingaanguaq, the other lane nearby, on a ledge in a steep wall. Both structures have two short, c. 20 m long, L-shaped rows of several stone-built inussuit (Greenlandic, "human-like", singular: inussuk), the space between each inussuk is often <1 m (Pasda 2016), a characteristic that has so far not been published in Greenland again. Nearly all inussuit have collapsed today, maybe due to processes associated with nivation (Christiansen 1998) and/or commercial reindeer herding undertaken here in 1952-1998 (Nellemann 1969/70: 140; Sturdy 1972: 165; Gaup 2019). However, this discovery led to archaeological investigations on prehistoric caribou hunting, making available detailed information on stone-built features from the Kangaatsiaq, Sisimiut, Maniitsoq and Nuuk inland (Grønnow et al. 1983; Grønnow 1986; C. Pasda 2002; C. Pasda 2004; Odgaard 2007a; Odgaard 2007b; Knudsen 2008; Grønnow 2009a; Odgaard 2010; C. Pasda 2011; K. Pasda & Odgaard 2011; C. Pasda 2013; C. Pasda 2014; Domínguez-Solera 2014; Neubeck & Pasda 2015; Jensen et al. 2017; Lennert 2017; A. Olsen 2021; Madsen & Lennert 2022). This report presents a newly discovered caribou hunting drive further north, at 70°N.

Nuussuaq (Greenlandic, "the large peninsula") is a c. 180 km long but narrow peninsula north of Disko Island (Fig. 2). The coastal area is prone to tsunami-generating rock avalanches and landslides (Svennevig 2019). The inland is a mountainous upland with glaciated heights up to 2,144 m a.s.l. (Fig. 8), which are the highest mountains in West Greenland (Steenstrup 1883: 31). During the Little Ice Age, several glacier tongues came down to the bottom of the long, 270 m a.s.l. high lake Saqqap Tasersua (Fig. 3) and its western, c. 70 km long outflow (Criterio et al. 2009: Fig. 9).



Fig. 1. Greenland (square: Fig. 2.) – map adapted from Dahl (2000: map 1).

Abb. 1. Grönland (Rahmen: Abb. 2.) – Karte verändert nach Dahl (2000: map 1).

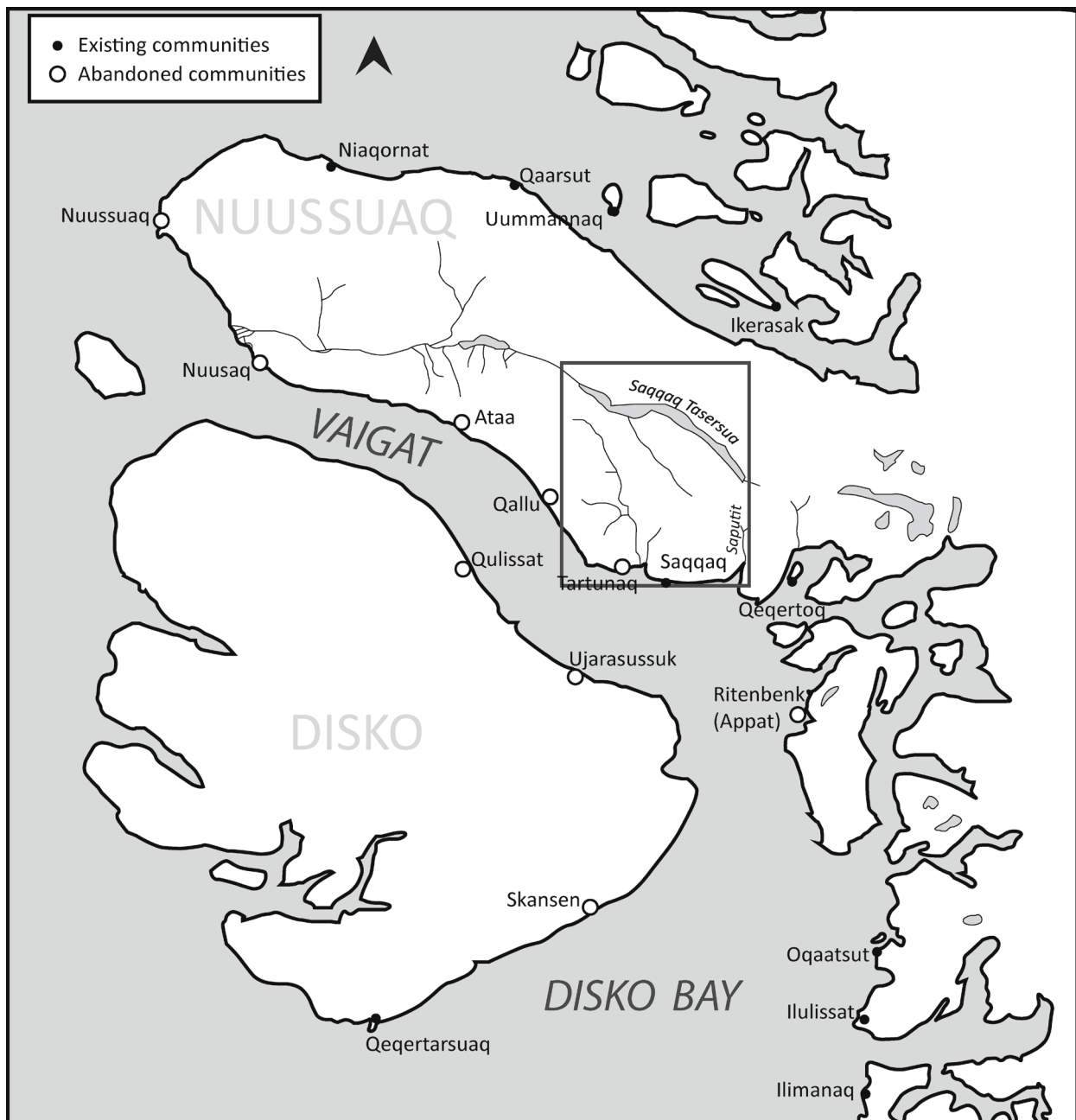


Fig. 2. Disko Bay and Nuussuaq (square: Fig. 3) – map adapted from Dahl (2000: map 2).

Abb. 2. Disko Bucht und Nuussuaq (Rahmen: Abb. 3) – Karte verändert nach Dahl (2000: map 2).

Many Paleo-Inuit sites are known from the coast of Nuussuaq (Møbjerg 1986: 25; Jensen 2006: 40-45; Walsh et al. 2020: 3-5). On the northern shore there is a Paleo-Inuit site where the widely-distributed killiaq, a type of rock used in the production of knapped stone tools, was extracted (Jensen 2006: 86-87). Sites of the Thule and historic period are known from the coast (Mathiassen 1934: 29-35), among them, on the northern shore, the well preserved grave burials of Qilakitsoq which date c. AD 1475 (Hansen & Gulløv 1989). The recent settlement Saqqaaq (Greenlandic, “the sunny side”; Fig. 3) has been inhabited since Thule times (Larsen & Meldgaard 1958: 42) but “no ancient ruins are to

be seen on this densely populated place” (Mathiassen 1934: 33). Two sites of the Thule period are situated east of the mouth of Pulateriaq (Fig. 3): Ikkarluarasuk with eight dwellings and Ujaqqiukkat with three dwellings (Mathiassen 1934: 33-35). West of the river mouth three more Thule/historic sites can be found (Ostermann & Porsild 1921: 266-267; Walsh et al. 2020: 3). In the vicinity of the recent settlement Qeqertat (Fig. 2) five small settlements were inhabited till the early 20th century (Ostermann & Porsild 1921: 259-263). Among them is Illorsuit, one of the largest Thule settlements in Disko Bay where habitation started in the 14th-16th century AD (Mathiassen 1934: 127-163; Larsen & Meldgaard 1958: 39;

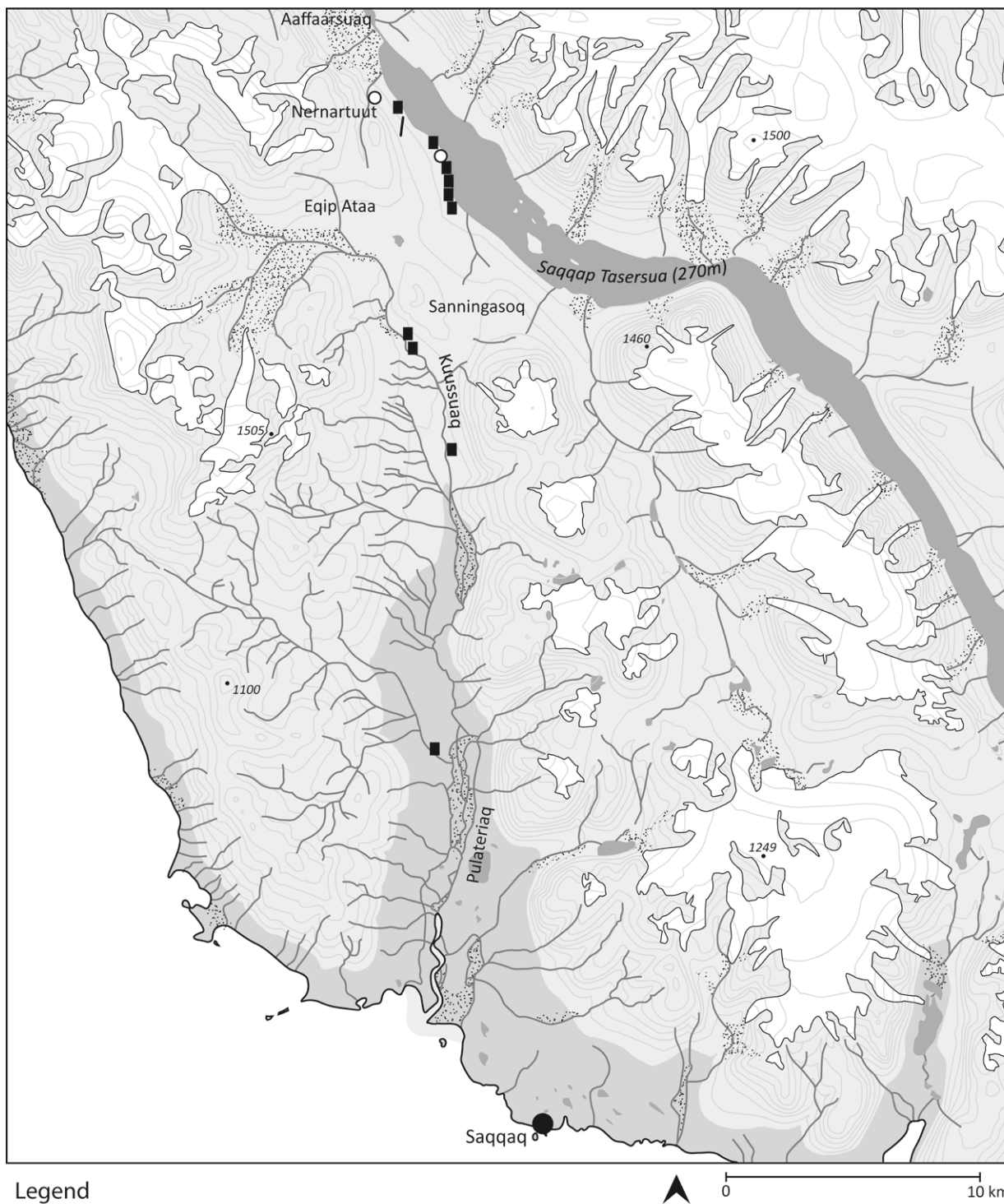


Fig. 3. Central part of Nuussuaq. Note: not all archaeological structures at Saqqap Tasersua are included. Base map from www.nunagis.gl.
Abb. 3. Mittlerer Teil von Nuussuaq. Anmerkung: nicht alle archäologischen Strukturen am Saqqap Tasersua sind kartiert. Kartengrundlage durch www.nunagis.gl.

