Understanding the Function of Container Technologies in Prehistoric Southwest Alaska
Admiraal, Marjolein; Knecht, Rick

Published in:
Ceramics in Circumpolar Prehistory

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2019

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment.

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.
UNDERSTANDING THE FUNCTION OF CONTAINER TECHNOLOGIES IN PREHISTORIC SOUTHWEST ALASKA

Marjolein Admiraal and Rick Knecht

INTRODUCTION

Where the Pacific Ocean meets the Bering Sea, sharp green peaks rise from the water surrounded by low hanging clouds. These peaks are the Aleutian Islands, which form part of the Pacific Ring of Fire, a circum-Pacific chain of volcanoes. Humans have inhabited the Eastern Aleutian Islands for at least 9,000 years. It was on one of these islands that the earliest evidence for the use of container technologies in Alaska was discovered: a stone bowl fragment dating to at least 8000 BP¹ (Aigner 1977).

Since these early times, container technologies such as stone bowls and pottery have played a significant role in people’s everyday lives. Vessels are often associated with household activities such as cooking and storing. But the cost of maintaining container technologies in challenging environments, such as in the Arctic and Subarctic, is high. Nevertheless, prehistoric peoples in Southwest Alaska chose to invest great time and effort in the manufacture of stone bowls and ceramic vessels. However, not much is known about the function of these potentially very important containers. What was so important about these container technologies that people were willing to invest in them so extensively? What were they used for? What motivated people to use expensive vessels and how was this use embedded in their everyday lives?

The process of converting marine resources into food and fuel may be a vital consideration when trying to understand the role container technologies played
in the lives of Alaska’s prehistoric coastal communities. The introduction of these container technologies coincides with the intensification of a more sedentary maritime subsistence strategy. Additionally, the distribution of stone bowls and pottery in Alaska appears to be limited to coastal areas. In contrast, inland groups generally lack expensive container technologies, although there are some exceptions. Vessel function plays a significant role as it may explain why container technologies were so important in maritime economies. Despite this, vessel function has rarely been investigated and remains poorly understood. It is hypothesized here that the introduction of container technologies is connected to the rise of a specialized maritime adaptation.

This chapter aims to critically review the current knowledge of container technologies in Southwest Alaska in order to gain an understanding of vessel function and the role container technologies played in prehistoric societies in Southwest Alaska. The focus area encompasses the Southwest Alaskan coast of the Pacific Ocean and the Bering Sea, including the Yukon-Kuskokwim River Delta, the Alaska Peninsula, Nunivak Island, the Aleutian Islands and the Kodiak Archipelago (Figure 6.1). The chapter is organized chronologically (Table 6.1), starting with the stone bowls of the Aleutian Islands and the technology of griddle stones that eventually replaced stone bowls in that area. Subsequently the
Table 6.1. Culture history and container technology occurrence in: the Aleutian Islands; the Southwest Alaska mainland (including the Alaska Peninsula); and Kodiak Island.

<table>
<thead>
<tr>
<th>Time</th>
<th>9000 BP</th>
<th>8000 BP</th>
<th>7000 BP</th>
<th>6000 BP</th>
<th>5000 BP</th>
<th>4000 BP</th>
<th>3000 BP</th>
<th>2000 BP</th>
<th>1000 BP</th>
<th>Late 18th century</th>
<th>500 BP/AD 1450</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Aleutian Islands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Russian contact period: introduction of metal kettles and subsequent abandonment of pottery</td>
<td></td>
</tr>
<tr>
<td>Stone bowl</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stone bowls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW Alaska mainland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Alaska Peninsula</td>
<td></td>
</tr>
<tr>
<td>Ocean Bay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iron ceramic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astoria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iron ceramic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br. Strand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br. Grands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br. Falls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br. Camp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br. Bluffs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peaks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kodiak Island</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kachemak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iron ceramic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nootka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iron ceramic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CERAMIC KONAG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Konig</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iron ceramic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warm/drier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
first emergence of pottery in Alaska is discussed, after which more attention will be given to the establishment of the pottery-using Norton and Thule cultural traditions in Southwest Alaska. Questions concerning the replacement of Norton pottery by Thule pottery and the wide influence Thule culture had on, for example, the Koniag tradition of the Kodiak Archipelago, will be addressed. What technological choices were made and why? Tools were used at every stage of food procurement and processing, and every step (i.e., capture, processing, cooking, consuming, storing) in this process demanded a specific tool kit. How did container technologies fit into these processes? What was their function?

THE RISE OF ALASKAN CONTAINER TECHNOLOGIES

The earliest evidence of container technologies in North America is found in a site from the Anangula Culture on the Eastern Aleutian Islands, dating to around 8000 BP in the form of a bowl fragment carved from volcanic stone (Aigner 1977; McCartney and Veltre 1996). The manufacture of stone bowls is, like many other crafts, labor-intensive and time demanding. What was so important about these vessels that they were worth such an effort? Very little research has been conducted on this vessel type. Pottery has been better studied. The use of pottery is generally confined to warmer, dry climates where clay can be dried and fuel is abundant for firing. In the Subarctic, winters are often too cold for the procurement of clay. During the short summer season circumstances are more favorable, but still far from ideal. Because of damp conditions in the coastal areas where pottery is usually found, clay pots dry slowly and, due to fuel shortages, firing is often problematic. The manufacture of pottery in the Subarctic is a time-consuming process. Despite these challenges, humans produced simple ceramic pots across Alaska from at least 2600 BP to late historic times (Harry et al. 2009; Anderson et al. 2017).