Gulløv 1997: 440-441). The famous, stone-built fence of Saputit is situated in the bay east of Saqqaq (Fig. 2). Its position at the coast, its impressive, c. 500 m long, wall-like construction and the occurrence of 65 small, stone-built shelters and nearly 100 meat

caches in its immediate surroundings are in marked contrast to the hunting drive described in the next chapter. This makes Saputit an exception in West Greenland which is described in detail elsewhere (Pasda in print).

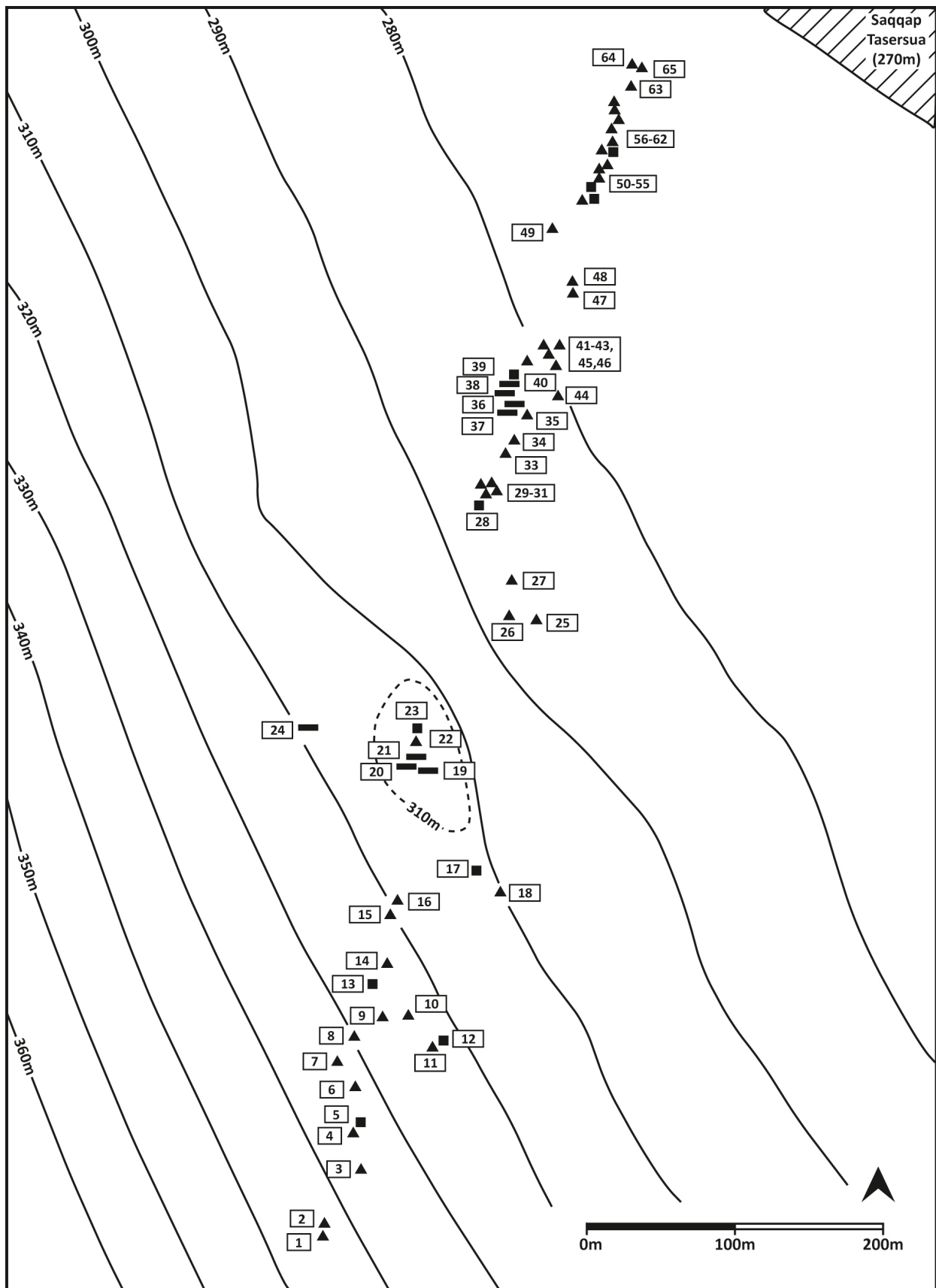


Fig. 4. Caribou hunting drive near Nernartuut (plotting of features according to hand-held GPS coordinates on a digitized relief model, triangle: single-stone inussuk; square: inussuk with two or three stones; rectangle: shooting blind, broken line: contour line drawn by hand to indicate micro relief (see Figs. 5 & 6), height above sealevel based on height of Saqqap Tasersua indicated on SagaMap 1:250,000).

Abb. 4. Karibufanganlage in der Nähe von Nernartuut (Kartierung der Strukturen mit GPS-Daten auf digitalem Reliefmodell, Dreieck: inussuk mit einem Stein, Quadrat: inussuk mit zwei bis drei Steinen, Rechteck: Jagdansitz, Strichlinie: händisch ergänzte Höhenlinie zur Darstellung des Mikroreliefs (siehe Abb. 5 & 6), Höhe über Normalnull bezieht sich auf Höhe des Saqqap Tasersua in der SagaMap 1:250.000).

Qualities and competences of a hunting drive

Description

In July 2019 a hunting drive was found and recorded in the center of the inland of Nuussuaq, at the shore of Saqqap Tasersua (Fig. 3). The hunting drive consists of 65 stone-built features (Fig. 4), among them 57 inussuit. The 47 single-stone inussuit (Fig. 5; 6; 9: 58, 59; 10: 56, 58, 59) and the ten inussuit with two or three stones (Fig. 7; 8; 9: 57; 10: 57) create an over 400 m long, more or less straight lane. The lane runs from Saqqap Tasersua obliquely uphill, ending where the slope becomes steep, c. 70 m above the lake shore. In the center of the lane (Fig. 4: between inussuit 23 and 26) no inussuit are present, possibly because of the steep terrain. Several distinct caribou paths run parallel to the contour lines, near or just beside the eight shooting blinds. These shooting blinds are 1.5-4.0 m long, straight (2x) or slightly curved rows (6x) built of 5-70 rocks (Fig. 11), sometimes incorporating large, natural boulders (Fig. 12), to create up to 60 cm high walls. All shooting blinds are west/east oriented, perpendicular to caribou paths and the inussuit lane (Fig. 4).

It has to be emphasized that inussuit are often difficult to identify in the terrain (Blehr 1990: 311; Gordon 1990: 281; Grønnow 2009a: 206) as each single stone has to be differentiated from erratics left by former glaciers (Humlum 1988; French 1996: 156-157; Schweinsberg et al. 2019: Fig. 4). A single stone is interpreted as an inussuk if found together with shooting blinds or with inussuit made of two or more stones

(C. Pasda 2014: 69). That being said, inussuit have been placed directly on boulders (Figs. 5 & 6), so they lack the small rocks that erratica rest on.

Age

As a major landscape development has taken place during and after the Paleo-Inuit time period (for a recent summary: Neubeck & Pasda 2015: 75) these delicate inussuit and shooting blinds (Figs. 5-12) may indicate a much younger age. The structure and arrangement of inussuit and shooting blinds (Figs. 4-12) is well-known from numerous Thule sites in West Greenland (Grønnow et al. 1983: 41-49; Grønnow 2009a; C. Pasda 2011: 77-81; C. Pasda 2013: 179-180; C. Pasda 2014: 51-57; Neubeck & Pasda 2015: 72; A. Olsen 2021: 71-73). Type and age of neighboring structures, described below, indicate Thule and later, historic occupation. This may indicate that the hunting drive was built and used in the Thule period when caribou were hunted using bows and arrows (Grønnow et al. 1983, 86-87; Grønnow 2009a: 201). This period started on Nuussuaq around the 14th century (Mathiassen 1934: 29-30; Hansen & Gulløv 1989; Gulløv 1997: 438-441; Gulløv 2016: 899, 901).

Function

The Greenland caribou population is characterized by dramatic demographic fluctuations which occur every 60-120 years and also influence the behaviour and spatial distribution of this species (Vibe 1967; Meldgaard 1986; Cuyler et al. 2002; Forchhammer et al. 2002; Post & Forchhammer 2002). For example, in southern Disko Bay in the two decades between AD



Fig. 5. Inussuk 3 (front, left) and 8 (behind, right), hill with nos. 19-23 (in background) – photo from S.

Abb. 5. Inussuk 3 (links) und 8 (rechts hinten), Hügel mit Strukturen 19-23 (im Hintergrund) – Foto von Süden.



Fig. 6. Inussuk 8 (in foreground), two other inussuit (in left center), hill with nos. 19-23 (in background) – photo from S.

Abb. 6. Inussuk 8 (vorne), zwei weitere inussuit (im Zentrum links), Hügel mit Strukturen 19-23 (im Hintergrund) – Foto von Süden.

1840-1860 up to 5,000 caribou skins were traded annually in contrast to the long period between AD 1860-1960 when only single skins were sold by hunters to The Royal Danish Trading Company (Meldgaard 1986: Fig. 38). With increasing caribou numbers this deer species expands its range to reach coastal areas

where they could be “shot almost standing in the doorways of people’s houses” (Meldgaard 1986: 63). In contrast, when caribou numbers are low, the few remaining individuals retreat inland where they live widely dispersed throughout the year (Meldgaard 1986: 63).



Fig. 7. Inussuk 23 – photo from S.

Abb. 7. Inussuk 23 – Foto von Süden.



Fig. 8. Inussuk 40 – photo from SW.

Abb. 8. Inussuk 40 – Foto von Südwesten.



Fig. 9. Inussuk 57 (right), 58 (center) and 59 (left) – photo from SW.

Abb. 9. Inussuk 57 (rechts), 58 (Mitte) und 59 (links) – Foto von Südwesten.

The hunting drive presented in this article is situated in the center of an area where caribou are always present despite the fluctuations in their numbers (Boertmann 2004; Cuyler 2005; Wegeberg & Boertmann 2016). The hunting drive is situated in a particularly strategic position, since the caribou of Nuussuaq prefer to inhabit regions above 300 m

a.s.l. during summer (Wegeberg & Boertmann 2016: 54): here, at the western end of Saqqap Tasersua with its plain-like surroundings (Figs. 6, 8 & 12) the two main valleys of Nuussuaq meet (Figs. 2 & 3), the Pulateriaq/Kuussuaq running from north to south and the Aaffaarsuaq (Greenlandic, “the great caribou hunting area”) running from east to west.



Fig. 10. Inussuit 56-59 (from left to right) – photo from S.

Abb. 10. Inussuit 56-59 (von links nach rechts) – Foto von Süden.



Fig. 11. Shooting blind 21.

Abb. 11. Jagdansitz 21.

This junction gives access to numerous upland areas. Therefore, the hunting drive is located in the center of the local caribou habitat and in the best strategic position where traversing caribou can be expected in summer. By using topography, the drive lane closes this passage between the mountain and the lake shore (Fig. 3).

As mentioned above, the feature presented here matches the previously known Thule stone-built caribou hunting drive lanes which have been found inland in Central West Greenland. These hunting sites show differences in lane length and shape, presence of shooting blinds as well as placement, numbers and appearance of inussuit. This is due to differences in



Fig. 12. Shooting blind 24 – photo from S.

Abb. 12. Jagdansitz 24 – Foto von Süden.

local topography, which influences the behaviour of caribou, but also due to the human investment necessary to build a hunting site and maintain it over decades and centuries with adjustments and alterations (Grønnow 2009a; Burch 2012: 40; C. Pasda 2014), making it often impossible to reconstruct exactly the function of the present hunting site. However, in general, all over the North American Arctic and Subarctic the same hunting techniques have been employed at caribou drive lanes (Jenness 1923: 148-150; Spiess 1979: 103-111; Ingold 1980: 56-64; Grønnow et al. 1983: 42-46; Blehr 1990; Gordon 1990; Stewart et al. 2000; Stewart et al. 2004; Benedict 2005; Brink 2005; Binford 2009; Burch 2012: 40; Friesen 2013; Whitridge 2013: 233-234; C. Pasda 2014). Caribou try to keep a distance of c. 100 m to humans (Aastrup 2000). Taking this behaviour into consideration, caribou hunting needs "a considerable amount of strategy and the careful utilization of topographical features" (Jenness 1923: 149). The aim was to control the path the deer would follow (Blehr 1990: 311) to get the animals within close range of Thule archery – the best distance may have been 15-20 m (Jenness 1923: 145-146; Pfeifer 2021: 67). As undisturbed caribou tend to move in definite directions, are more or less unconcerned about potential danger and curious when they spot a strange object (Burch 1972: 361), controlling of moving deer was most effective with the construction of inussuit. Often the inussuit were activated by stretching thongs between them, by attaching the wings of birds or by placing lumps of turf on top of the rocks (Rosing 1958; Holtved 1967: 108; Nellemann 1969/70; Nellemann 1970; Rosing 1988). The most productive hunting method involved communal activity when a battue was organized, during which women and young people drove caribou to hunters concealed behind shooting hides (Holtved 1962: 73). As the hunting drive at Nernartuut runs obliquely from the slope to the lake shore (Fig. 4), also caribou frightened by drivers may have been forced to enter the lake to swim where hunters in their kayaks waited for their prey (Holtved 1962: 73). Of course, individual hunting was also possible: single hunters knew good hunting spots to wait for a long time – "hour after hour" (Astrup 1898: 139) – behind shooting blinds for passing caribou. But only a few caribou were shot in this way, by individuals hunting alone (Jenness 1923: 148).

Context

The surrounding sites

According to the classification of Grønnow (2009a: Tab. 1) this lane, with its high amount of inussuit and shooting blinds, can be considered a large caribou hunting structure. Comparable large hunting structures occur rarely in the inland of Central West Greenland (C. Pasda 2014: Tab. 3-5; Neubeck & Pasda 2015: Tab. 3) but the most spectacular ones are

always associated with a large inland summer camp (Grønnow et al. 1983; Grønnow 2009a: 205-206). This is also the case here (Fig. 3), as the hunting drive is situated about 1 km south of Nernartuut (Greenlandic: "locality with rich saxifrage vegetation"), the only large inland Nuussuaq hunting camp known so far (Rosenkrantz 1943: 90; Dahl 2000: 162-163). At Nernartuut the stone and turf walls of former shelters can be seen. When in use, these shelters were covered with skin to offer space for five people who always cooked outside (Ostermann & Porsild 1921: 237). The hunting drive described above made steering caribou possible "down towards a suitable place for dispatch near the camp" (Grønnow et al. 1983: 45). However, at Nernartuut, and in general in West Greenland, hunting and living facilities occur in separate areas (Grønnow et al. 1983: Fig. 39; Grønnow 2009a: 206; C. Pasda 2014) as hunters are aware that caribou avoid places inhabited by humans (Stewart et al. 2000: 273-274; Stewart et al. 2004: 198; Panzacchi et al. 2013; Skarin & Åhman 2014; Flydal et al. 2019).

A naanngisat – a hopping stone row – is situated below Nernartuut (Rosenkrantz 1943: 91). This line of rocks indicates a playground (Porsild 1920; Grønnow et al. 1983: 51-52) as "stepping or jumping stones were normally laid out where people met, and where certain social gatherings were held" (R. Petersen 2003: 31). Many other archaeological sites occur on the approximately 5 km long lake shore south of Nernartuut (Fig. 3): eleven hunters' beds – square or round, stone-built structures where travelling hunting parties rested or slept in the open (Rosenkrantz 1943: 95) – seven single meat caches, three single shooting blinds, two sites with few tent rings, two small summer camps with two to three tent houses and meat caches, and a larger summer camp with six tent house-like structures (Fig. 13), four substantial but undetermined structures, three hunters' beds and 26 meat caches (C. Pasda in print). Beside one tent house (Fig. 13) a metal bucket with the imprint „EST 1871" was found which indicates human activities in the late 19th century and/or later. The high amount of Thule and historic sites at Saqqap Tasersua is in striking contrast to the long access route from the south, where in Pulateriaq/Kuussuaq only four single hunters' beds have been found (Fig. 3). The spatial concentration of a large summer camp with its long drive lane, its naanngisat and many other sites indicate that this area was the center of Thule and Greenlandic inland caribou hunting on Nuussuaq.

The meeting of times and worlds

The drive lane presented here is not just an ordinary archaeological feature connected with subsistence activities of hunter-gatherers. As the hunting drive may be several centuries old, this stone-built structure can also be seen as a feature "bringing together different times and worlds" (Herva & Lahelma 2020: 14), the times of its creators, its users, of passing people and the worlds of landscape and stories. Since there is



Fig. 13. Remains of a summer tent house (south of the hunting drive).

Abb. 13. Überreste eines Sommerzelthauses (südlich der Karibujagdanlage).

almost no information from Nuussuaq on these topics, the data and results from Central West Greenland and the Canadian Arctic are taken into account.

The origin and causes of the Thule migration into the eastern Arctic are still a matter of debate (Mason 2020). An early part of this migration “was likely initiated by extended families from various locations along the north and west Alaskan and possibly Siberian coast” (Friesen 2016: 684) who reached Greenland some 2,500 km away within a few decades (Friesen 2016: 683, 685; Gulløv 2016: 898; Mason 2016; Whitridge 2016a: 830-831). These Thule people introduced new methods of hunting, travelling and transportation, among them the skin-covered boats umiak and kayak, float-based seal hunting, organized large whale hunting and dog-sledge traction (Darwent & Darwent 2014: 190). Moreover, Thule people had bow and arrow (Mason 2016: 492) which were unknown among the last Paleo-Inuit in the eastern Arctic (Appelt et al. 2016: 785; Friesen 2013; Jensen et al. 2017: 45). Beside caribou hunting with bows and arrows, lancing deer at water crossings from kayak or using drive systems and shooting blinds were an integral part of Neo-Inuit subsistence hunting (Betts 2016: 92-93). This made it possible for early Thule migrants to hunt caribou “whenever possible” (Friesen 2012: 4), e.g. on Victoria Island in the Canadian Arctic (Friesen & Norman 2016; Le Mouël & Le Mouël 2002). In contrast, no or scarce caribou remains are present in early Thule sites of northernmost Canada and High Arctic Greenland (McCullough 1989: 111-124, 252; Darwent & Foin 2010, 325; Flora et al. 2018: S259; Gotfredsen et al. 2018: Tab. 1; 2). More to the south, between Upernavik and Disko Bay (Fig. 1), proof of caribou hunting in early Thule times is restricted to

the presence of a few caribou bones and remains of bows and arrows at excavated sites (Mathiassen 1930: 194-197; Mathiassen 1934: 150-151; Meldgaard 1986: 26-30; Pfeifer 2021: 18-20 – for a late Thule/historic site: Møhl 1979) as well as by clothes, stockings and shoes made of caribou skins worn by the c. 600 years old mummies of Qilakitsoq on Nuussuaq (Hansen & Gulløv 1989: 23-46).

Radiocarbon dates are not available from inland sites at Nuussuaq, which is situated at N70°. Further south, however, 14 radiocarbon dated caribou bone or antler (for details and context of radiocarbon data: Appendix 1) indicate Thule inland occupation at the Sisimiut (Fig. 14: 67°), Maniitsoq (Fig. 14: 66°) and Nuuk municipalities (Fig. 14: 64°). Among the samples are five conventional radiocarbon measurements (Fig. 14: 1-3, 12 & 13). Nine samples are AMS-¹⁴C data (Fig. 14: 4-11 & 14). Sample no. 1 is the oldest date and derives from a marrow-split caribou bone recovered from a large, rectangular hunters’ bed (Grønnow et al. 1983: Fig. 56) which is situated 1.5 km northwest of the large summer camp Aasivissuit. According to Gulløv (1997: 438) the age is too old for Thule occupation and falls within a time period when no Paleo-Inuit were present in West Greenland. However, the calibration made here indicates partial overlap with the oldest date from the excavation at Aasivissuit (Fig. 14: 2) which is accepted by Gulløv (1997: 438). This may support the interpretation by Grønnow et al. (1983: 82) that the hunter’s bed was built and used during a brief overnight stay by early, maybe the first, Thule caribou hunters. The archaeological and archaeozoological context of the two stratified samples from the excavation of the midden area at Aasivissuit (Fig. 14: 2 & 3) is interpreted by Grønnow et al. (1983: 82) as evidence of

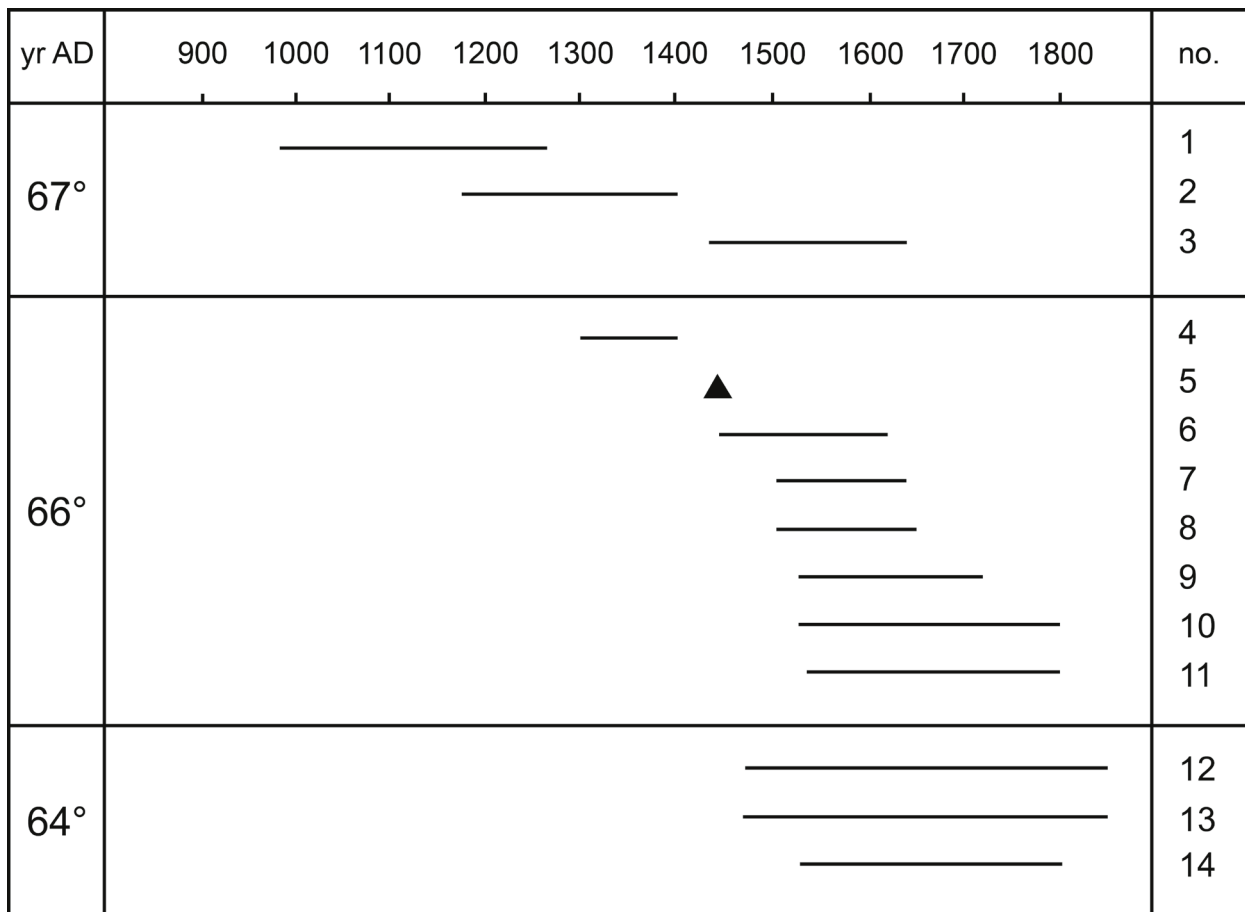


Fig. 14. Chronology of single Thule structures and summer camps in the inland of West Greenland (radiocarbon age calibrated with two standard deviations, see appendix 1 for site numbers, primary radiocarbon data, context and comments).

Abb. 14. Zeitstellung von Einzelstrukturen und Sommerlagern der Thule-Kultur im Inland von Westgrönland (kalibrierte ¹⁴C-Alter mit zweifacher Standardabweichung, siehe Appendix 1 zur Dokumentation von Nummern, ¹⁴C-Daten, Kontext und Kommentaren).

small groups of early Thule hunters who stayed at the site in late summer and autumn to hunt caribou and wildfowl.

In the Maniitsoq inland the oldest sample (Fig. 14: 4) was collected beside shooting blinds indicating ambush hunting by early Thule people in the 14th century. This AMS date supports the earliest, conventional age of Aasivissuit (Fig. 14: 2). The next two radiocarbon dates derive from a tent house (Fig. 14: 5) and a midden area beside the tent houses (Fig. 14: 6). Date no. 5 lacks specific information but was included as it is from the only site where a photo and a drawing of the early Thule summer tent house has been published (C. Pasda 2004: Fig. 16b; Odgaard 2009: Fig. 15). Both dates indicate that in the first half of the 15th century summer camps were used by Thule people to hunt caribou inland, 100 km far away from the fjord. Thule people also came inland later in the 16th century, as indicated by a caribou bone from a human grave (Fig. 14: 8). Four other samples derive from tent houses (Fig. 14: 7 & 9-11) to show the use of summer camps from c. AD 1500 well into historic times.

Further south, in the Nuuk inland, three samples derive from large camp sites (Fig. 14: 12-14) and may indicate the start of Thule stays in summer camps in the 15th century.

In sum, figure 14 shows that immediately after arriving in the 14th century (Gulløv 2016: 899, 901) Thule people were present far inland east of Sisimiut and Maniitsoq (Fig. 14: 1, 2 & 4). To reach these regions Thule people had to sail by boat from the coast into the fjords and then to walk up to 100 km by foot (Jensen et al. 2017: 59; Fig. 2.33). This shows that Thule people instantly became aware of the best caribou hunting ground in Greenland to start caribou hunting by small groups of Thule hunters sailing and trekking sporadically inland (Grønnow et al. 1983: 82; Gulløv 1997: 344-345). Shortly after AD 1400 the first caribou hunting summer camps were established far inland (Fig. 14: 5, 6, 12 & 13) to be followed by others after AD 1500 (Fig. 14: 7, 9-11 & 14). This indicates that after AD 1400 Thule families made regular, seasonal and long residential moves between winter camps on the coast and summer camps far inland.

Of course, the coarse chronological resolution offered by calibration of radiocarbon data of this time period (Fig. 14 & Appendix 1) hampers a precise interpretation of early Thule inland occupation. But it cannot be ruled out that it took Thule people only a few decades to travel from High Arctic northern Greenland to Low Arctic Central West Greenland.

Here, in the largest caribou hunting grounds in Greenland, Thule people immediately went far inland to incorporate the hunting of terrestrial animals into their primarily maritime based subsistence. Within a few decades, Thule people made regular seasonal residential moves between coastal winter and inland summer camps. These actions were not impeded by the presence of Norse hunters, who the Thule people had encountered ever since they had entered Greenland (Gulløv 2016) and who had also left behind single structures and artefacts near and on Nuussuaq (Imer 2017: 83-86; Madsen 2019: 132-134). It is conceivable that the early Thule people, the 'pioneers', with their economy based on whaling, their social complexity and their experience of competition and warfare (Dawson 2016: 919-920; Friesen 2016: 682; Mason 2016: 492-495; Mason 2020), were not hunter-gatherers who cautiously scouted unknown regions, but were powerful, self-confident travellers eager to explore a continent and showing no fear of conflict (Appelt & Gulløv 2009: 316; Gulløv 2016: 903). All this may indicate that a rapid acquisition of the knowledge of natural and human landscapes may have been a presupposition of the way of life of early Thule people.

It has to be emphasized that this interpretation should not be seen as evidence for an ephemeral start of caribou hunting in the 14th century to be followed in the 15th century by a more complex hunting economy which remained unchanged for centuries.

The relationship, mentioned above, between caribou abundance, distribution and movement also has been documented in other areas of the North American Arctic (Meldgaard 1986: 64; Stenton 1991; Burch 2012). Sometimes this is taken to explain culture change (David 1973; Mason & Gerlach 1995). However, caribou population cycles influenced the way of life of Greenlanders differently. Grønnow et al. (1983: 60-68) have shown how, during the last 300 years, employment of a simple versus a complex subsistence strategy is connected with caribou population cycles (Meldgaard 1983) but that political and social developments also created changes in inland use (Grønnow et al. 1983; C. Pasda 2014). This "discontinuous model" (Gulløv 1997: 26) emphasizes that more or less each generation of Greenlanders who hunted inland differed in their use of sites, in group size, mobility, duration of stay, territoriality and hunting methods (Grønnow et al. 1983; Grønnow 2009a: 202). Additionally, variations between regions occurred (C. Pasda 2014) while, maybe, small, isolated regions were not affected too much by the periodic crashes of the whole caribou population (Madsen & Lennert 2022: 5). Taking the discontinuous model to interpret the Thule period in West Greenland, it may have been that the first Thule people arrived when the caribou population was low, making a mobile foraging strategy by a few hunters the most effective method to catch the dispersed deer. After AD 1400, when numbers

of caribou increased, Thule people switched their subsistence strategy to communal hunting by large groups which stayed at large summer camps. However, as no information on caribou population before AD 1700 is available (Grønnow et al. 1983: 82; K. Pasda & Odgaard 2011: 38-40), future excavation of inland midden areas is necessary to test this hypothesis.

In southern Disko Bay the use of bows and arrows became rare in the historic period by AD 1750 and was regarded as a curiosity only twenty years later (Birket-Smith 1918: 9). Knowledge of the complex archery technology was forgotten within one generation (Pfeifer 2021: 27-29). Following the introduction of guns in the late 18th century, caribou hunting by individual hunters became possible, marking the end of communal hunting (R. Petersen 2003: 54). However, former hunting sites with shooting blinds remained in use (Grønnow et al. 1983: 87; Grønnow 2009a: 201), often into recent times (C. Pasda in print: Fig. 16c). How caribou hunting was influenced in the historic period by bartering with Dutch whalers in Disko Bay (Mathiassen 1934: 10; Mikkelsen et al. 2018) and later by colonial affairs, remains to be investigated. On Nuussuaq inland caribou hunting was still performed in the 19th century and up to the early 1950s (Berthelsen et al. 1921: 359, 394; Ostermann & Porsild 1921: 234, 237; Rosenkrantz 1943; Rosenkrantz 1968; Dahl 2000, 162). It can be assumed that during that period Greenlanders hunting with guns used the shooting blinds of the hunting drive, depending on caribou presence and behaviour, wind direction and number of participants in hunting events.

In the 19th century caribou were hunted on Nuussuaq in spring (March to early May) and in August/September (Berthelsen et al. 1921: 359, 394; Ostermann & Porsild 1921: 234, 237; Rosenkrantz 1968: 68). According to Jonas Jensen (oral inf. Saqqaq, 31/7/2019), the Saqqarmiut travelled in May by dog sledges to Nernartuut. Women and children were left there to fish while the hunters went back to the coast to return in July by foot for inland caribou hunting. Furthermore, an umiak was transported in spring by dog sledge to Saqqap Tasersua (Rosenkrantz 1943: 90). This indicates that the use of dog-sledge traction made transport of people and equipment easier here in contrast to further south, in Greenland, where sea ice conditions did not support dog sledding (Birket-Smith 1917: 14-16; Birket-Smith 1924: 242; Møhl 1997: 500; Morey 2010: 120, 126-128; Egevang 2020: 20, 52). However, dog-sledge traction also makes logistics more complicated as feeding dogs is always necessary (Hill 2018: 93; Whitridge 2018; Egevang 2020: 126).

The easiest access route by foot in summer from Saqqaq to Nernartuut is the eastern side of Pulateriaq/Kuussuaq (Fig. 3): this side is characterized by firmer ground, less steep slope and many freshwater creeks, in contrast to the western side with unstable shrub vegetation and creeks with a high amount of natural coal particles (Pedersen et al. 2018). These contrasting



Fig. 15. Remains of a hunters' bed (in Pulateriaq).

Abb. 15. Überreste eines Jägerbetts (in Pulateriaq).

qualities are reflected in the archaeological record: three hunters' beds are located on the eastern side of the river in contrast to a single one on the western side (Figs. 3 & 15). In addition, all tent rings occur on the eastern side, indicating that summer occupation in the 20th century also took advantage of this valley side. However, there is also a regular dog sledge route from Saqqaq, following the eastern side of Pulateriaq/Kuussuaq to cross the glacier to the northern shore of Nuussuaq (Berthelsen et al. 1921: 344; Ostermann & Porsild 1921: 213). Therefore, caribou were also hunted inland in winter, sometimes by using dog sledges (Ostermann & Porsild 1921: 225, 237; Egevang 2020: 117).

Rosenkrantz (1943: 92), a Danish geologist doing research on Nuussuaq in the late 1930s, wrote that the inland of the peninsula was divided into caribou hunting territories used by distinct coastal villages (Dahl 2000: 163). According to him, the reason for this division is the outflow of Saqqap Tasersua which is difficult or impossible to cross. However, in July 2019 crossing the river was not dangerous and the geologist contradicted his remark later by mentioning human hunting outside of these territories (Rosenkrantz 1968). Moreover, the use of an umiak in an inland caribou hunting area (Rosenkrantz 1943: 90) meant that rivers could be crossed and obstacles circumnavigated by sailing along lakes (H.C. Petersen 1986: 165-169), making territories accessible. Therefore, as in Central West Greenland, there were "probably no fixed territories. In certain periods, hunting parties and single hunters would (...) exploit various hunting

grounds (...). This could happen during periods of low settlement intensity inland, when access was unimpeded to uninhabited areas, as well as during periods of intensive settlement inland, when visiting hunting parties were assigned grounds in marginal zones" (Grønnow 2009a: 209). This may be supported by Jonas Jensen (oral inf. Saqqaq 31/7/2019) who told that Greenlanders from the whole Disko Bay area, from Sermermiut – the largest Thule settlement in Disko Bay, inhabited till AD 1850 (Larsen & Meldgaard 1958; Møbjerg 1983; Møbjerg & Caning 1986) – from Atta Sound, Qeqertat (Ostermann & Porsild 1921: 259) as well as from the settlements along Vaigat came to Nernartuut. A few of these hunters are known by name, for example Saqqarmiut Abel Broberg, Hans Eriksen, Ole Jensen, Manasse Mathaeussen, the most famous kayaker of his time (oral inf. A. Olsen, Saqqaq 9/7/2023), and Esaias Nathanielsen who led Danish geologists in August/September 1938 from Saqqaq to Nernartuut to continue in a western direction via Aaffarsuaq to reach the sea after seven days (Rosenkrantz 1943).

Summarizing these observations, it appears that c. 700 years of caribou hunting and fishing inland of Nuussuaq created a cultural landscape: valleys with hunters' beds and isolated inussuit of diverse meaning (Whitridge 2016b) became familiar access routes with caribou trails as suitable pathways (Whitridge 2013). Paleo-Inuit features, difficult to see in the terrain (C. Pasda in print: Fig. 5), as well as the few traces of Norse presence became perceived and interpreted. Inland summer camps became focal places visited

and used over decades (Ostermann & Porsild 1921: 237) but, as shown above, in a discontinuous manner. Thus, the landscape became dotted with place names connected with narratives or events (Aporta 2016). Abandoned tent houses became connected with distinct hunters (Rosenkrantz 1968: 68-69). The inland became part of the cosmology of Thule/Greenlandic maritime hunters, inhabited by ghosts, giants, monsters, mythical inland people, former hunters and the qivittoq, the legendary anonymous stranger (Grønnow 2009b; Sonne 2017; Flora 2019: 56-63). Thus, wayfinding and travelling, dwelling, hunting and gathering, social interaction, individual experiences, teaching, learning as well as information exchange through stories, myths and legends created the "marked and/or intentionally built environment" (Lovis & Whallon 2016: 2) described at Nernartut and its surroundings.

Results

In this article a stone-built caribou hunting drive lane is presented, starting with the description of the site and its features. A short discussion of its age is made, followed by the interpretation of its function and possible hunting methods. The relation of the hunting drive to other sites in its surroundings is presented, indicating a certain depth of time of human presence. A wider perspective is taken by presenting early Thule migration and social structure in general, as well as a discussion of radiocarbon chronology of Thule sites in the inland of Central West Greenland. This is followed by a presentation of information from historic times concerning the region where the hunting site is situated which is supplemented with a few references on the landscape perception of the Inuit in Nunavut and Greenland. This indicates that people of the Thule culture rapidly travelled vast distances in the Arctic. Immediately after arriving in West Greenland, these maritime hunters regularly travelled inland for caribou hunting. This led to the rapid emergence of the cultural landscape. This cultural landscape was travelled, settled and used not in a kind of linear evolution with simple beginnings and increasing complexity over time, but the settlement and subsistence system oscillated according to caribou population cycles which were also influenced by social and political changes.

Prospect

The rich ethnography and archaeology of Arctic hunter-gatherers has inspired interpretations of the European Palaeolithic record for over a century (Sommer 2005). However, the major difference between the archaeological records of the Arctic and the European Pleistocene has to be emphasized: the overwhelming majority of archaeological excavations at European Palaeolithic sites reveal mainly debris

from human flint knapping, which occurs in small, dense concentrations to loose scatters. These lithics were transported in different stages of the chaîne opératoire to be knapped and left while supporting primary activities such as butchering, consumption, manufacture and retooling (e.g. de Loecker 2004; Hallos 2005; Pope & Roberts 2005; Turq et al. 2013; Leesch et al. 2019). Arctic archaeology and ethnography cannot provide information on the creation of Palaeolithic flint artefact scatters as Thule people in the Canadian High Arctic and Greenland did not knap stone tools (Sørensen 2010; Desrosier & Sørensen 2012: 391). Furthermore, it seems important to emphasize that recent hunter-gatherers do not have a common base rooting in the Pleistocene: in contrast, the recent human world is an outcome of diverse cultural histories which created a large social system with local political and economic dependencies of which one part relied on hunting and gathering (Morrison & Junker 2002; Barnard 2004; Jordan 2007; Cannon 2014: 93-94; Jordan & Cummings 2014b: 14-15; Lane 2014: 136-137; articles in Cummings et al. 2014: 903-1090). The complex emergence, spread and development of the Thule culture may be another example for such a social system (articles in Friesen & Mason 2016: 371-536, 563-606, 631-650, 807-960). That may be the reason why cultural history is more important than ecology for behavioral categories like warfare, settlement, kinship, economy, politics, marriage patterns, ceremony and supernatural belief (Boyd 2018: Fig. 1.10). This indicates that to predict behavioral categories, "whether a person makes coiled baskets, whether she belongs to a clan with matrilineal relatives, or whether her group buries their dead, it's more useful to know what language she speaks than to know what kind of environment she lives in" (Boyd 2018: 50). An exception may be technology and subsistence which are not so much a result of cultural history but show a close link to ecology (Boyd 2018: 50). That may be the reason why hunting, butchering, consumption and storage of reindeer by Late Weichselian foragers in North Germany more or less matches that of caribou hunters in Greenland (Grønnow 1985; Bratlund 1999; Weinstock 2000).

However, the description of the qualities and competences of a caribou hunting drive in West Greenland reveals a much more complex relationship of the built environment with ecology and cultural history: this caribou hunting drive informs Palaeolithic archaeologists on technology and subsistence, on the internal structure, construction and function of a hunting site which is the outcome of human knowledge based on the behaviour of the hunted animal species. Information is provided on different hunting methods, their expenditure and success as well as on the spatial connection of a hunting locality to camp sites. Maybe this information can be transferred to the Palaeolithic (Grønnow 1993). Palaeolithic archaeologists also gain an impression on the

physical abilities of hunter-gatherers and the size of the utilized areas, since distances of up to 100 km were walked within a few days by the Thule people and Greenlanders, by hunters and families, carrying equipment and their game (for longer distances in Arctic Alaska and Canada: Burch 1991: 443; Burch 2013: 8). However, Palaeolithic archaeologists should be aware that each archaeological record is not only an outcome of ecology but also arose due to a unique cultural history. The Greenlandic site presented here was shaped by a cultural history which is characterized by discontinuity resulting in changes of site function, of size and composition of the hunting group as well as hunting methods, but also in changes of mobility, transport of equipment, duration of stay and territoriality. This cultural history makes it questionable that these particular behaviors can be transferred to the Palaeolithic (Kelly 1995: 333-343; Cannon 2014: 93-94; Jordan 2014: 916; Lane 2014: 112, 137). Lastly, it should be pointed out that the arctic is often perceived as a marginalized and exoticized region (Herva & Lahelma 2020: 5) but this article shows that Thule people were active and competent creators of a cultural landscape.

Knowledge of natural and human landscapes was acquired very fast, maybe within one or two generations. This information should be considered when speculating about the “landscape learning process” (Rockman 2003: 12) of Palaeolithic hunter-gatherers.

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Date no.	Region	Site no.	Structure or place name	Context	Lab no.	¹⁴ C yrs BP	Calibrated in yrs AD ($\pm 2\sigma$)	Unknown calibration in yrs AD	Reference
1	Sisimiut	unknown	single hunters' bed	excavation	K-3514	950 \pm 70	978-1,256	-	Grønnow et al. (1983: 53)
2		67V2-III-006	Aasivissuit	excavation of midden area (layer 4A)	K-3153	730 \pm 70	1,174-1,397	-	Grønnow et al. (1983: 63)
3		67V2-III-006	Aasivissuit	excavation of midden area (layer 4B)	K-3154	380 \pm 65	1,430-1,644	-	Grønnow et al. (1983: 63)
4	Maniitsoq	66V2-III-136	surface find	next to two shooting-blinds	KIA-35097	616 \pm 23	1,300-1,399	-	Odgaard (2008: 30-31), Andreasen (2009: 44), Knudsen (2009a: 2)
5		66V2-II-031	Atamiilat Tasersuat	single find under rock wall of tent house structure (fieldnotes by the author)	unknown	unknown	-	1,445	Odgaard (2009: 197)
6		66V2-III-084	Qoornoq Kangilleq	surface find partly buried in turf	KIA-37458	404 \pm 23	1,440-1,619	-	Odgaard (2008: 40-43), Andreasen (2009: 44)
7		66V2-III-084	Qoornoq Kangilleq	surface find partly buried in turf	KIA-37459	318 \pm 21	1,495-1,643	-	Odgaard (2008: 40-43), Andreasen (2009: 44)
8		66V2-III-167	Napasorsuaq	single find taken from human grave	KIA-37453	308 \pm 25	1,496-1,649	-	Odgaard (2008: 38), Andreasen (2009: 44)
9		66V2-III-153	single tent house	surface find	KIA-35100	282 \pm 24	1,516-1,719	-	Odgaard (2008: 35-36), Andreasen (2009: 44), Knudsen (2009a: 2)
10		66V2-III-093	Issormiut	single find from cavity in wall of tent house structure	KIA-37463	273 \pm 22	1,521-1,795	-	Andreasen (2009: 44), Knudsen (2009a: 22), Knudsen (2009b: 30)
11		66V2-III-093	Issormiut	excavation of midden area	KIA-37462	239 \pm 21	1,534-1,800	-	Andreasen (2009: 44), Knudsen (2009a: 22), Knudsen (2009b: 30)
12	Nuuk	64V2-III-94	Igannanguaq	excavation of midden area (layer 5)	K-4041	270 \pm 65	1,455-1,950	-	Kapel (1993: 83, 215)
13		64V2-III-94	Igannanguaq	excavation of midden area (layer 6B)	K-4040	260 \pm 65	1,460-1,950	-	Kapel (1993: 83, 215)
14		64V2-IV-70	Tusaap Tasia	excavation of hunters' bed A or tent-house J (Pasda 2011: Abb. 77)	KIA-37449	263 \pm 23	1,524-1,797	-	Andreasen (2009: 44), Knudsen (2009a: 17)

Appendix 1. Radiocarbon age of caribou bone and antler from single Thule structures and Thule summer camps in the inland of West Greenland. Notes: The first two numbers of the site no. indicate geographical latitude. A place name indicates a large summer camp. Calibration with OxCal 4.4 (<https://c14.arch.ox.ac.uk/oxcal/>).

Appendix 1. ¹⁴C-Daten von Karibuknochen und -geweih aus Strukturen und Sommerlagern der Thule-Kultur im Inland von Westgrönland. Anmerkungen: In der 3. Spalte (site no.) entsprechen die ersten zwei Zahlen der geographischen Breite. In der 4. Spalte geben Ortsnamen ein Sommerlager mit zahlreichen Zelthäusern an. Kalibration mit OxCal 4.4 (<https://c14.arch.ox.ac.uk/oxcal/>).

Literatur cited

- Aastrup, P. (2000).** Responses of West Greenland caribou to the approach of humans by foot. *Polar Research* 19: 83-90.
- Astrup, E. (1898).** *With Peary near the Pole*. Cambridge University, London.
- Andreasen, C. (2009).** Appendix C - radiocarbon dates. In: P.K. Knudsen (Ed.), *Culture historical significance on areas Tasersiaq and Tarsartuup Tasersua in West Greenland & Suggestions for salvage archaeology and documentation in case of damming lakes*. Nunatta Katersugaasivia Allaqaateqarfialu / Greenland National Museum and Archives, Nuuk. https://en.nka.gl/fileadmin/user_upload/feltrapporter/NKA_report_EN_full_version.pdf.
- Appelt, M. & Gulløv, H.C. (2009).** Tunit, Norsemen, and Inuit in thirteenth century northwest Greenland - Dorset between the devil and the deep sea. In: H. Maschner, O. Mason & R. McGhee (Eds.), *The northern world AD 900-1400*. University of Utah, Salt Lake City, 300-320.
- Appelt, M., Damkjar, E. & Friesen, T. M. (2016).** Late Dorset. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 783-806.
- Aporta, C. (2016).** Markers in space and time - Reflections on the nature of place names as events in the inuit approach to the territory. In: W.A. Lovis & R. Whallon (Eds.), *Marking the land - Hunter-gatherer creation of meaning in their environment*. Routledge, London, 67-88.
- Barnard A. (2004).** *Hunter-gatherers in history, archaeology and anthropology*. Berg, Oxford.
- Benedict, J.B. (2005).** Tundra game drives: an arctic-alpine comparison. *Arctic, Antarctic and Alpine Research* 37: 425-434.
- Berthelsen, A., Porsild, M. P. & Ostermann, H. (1921).** Umanak Distrikt. In: G.C. Amdrup, L. Bobé, A.S. Jensen & H.P. Steensby (Red.), *Grønland tohundredtaaret for Hans Egedes landing*. Meddelelser om Grønland 60. C.A. Reitzel, København, 342-429.
- Betts, M. W. (2016).** Zooarchaeology and reconstruction of ancient human-animal relationships in the Arctic. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 81-108.
- Binford, L. R. (2009).** Nunamiut subsistence provinces - The mountain area: hunting with bow and arrow versus gun. In: B. Grønnow (Ed.), *On track of the Thule culture from Bering Strait to East Greenland*. Studies in Archaeology and History 15. National Museum of Denmark, Copenhagen, 211-222.
- Birket-Smith, K. (1917).** *Foreløbigt bidrag til Kap Farvel distrikternes kulturhistorie*. Meddelelser om Grønland 53. C.A. Reitzel, København.
- Birket-Smith, K. (1918).** *The greenland bow*. Meddelelser om Grønland 56. C.A. Reitzel, Copenhagen.
- Birket-Smith, K. (1924).** *Ethnography of the Egedesminde District*. Meddelelser om Grønland 66. Bianco Lunos, Copenhagen.
- Blehr, O. (1990).** Communal hunting as a prerequisite for caribou (wild reindeer) as a human resource. In: B. Davies & B.O.K. Reeves (Eds.), *Hunters of the recent past*. Unwin Hyman, London 1990, 304-326.
- Boertmann, D. (2004).** *Background studies in Nuussuaq and Disko, West Greenland*. Technical Report 482. National Environmental Research Institute, Copenhagen.
- Boyd, R. (2018).** *A different kind of animal - How culture transformed our species*. Princeton University, Princeton.
- Bratlund, B. (1999).** Hunting strategies in the Late Glacial of Northern Europe: a survey of the faunal evidence. *Journal of World Prehistory* 10: 1-48.
- Brink, J. W. (2005).** Inukshuk: caribou drive lanes on southern Victoria Island, Nunavut, Canada. *Arctic Anthropology* 42: 1-28.
- Burch, E. S. jr. (1972).** The caribou/wild reindeer as a human resource. *American Antiquity* 37: 339-368.
- Burch, E. S. jr. (1991).** Herd following reconsidered. *Current Anthropology* 32: 439-445.
- Burch, E. S. jr. (2012).** *Caribou herds of Northwest Alaska 1850-2000*. University of Alaska, Fairbanks.
- Burch, E. S. jr. (2013).** From skeptic to believer: the making of oral histories. In: E. Hill (Ed.), *Inupiaq ethnohistory - Selected essays by Ernest S. Burch jr.* University of Alaska, Fairbanks, 1-16.
- Cannon, A. (2014).** Historical and humanistic perspectives on hunter-gatherers. In: V. Cummings, P. Jordan & M. Zvelebil (Eds.), *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford, 92-103.
- Christiansen, H. H. (1998).** Nivation forms and processes in unconsolidated sediments, NE Greenland. *Earth Surface Processes and Landforms* 23: 751-760.
- Critterio, M., Paul, F., Ahlstrøm, A. P., Jepsen, H. F. & Weidick, A. (2009).** Remote sensing of glacier change in West Greenland: accounting for the occurrence of surge-type glaciers. *Annals of Geology* 50: 70-80.
- Cummings, V., Jordan, P. & Zvelebil, M. (2014).** *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford.
- Cunningham, J. J. & MacGeough, K. M. (2018).** The perils of ethnographic analogy. Parallel logics in ethnoarchaeology and Victorian Bible customs books. *Archaeological Dialogues* 25: 161-189.
- Cuyler, C., Rosing, M., Linnell, J. D. C., Loison, A., Ingerslev, T. & Landa A. (2002).** *Status of the Kangerlussuaq-Sisimiut caribou population (Rangifer tarandicus groenlandicus) in 2000, West Greenland*. Technical Report 42. Greenland Institute Natural Research, Nuuk.
- Cuyler, C. (2005).** Caribou recovery and coexistence with feral reindeer on the Nuussuaq Peninsula (70-71°N), West Greenland. *Rangifer Special Issue* 16: 137-142.
- Dahl, J. (2000).** *Saqqaa - An inuit hunting community in the modern world*. University of Toronto, Toronto.
- Darwent, J., & Darwent, C. M. (2014).** Scales of violence across the North American Arctic. In: M.W. Allen & T.I. Jones (Eds.), *Violence and warfare among hunter-gatherers*. Left Coast, Walnut Creek, 182-203.
- 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: 315-336.
- David, N. (1973).** On upper palaeolithic society, ecology and technological change. In: C. Renfrew (Ed.), *The explanation of culture change: models in Prehistory*. Duckworth, London, 277-304.
- David, N. & Kramer, C. (2001).** *Ethnoarchaeology in action*. Cambridge University, Cambridge.
- Dawson, P. (2016).** The Thule-Inuit succession in the Central Arctic. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 915-935.
- De Loecker, D. (2004).** *Beyond the site - The Saalian archaeological record at Maastricht-Belvédère* (The Netherlands). *Analecta Praehistorica Leidensia* 35/36. University of Leiden, Leiden.
- Desrosiers, P. M. & Sørensen, M. (2012).** Eastern Arctic under pressure: from Paleoeskimo to Inuit culture (Canada and Greenland). In: P.M. Desrosiers (Ed.), *The emergence of pressure blade making: from origin to modern experimentation*. Springer, New York, 375-400.
- Domínguez-Solera, S. D. (2014).** Inuksuit en el oeste de Groenlandia símbolo y huella de la relación ancestral de los inuit con el espacio. *Revista Española de Antropología Americana* 44: 151-166.

- Egevang, C. (2020). *Qimmeq – The Greenland sled dog*. Alle alle, Copenhagen.
- Flora, J. (2019). *Wandering spirits - Loneliness and longing in Greenland*. University of Chicago, Chicago.
- Flora, J., Johansen, L., Grønnow, B., Andersen, A. O. & Mosbech, A. (2018). Present and past dynamics of Inughuit resource spaces. *Ambio* 47 (Supplement 2): S244-S264.
- Flydal, K., Tsegaye, D., Eftestøl, S., Reimers, E. & Colman, J. (2019). Rangifer within areas of human influence: understanding effects in relation to spatiotemporal scales. *Polar Biology* 42: 1-16.
- Forchhammer, M. C., Post, E., Stenseth, N. C. & Boertman, D.M. (2002). Long-term responses in Arctic ungulate dynamics to changes in climatic and trophic processes. *Population Biology* 44: 113-120.
- French, H. M. (1996). *The periglacial environment*. Wiley, Harlow.
- Friesen, T.M. (2012). Alaskan analogues and eastern uncertainties: reconstructing Thule Inuit interaction networks in the eastern North American Arctic. *Suomalais-Ugrilainen Seurran Toirnitukxia / Mémoires de la Société Finno-Ougrienne* 265: 3-26.
- Friesen, T.M. (2013). The impact of weapon technology on caribou drive system variability in the prehistoric Canadian arctic. *Quaternary International* 297: 13-23.
- Friesen, T.M. (2016). Pan-arctic population movements – The early Paleo-Inuit and Thule Inuit migrations. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 673-691.
- Friesen, T.M. & Mason, O.K. (2016). *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford.
- Friesen, T.M. & Norman, L.E.Y. (2016). The Pembroke site: Thule Inuit migrants on southern Victoria Island. *Arctic* 69: 1-18.
- Gaup, L.S.K. (2019). *The history of Sámi reindeer husbandry in Greenland and the transfer of traditional knowledge from Sámi herders to Greenlandic apprentices*. Master thesis. Arctic University of Norway, Tromsø. <https://munin.uit.no/handle/10037/15667>.
- Gordon, B.C. (1990). World Rangifer communal hunting. In: B. Davies & B.O.K. Reeves (Eds.), *Hunters of the recent past*. Hyman Unwin, London, 277-303.
- Gosselain, O.P. (2016). To hell with ethnoarchaeology? *Archaeological Dialogues* 23: 215-228.
- Gotfredsen, A.B. & Møbjerg, T. (2004). *Nipisat - A Saqqaq culture site in Sisimiut, Central West Greenland*. Meddelelser om Grønland - Man & Society 31. Danish Polar Center, Copenhagen.
- Gotfredsen, A.B., Appelt, M. & Hastrup, K. (2018). Walrus history around the North Water: human-animal relations in a long-term perspective. *Ambio* 47 (Supplement 2): S193-S212.
- Grønnow, B. (1985). Meiendorf and Stellmoor revisited. An analysis of Palaeolithic reindeer exploitation. *Acta Archaeologica* 56: 131-166.
- Grønnow, B. (1986). Recent archaeological investigations of West Greenland caribou hunting. *Arctic Anthropology* 23: 57-80.
- Grønnow, B. (1993). Comments on analogy in Danish Prehistoric studies. *Norwegian Archaeological Review* 26: 79-82.
- Grønnow, B. (2004). Saqqaqkulturen. In: H.C. Gulløv (Red.), *Grønlands forhistorie*. Gyldendal, København, 66-108.
- Grønnow, B. (2009a). Caribou hunting structures and hunting grounds of the Thule culture in Angujaartorfiup Nunaa, West Greenland. In: B. Grønnow (Ed.), *On track of the Thule culture from Bering Strait to East Greenland*. Studies in Archaeology and History 15. National Museum of Denmark, Copenhagen, 201-210.
- Grønnow, B. (2009b). Blessings and horrors of the interior: ethno-historical studies of Inuit perceptions concerning the inland region of West Greenland. *Arctic Anthropology* 46: 191-201.
- Grønnow, B. (2016). Independence I and Saqqaq - The first Greenlanders. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 713-736.
- Grønnow, B., Meldgaard, M. & Nielsen, J.B. (1983). *Aasivissuit - The great summer camp: Archaeological, ethnographical and zoo-archaeological studies of a caribou-hunting site in West Greenland*. Meddelelser om Grønland - Man & Society 5. Kommissionen for videnskabelige Undersøgelser, Copenhagen.
- Gulløv, H.C. (1997). *From Middle Ages to Colonial Times - Archaeological and ethnohistorical studies of the Thule culture in South West Greenland 1300-1800 AD*. Meddelelser om Grønland - Man & Society 23. Danish Polar Center, Copenhagen.
- Gulløv, H.C. (2012). Archaeological commentary on the isotope study of the Greenland Thule culture. *Journal of the North Atlantic Special Volume* 3: 65-76.
- Gulløv, H.C. (2016). Inuit-European interactions in Greenland. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 897-914.
- Gulløv, H.C. & Kapel, H. (1979). *Haabets Colonie 1721-1728 - A historical-archaeological investigation of the Danish-Norwegian colonization of Greenland*. Publications of the National Museum - Ethnographical Series 26. National Museum of Denmark, Copenhagen.
- Gulløv, H.C. & Kapel, H. (1980). Legend, history, and archaeology - A study in the art of Eskimo narratives. *Folk* 31-32 (1979-80) 347-380.
- Hallos, J. (2005). „15 minutes of fame“: exploring the temporal dimensions of Middle Pleistocene lithic technology. *Journal of Human Evolution* 49: 155-179.
- Hansen, J.H.P. & Gulløv, H.C. (1989). *The mummies from Qilakitsoq - Eskimos in the 15th century*. Meddelelser om Grønland - Man & Society. Danish Polar Center, Copenhagen.
- Herva, V.-P. & Lahelma, A. (2020). *Northern archaeology and cosmology - A relational view*. Routledge, Oxon.
- Hill, E. (2018). The archaeology of human-dog relations in Northwest Alaska. In: R.J. Losey, R.P. Winhart & J.P.I. Looovers (Eds.), *Dogs in the north*. Routledge, London, 87-104.
- Holtved, E. (1962). *Otto Fabricius' ethnographical works*. Meddelelser om Grønland 140. C.A. Reitzel, København.
- Holtved, E. (1967). *Contributions to Polar Eskimo ethnography*. Meddelelser om Grønland 182. C.A. Reitzel, København.
- Humlum, O. (1988). Natural cairns on rock glaciers as an indication of a solid ice core. *Geografisk Tidsskrift* 88: 78-82.
- Ingold, T. (1980). *Hunters, pastoralists and ranchers*. Cambridge University, Cambridge.
- Ingold, T. (2000). *The perception of the environment*. Routledge, London.
- Imer, L.M. (2017). *Peasants and prayers - The inscriptions of Norse Greenland*. Publications from the National Museum 25. University of Southern Denmark, Copenhagen.
- Jensen, J.F. (2006). *The Stone Age of Qeqertarsuup Tunua (Disko Bugt) - A regional analysis of the Saqqaq and Dorset cultures of Central West Greenland*. Meddelelser om Grønland - Man & Society 32. Danish Polar Center, Copenhagen.
- Jensen, J.F. (2016). Greenlandic Dorset. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 737-760.
- Jensen, J.F., C. Andreasen, C., Fleischer-Lyberth, P., Løgstrop, L., Poulsen, H.H., Ólafson O.R., Løventoft-Jessen, A.-C., Barr, S. & Meldgaard, M. (2017). *Aasivissuit-Nipisat. Inuit hunting ground between sea and ice*. Rosendahls, Copenhagen.
- Jenness, D. (1923). The Copper Eskimos. Report of the Canadian Arctic Expedition 1913-18, Volume 12. V.A. Acland, Ottawa.
- Jordan, P. (2007). Hunter-gatherers. In: R.A. Bentley, H.D.G. Maschner & C. Chippindale (Eds.), *Handbook of archaeological theories*. AltaMira, U.S., 447-466.

- Jordan, P. (2014). The ethnohistory and anthropology of 'modern' hunter-gatherers. In: V. Cummings, P. Jordan & M. Zvelebil (Eds.), *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford, 903-917.
- Jordan, P. & Cummings, V. (2014a). Analytical frames of references in hunter-gatherer research. In: V. Cummings, P. Jordan & M. Zvelebil (Eds.), *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford, 33-42.
- Jordan, P. & Cummings, V. (2014b). Introduction. In: V. Cummings, P. Jordan & M. Zvelebil (Eds.), *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford, 1-32.
- Kapel, H. (1993). *Kangerluarsunnguup Tasersua / Tasersuaq - Arkæologiske og etnologiske undersøgelser udført i forbindelse med etablering af vandkraftværket ved Buksefjorden, Nuuk kommune*. Nunatta Katersugaasivia Allagaateqarfialu / Grønlands Nationalmuseum & Arkiv, Nuuk.
- Kelly, R. (1995). *The foraging spectrum*. Smithsonian Institution, Washington.
- Knudsen, P.K. (2008). Angujaartorfiup Nunaa – Fortidsminder og mundtlig tradition. *Tidsskriftet Grønland*: 162-171.
- Knudsen, P.K. (2009a). *An archaeological survey in the West Greenland inland, summer 2008, in advance of proposed development of hydroelectric power*. Nunatta Katersugaasivia Allagaateqarfialu / Grønlands Nationalmuseum & Arkiv, Nuuk. https://en.nka.gl/fileadmin/user_upload/felrappporter/Tasersiaq_-_report_2008.pdf.
- Knudsen, P.K. (2009b). *Culture historical significance on areas Tasersiaq and Tarsartuup Tasersua in West Greenland and Suggestions for salvage archaeology and documentation in case of damming lakes*. Nunatta Katersugaasivia Allagaateqarfialu / Grønlands Nationalmuseum & Arkiv, Nuuk. https://en.nka.gl/fileadmin/user_upload/felrappporter/NKA_report_EN_full_version.pdf.
- Lane, P.J. (2014). Hunter-gatherer-fishers, ethnoarchaeology and reasoning. In: V. Cummings, P. Jordan & M. Zvelebil (Eds.), *The Oxford Handbook of archaeology and anthropology of hunter-gatherers*. Oxford University, Oxford, 104-150.
- Larsen, H. & Meldgaard, J. (1958). *Paleo-Eskimo cultures in Disko Bugt, West Greenland*. Meddelelser om Grønland 161. C.A. Reitzel, København.
- Leesch, D., Bullinger, J. & Müller, W. (2019). *Vivre en Suisse il y a 15000 ans – Le Magdalénien*. Archéologie suisse, Bâle.
- Lehme, A. (2021). Literal niche construction: built environments of hunter-gatherers and hunting architecture. *Journal of Anthropological Archaeology* 62: <https://doi.org/10.1016/j.jaa.2021.101276>.
- Lemoine, G. & Darwent, C.M. (2016). Development of Polar Inughuit culture in the Smith Sound region. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 872-896.
- Le Mouél, J.-F. & Le Mouél, M. (2002). Aspects of early Thule culture seen in the architecture of a site on Victoria Island, Amundsen Gulf area. *Arctic* 55: 167-189.
- Lennert, A. E. (2017). Participatory mapping: an additional layer of the Godthåbsfjord, Greenland. *Polar Geography* 40: 227-250.
- Lovis, W. A. & Whallon, R. (2016). The creation of landscape meaning. In: W.A. Lovis & R. Whallon (Eds.), *Marking the land - Hunter-gatherer creation of meaning in their environment*. Routledge, London, 1-9.
- Lyons, D. & David, N. (2019). To hell with ethnoarchaeology... and back! *Ethnoarchaeology* 11: 99-133.
- Madsen, C.K. (2019). Marine shielings in Medieval Norse Greenland. *Arctic Anthropology* 56: 119-159.
- Madsen, C.K. & Lennert, A. E. (2022). Behind the ice: the archaeology of Nunatarsuaq, Southwest Greenland. *Journal of the North Atlantic* 42: 1-32.
- Mason, O.K. (2016). Thule origins in the Old Bering sea Culture - The interrelationship of Punuk and Birnirk Cultures. In: T.M. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 489-512.
- Mason, O.K. (2020). The Thule migrations as an analog for the early peopling of the Americas: evaluating scenarios of overkill, trade, climate forcing, and scalar stress. *Paleoamerica*: <https://doi.org/10.1080/20555563.2020.1783969>.
- Mason, O. & Gerlach, S. C. (1995). Chukchi hot spots, paleopolynyas, and caribou crashes: climatic and ecological dimensions of North Alaskan Prehistory. *Arctic Anthropology* 32: 101-130.
- Mathiassen, T. (1930). *Inugsuk, a medieval Eskimo settlement in Upernavik District, West Greenland*. Meddelelser om Grønland 77. C.A. Reitzel, København, 145-338.
- Mathiassen, T. (1934). *Contributions to the archaeology of Disko Bay*. Meddelelser om Grønland 93. C.A. Reitzel, København.
- McCullough, K.M. (1989). *The Ruin Islanders - Thule culture pioneers in the eastern High Arctic*. Archaeological Survey of Canada 141. Canadian Museum of Civilization, Hull.
- Meldgaard, M. (1983). Resource fluctuations and human subsistence: a zoo-archaeological and ethnographical investigation of a West Greenland caribou hunting camp. In: J. Clutton-Brock & C. Grigson (Eds.), *Animals and archaeology 1: hunters and their prey*. British Archaeological Reports International Series 163, Oxford, 259-272.
- Meldgaard, M. (1986). *The Greenland caribou - Zoogeography, taxonomy, and population dynamics*. Meddelelser om Grønland - Bioscience 20. Nyt Nordisk, Copenhagen.
- Meldgaard, M. (2004). *Ancient harp seal hunters of Disko Bay*. Meddelelser om Grønland - Man & Society 30. Danish Polar Center, Copenhagen.
- Mikkelsen, N., Kujpers, A., Ribeiro, S., Myrup, M., Seiding, I. & Lennert, A. E. (2018). European trading, whaling and climate history of West Greenland documented by historical records, drones and marine sediments. *Geological Survey of Denmark and Greenland Bulletin* 41: 67-70.
- Morey, D. F. (2010). *Dogs - Domestication and the development of a social bond*. Cambridge University, Cambridge.
- Morrison, K. D. & Junker, L. L. (2002). *Forager-traders in South and Southeast Asia - Long-term histories*. Cambridge University, Cambridge.
- Møbjerg, T. (1983). An ethno-archaeological investigation of the Sermermiut settlement, West Greenland. *Folk* 25: 23-50.
- Møbjerg, T. (1986). A contribution to Paleoeskimo archaeology in Greenland. *Arctic Anthropology* 23: 19-56.
- Møbjerg, T. & Caning, K. (1986). Sermermiut in the middle of the nineteenth century. *Arctic Anthropology* 23: 177-198.
- Møhl, J. (1979). Description and analysis of the bone material from Nugarsuk: an Eskimo settlement representative of the Thule culture in West Greenland. In: A.P. McCartney (Ed.), *Thule Eskimo culture: an anthropological retrospective*. National Museum of Man Mercury Series, Archaeological Survey of Canada 88. National Museum of Canada, Ottawa, 380-394.
- Møhl, J. (1997). Appendix: Faunal remains from Illorpaat. In: H.C. Gulløv (Ed.), *From Middle Ages to Colonial Times - Archaeological and ethnohistorical studies of the Thule culture in South West Greenland 1300-1800 AD*. Meddelelser om Grønland - Man & Society 23. Danish Polar Center, Copenhagen, 495-501.
- Nellemann, G. (1955). Trak af rensdyrjagtens historie. *Tidsskriftet Grønland*: 81-87.
- Nellemann, G. (1969/70). Caribou hunting in West Greenland. *Folk* 11-12: 133-153.

- Nellemann, G. (1970).** Rensdyrjagten i Vestgrønland: jagtmetoder i fortid et nutid. *Tidsskriftet Grønland*: 289-308.
- Neubeck, V. & Pasda, C. (2015).** Caribou hunting in alpine West Greenland - An archaeological investigation. *Ethnographisch-Archäologische Zeitschrift* 56: 65-91.
- Odgaard, U. (2007a).** On the trail of the caribou hunters: archaeological survey in Western Greenland. In: V. Cummings & R. Johnston (Eds.), *Prehistoric journeys*. Oxford University, Oxford, 21-32.
- Odgaard, U. (2007b).** Historic and Prehistoric caribou hunters in West Greenland. In: S. Beyries & S. Vaté (Eds.), *Les civilisations du renne d'hier et d'aujourd'hui*. APDCA, Antibes, 89-109.
- Odgaard, U. (2008).** An archaeological survey in the West Greenland inland, summer 2007, in advance of proposed development of hydroelectric power. Nunatta Katersugaasivia Allagaateqarfialu / Grønlands Nationalmuseum & Arkiv, Nuuk. https://en.nka.gl/fileadmin/user_upload/felrappporter/ALCOA_Archaeological_Report_2007_2_.pdf.
- Odgaard, U. (2009).** Tent houses, territories and two generations. In: B. Gronnow (Ed.), *On the track of the Thule culture from Bering Strait to East Greenland*. Studies in Archaeology & History 15. National Museum of Denmark, Copenhagen, 185-199.
- Odgaard, U. (2010).** På sporet af rensdyrjægerne - et anderledes arkæologisk feltarbejde. *Nationalmuseets Arbejdsmark*: 181-198.
- Olsen, B. (2010).** *In defense of things*. Rowman & Littlefield, Lanham.
- Olsen, A. (2021).** Rensdyrjagt i fortid og nutid i Nassuttooq fjord - En arkæologisk og etnografisk undersøgelse af rensdyrjagtkulturen i Nassuttooq fjord. Master thesis, Ilisimatusarfik/Grønlands Universitet, Nuuk. <https://uni.gl/media/7077063/angutinnguaq-olsen.pdf>.
- Ostermann, H. & Porsild, M. P. (1921).** Ritenbenk Distrikt. In: G.C. Amdrup, L. Bobé, A.S. Jensen & H.P. Steensby (Red.), *Grønland tohundredtaaret for Hans Egedes landing*. Meddelelser om Grønland 60. C.A. Reitzel, København, 209-271.
- Panzacchi, M., van Moorter, B., Jordhøy, P. & Strand, O. (2013).** Learning from the past to predict the future: using archaeological findings and GPS data to quantify reindeer sensitivity to anthropogenic disturbance in Norway. *Landscape Ecology* 28: 847-859.
- Pasda, C. (2002).** Die urgeschichtliche Fundlandschaft: Zeugnis einer Kulturlandschaft - Ergebnisse der Surveys im Inland von Westgrønland 1999-2000. *Ethnographisch-Archäologische Zeitschrift* 43: 323-376.
- Pasda, C. (2004).** *Hotel Grønland - Human use of caves and rock shelters in West Greenland*. British Archaeological Reports International Series 1309. Archaeopress, Oxford.
- Pasda, C. (2011).** *Karibujäger in Grønland - Ergebnisse der archäologischen Untersuchungen von 2005-2009 im hinteren Nuuk-Fjord*. Internationale Archäologie 116. M. Leidorf, Rahden/Westfalen.
- Pasda, C. (2013).** Jäger in der Landschaft - Konsequenzen menschlichen Tuns. In: S. Feldmann & T. Uthmeier (Eds.), *Gedankenschleifen - Gedenkschrift für Wolfgang Weißmüller*. Erlanger Studien zur Prähistorischen Archäologie 1. Dr. Faustus, Erlangen, 177-184.
- Pasda, C. (2014).** Regional variation in Thule and Colonial caribou hunting in West Greenland. *Arctic Anthropology* 51: 41-76.
- Pasda, C. (2016).** C. Pasda, *Archaeological sites on Qingaanguaq (Nuuk Municipality) - Report (summer 2016)*. Field report for the Greenland National Museum & Archives in Nuuk and the Danish National Museum in Copenhagen, Jena.
- Pasda, C. (in print).** Archaeological research on prehistoric and historic caribou hunting in West Greenland - An example from Nuussuaq. In: J. Beutmann, S. Hansen, C. Michel, S. Reinhold & S. Wolfram (Eds.), *On melting ground - Arctic Archaeology*. Habelt, Bonn, in print.
- Pasda, K. (2015).** Entstehung von Knochenabfall in Westgrønland bei modernen Karibujägern und im archäologischen Kontext. *Beiträge zur Archäozoologie und Prähistorischen Anthropologie* 10. Beier & Beran, Langenweissbach, 157-174.
- Pasda, K. (2018).** Geschlechtsbestimmung von archäologischen Karibuknochen aus der saqqaqzeitlichen Fundstelle von Angujaartorfik durch Vergleichsmaße einer modernen Karibupopulation Westgrønlands (Rangifer tarandus groenlandicus). *Annalen des Naturhistorischen Museums Wien Serie A* 120: 435-452.
- Pasda, K. & Odgaard, U. (2011).** Nothing is wasted: the ideal „nothing is wasted“ and divergence in past and present among caribou hunters in Greenland. *Quaternary International* 238: 35-43.
- Pedersen, A. K., Larsen, L. M. & Pedersen, G. K. (2018).** *Lithostratigraphy, geology and geochemistry of the volcanic rocks of the Maligât Formation and associated intrusions on Disko and Nuussuaq, Paleocene of West Greenland*. Geological Survey of Denmark and Greenland Bulletin 40. GEUS, Copenhagen.
- Petersen, H. C. (1986).** *Skinboats of Greenland*. National Museum of Denmark & Greenland National Museum, Roskilde.
- Petersen, R. (2003).** *Settlement, kinship and hunting grounds in traditional Greenland*. Meddelelser om Grønland - Man & Society 27. Danish Polar Center, Copenhagen.
- Pfeifer, S. (2021).** *Bows and arrows of the Greenland Thule culture (1200-1900 AD) - A study of archaeological and ethnographic sources*. British Archaeological Reports 3060. BAR, Oxford.
- Pope, M. & Roberts, M. (2005).** Observations on the relationship between Palaeolithic individuals and artefact scatters at the Middle Pleistocene site of Boxgrove, UK. In: C. Gamble & M. Porr (Eds.), *The hominid in context*. Routledge, London, 81-97.
- Post, E. & Forchhammer, M.C. (2002).** Synchronisation of animal population dynamics by large-scale climate. *Nature* 420: 168-171.
- Porsild, M.P. (1920).** On Eskimo stone rows in Greenland formerly supposed to be of Norse origin. *The Geographical Review* 10: 297-309.
- Rockman, M. (2003).** Knowledge and learning in the archaeology of colonization. In: M. Rockman & J. Steele (Eds.), *Colonization of unfamiliar landscapes*. Routledge, London, 3-24.
- Rosenkrantz, A. (1943).** Auvfarssuaq. *Det Grønlandske Selkabs Aarskrift*: 82-98.
- Rosenkrantz, A. (1968).** Hundemordet i bjergene eller quivitoq'en, der røg Lucky Strike. *Tidsskriftet Grønland*: 65-70.
- Rosing, J. (1956).** Renjakt i det gamle Grønland. *Polarårboken*: 99-112.
- Rosing, J. (1958).** Tanker ved et „Viftested“. *Tidsskriftet Grønland*: 385-392.
- Rosing, J. (1988).** Rensdyrjægere i Itinnera. In: T. Møbjerg & B. Gronnow (Eds.), *Palæoeskimoisk forskning i Grønland*. Aarhus Universitet, Aarhus, 69-79.
- Roux, V. (2017).** Not to throw the baby out with the bathwater. A response to Gosselain's article. *Archaeological Dialogues* 24: 225-229.
- Rud, S. (2017).** *Colonialism in Greenland - Tradition, governance and legacy*. Springer, Cham.
- Schweinsberg, A. D., Briner, J. P., Licciardi, J. M., Bennike, O., Lifton, N. A., Graham, B. L., Young, N. E., Schaefer, J. M. & Zimmermann, S. H. (2019).** Multiple independent records of local glacier variability on Nuussuaq, West Greenland, during the Holocene. *Quaternary Science Reviews* 215: 253-271.
- Skarin, A. & Åhman, B. (2014).** Do human activity and infrastructure disturb domesticated reindeer? The need for the reindeer's perspective. *Polar Biology* 37: 1041-1054.

- Sommer, M. (2005).** Ancient hunters and their modern representatives – William Sollas's (1849-1936) anthropology from disappointed bridge to trunkless tree and the instrumentalisation of racial conflict. *Journal of the History of Biology* 38: 327-363.
- Sonne, B. (2017).** *Worldviews of the Greenlanders - An inuit arctic perspective*. University of Alaska, Fairbanks.
- Sørensen, M. (2010).** Thulekulturens anvendelse af bjergarter til fremstilling af redskaber i Nordøstgrønland. *Tidsskriftet Grønland* 58: 288-297.
- Spiess, A.E. (1979).** *Reindeer and caribou hunters - An archaeological perspective*. Academic, New York.
- Steenstrup, K.J.V. (1883).** *Beretning om undersøgelses rejse i Nord-Grønland: aarene 1878-80*. Meddelelser om Grønland 5. Bianco Lunos, København.
- Stenton, D.R. (1991).** Caribou population dynamics and Thule culture adaptations on Southern Baffin Island, N.W.T. *Arctic Anthropology* 28: 15-43.
- Stewart, A.M., Friesen, T.M., Keith, D. & Henderson, L. (2000).** Archaeology and oral history of Inuit land use on the Kazan river, Nunavut: a feature-based approach. *Arctic* 53: 260-276.
- Stewart, A.M., Keith, D. & Scottie, J. (2004).** Caribou crossings and cultural meanings: placing traditional knowledge and archaeology in context in an Inuit landscape. *Journal of Archaeological Method and Theory* 11: 183-211.
- Sturdy, D.A. (1972).** The exploitation of a modern reindeer economy in West Greenland. In: E.S. Higgs (Ed.), *Papers in economic prehistory*. Cambridge University, Cambridge, 161-168.
- Svennevig, K. (2019).** Preliminary landslide mapping in Greenland. *Geology of Greenland Survey Bulletin* 43. <https://doi.org/10.34194/GEUSB-201943-02-07>.
- Turq, A., Roebroeks, W., Bourguignon, L. & Faivre, J.P. (2013).** The fragmented character of Middle Palaeolithic stone tool technology. *Journal of Human Evolution* 65: 641-655.
- Veit, U. (2020).** Die „ethnographische Analogie“: Aufstieg und Niedergang eines heuristischen Schemas in der deutschsprachigen Urgeschichtsforschung im 20. Jahrhundert. *Saeculum* 70: 213-233.
- Vibe, C. (1967).** *Arctic animals in relation to climate fluctuations*. Meddelelser om Grønland 170. C.A. Reitzel, Copenhagen.
- Walsh, M.J., Tejsner, P., Carlson, D.F., Vergeynst, L., Kjeldsen, K.U., Gründger, F., Dai, H., Thomsen, S. & Laursen, E. (2020).** The VIMOA project and archaeological heritage in the Nuussuaq Peninsula of north-west Greenland. *Antiquity* 94, e6: 1-7.
- Wegeberg, S. & Boertmann, D. (2016).** *Disko Island and Nuussuaq Peninsula, West Greenland - A strategic environmental assessment of petroleum exploration and exploitation*. Danish Centre for Environmental Energy Scientific Report 199. Aarhus University, Aarhus.
- Weinstock, J. (2000).** *Late Pleistocene reindeer populations in Middle and Western Europe*. BioArchaeologica 3. MoVince, Tübingen.
- Whitridge, P. (2013).** The imbrication of human and animal paths: an arctic case study. In: C. Watts (Ed.), *Relational archaeologies: humans, animals, things*. Routledge, New York, 228-244.
- Whitridge, P. (2016a).** Classic Thule [Classic precontact Inuit]. In: T. Max. Friesen & O.K. Mason (Eds.), *The Oxford Handbook of the Prehistoric Arctic*. Oxford University, Oxford, 827-849.
- Whitridge, P. (2016b).** Inukshuk, sled shoe, place name - Past inuit ethnogeographies. In: W.A. Lovis & R. Whallon (Eds.), *Marking the land - Hunter-gatherer creation of meaning in their environment*. Routledge, London, 89-115.
- Whitridge, P. (2018).** The government of dogs - archaeozoological (zo)ontologies. In: M.R. Baltus & S.E. Baires (Eds.), *Relational engagements of the indigenous Americas*. Routledge, London, 31-39.

Inhalt - Contents

Spatial use at Große Grotte (Blaubeuren, Southern Germany), and Implications for Middle Paleolithic Stratigraphy, Spatiality and Chronology

Raumnutzung in der Großen Grotte (Blaubeuren, Süddeutschland) und Implikationen für die mittelpaläolithische Stratigraphie, Räumlichkeit und Chronologie

Jens Axel FRICK, Benjamin SCHÜRCH & Berrin ÇEP.....7-27

Exploring a novelty in the Middle Palaeolithic of Croatia: Preliminary data on the open-air site of Campanož

Erste Daten zu der neu entdeckten mittelpaläolithischen Freilandfundstelle Campanož in Kroatien

Marko BANDA, Francesca ROMAGNOLI, Darko KOMŠO, Maja ČUKA & Ivor KARAVANIĆ.....29-56

Living on the slope. The Middle and Upper Paleolithic occupation of Feldberg "Steinacker"

Leben auf dem Hang. Die mittel- und jungpaläolithische Besiedlung von Feldberg "Steinacker"

Marcel BRADTMÖLLER, Olaf BUBENZER, Stefan HECHT, Diethard TSCHOCKE, Aitor CALVO, Arantzazu Jindriska PÉREZ FERNÁNDEZ, Christoph SCHMIDT, Joao MARREIROS, Felix HENSELOWSKY, Merlin HATTERMANN, Lisa BAUER & Marcel EL-KASSEM.....57-84

Technological and functional analysis of Upper Palaeolithic backed micro-blades from southern Oman

Technologische und funktionale Analyse jungpaläolithischer Mikroklingen aus dem südlichen Oman

Yamandú H. HILBERT, Ignacio CLEMENTE-CONTE, Matthias LÓPEZ CORREA, Najat AL-FUDHAILI & Claudio MAZZOLI.....85-103

Investigations at the Epigravettian site of Barmaky in Volhynia, north-west Ukraine: analyses and taxonomic reflections

Untersuchungen am Epigravettien-Fundplatz Barmaky in Volhynia, Nordwest-Ukraine: Analysen und taxonomische Überlegungen

Victor CHABAI, Diana DUDNYK, Kerstin PASDA, Michael BRANDL & Andreas MAIER.....105-144

Grooves on the cortex of the Epigravettian lithic industry in the broader context

Rillen auf der Kortex von Steinartefakten des Epigravettien im weiteren Kontext

Zdeňka NERUDOVA & Petr LEPCIO.....145-161

Rivers run and people may meander. Water body-oriented land use decisions in the Neuwied Basin during the Late Upper Palaeolithic and Late Palaeolithic

Fluss im Lauf und Lauf am Fluss. Wasser-orientierte Landnutzungsentscheidungen im Neuwieder Becken während des späten Jungpaläolithikums und Spätpaläolithikums

Tjaark SIEMSEN & Andreas MAIER.....163-177

A caribou hunting drive at Nernartuut (Nuussuaq, Northwest Greenland)

Eine Karibu-Jagdanlage bei Nernartuut (Nuussuaq, Nordwestgrönland)

ClemensPASDA.....179-202

Book review

Buchbesprechung.....203-205