Stone Bowls from the Aleutian Islands

Stone bowls have a long-lived presence on the Aleutian Islands and generally date to a phase described by Knecht and Davis (2001) as the Margaret Bay phase: 4000–3000 BP. Among others, sites containing bowls from this period are the Unalaska Island sites at Margaret Bay (UNL-48, n = 426), Anaknak Bridge (UNL-50, n = 71), Tanaxatak (UNL-55, n = 6) and the Chaluka site located on Umnak Island. An earlier, though scarce occurrence (n = 1) was recorded at the Anangula Blade site, dating to the Early Anangula phase: 9000–7000 BP (Aigner 1977). In the past, stone bowls have been incorrectly interpreted as pottery (Quimby 1945). This notion was later rectified by McCartney (1970); there is no known occurrence of pottery on the Aleutian Islands.

Most of the stone bowls are large and either oval or sub-rectangular in form (Figure 6.2 and 6.3). Sizes generally range from 12 to 45 cm in diameter and 3 to
Stone bowls are large and heavy to the point that they are not easily portable. Bases of the bowls are flat and thinner than the rims. Two different bowl shapes can be roughly distinguished. One type is nicely ground and shaped on both the inside and the outside and usually made of fine-grained tuff (Figure 6.2). The other type is made of a coarser volcanic tuff resulting in bowls with a rougher appearance. The latter are also bigger and generally have higher walls (Figure 6.3). Layers of charred material are often present on the exterior and rims of bowl fragments of either type, while the insides of the bowls are usually clean (Knecht and Davis 2001, Knecht and Davis 2008). The presence of a greasy layer of organic material on vessels is often assumed to be associated with the rendering of marine mammal fats (Knecht et al. 2001). Could this be the main function of these vessels? Future research on residues may provide an answer to this question.

The function of stone lamps is better understood. Rendered animal fat was burned in these extremely shallow vessels with thick bases that are easily distinguished from the thin based, steep sided stone bowls (see Figures 6.2 and 6.3 compared to Figure 6.4). The use of stone bowls in the Aleutian Islands sharply declined after 3000 BP until eventually being abandoned around 2000 BP (Knecht et al. 2001). The decline of the stone bowls may be connected to the increased occurrence of a rival cooking technology known as “griddle stones.”
Griddle Stones or “Stone Frying-Pans”

These flat stones have been described as “stone frying-pans” by Jochelson (1925, p. 73) and are also found in the Aleutian Islands. Even though this artifact type is not very similar to the stone bowls, they might have been used for the same purpose: cooking, and thus might have functionally replaced the stone bowls after 2000 BP. The stone slabs range in thickness from 1 to 4 cm. They were found at various sites on Unalaska and Amaknak Island, including the Tanaxtaxak and Oiled Blade sites as well as at various sites on Adak Island (ADK-061; -011; -012; -171) (Corbett et al. 2010; Hatfield 2010; Wilmerding and Hatfield 2012) and at the Islands of the Four Mountains (Virginia Hatfield, personal communication, 2017). At Adak Island it is evident that griddle stones became more common through time with the earliest specimens at 6041–5735 BP, then a clear increase and an absolute abundance of griddle stones during the period of 400–170 BP (Wilmerding and Hatfield 2012).

How were these flat stone slabs used? At the late historic Nunik site, midden material containing shellfish, marine mammal bones and fish remains were associated with griddle stones. These features have been interpreted as roasting pits by Johnson (2004). Jeanotte et al. (2012) conducted a study of lipid residues on griddle stones from the ADK-011 site. They conclude that organic residues on the surface of the griddle stones show contributions from sea food, probably as a result of prehistoric cooking practices. However, further bioarchaeological research is necessary to confirm this.

Ethnohistorical research can provide valuable information on methods of food preparation and processing. Various sources quoted in Johnson (2004) note that fish was commonly consumed raw, as was meat, often in order to maintain vitamins important for survival in the subarctic environment. However, Jochelson (1925) notes that fish was also sometimes prepared in nearby hot springs. He describes how cooking usually took place either in the open air or in semi-underground kitchen huts: “There they fried meat of sea animals, birds, and fishes on flat stone frying-pans called au’ihux’” (p. 73). He also stresses that lamps were not used to cook on as they were in the southern regions. The griddle stones are further defined by Jochelson (1925) as made “of volcanic andesitic tuff blackened by smoke on the lower side and with grease on the upper. In use the edges of the frying-pan were supported by stones, so wood could be burned under it” (p. 73). C. I. Shade described the traditional Unangan way to prepare soup using a griddle stone in Johnson (2004: 52):

The traditional method of making soup was to dig a fire pit and place over it a stone, flush with the ground. Then a very thin beach stone was placed on the fire stone and clay walls built upon this base. The liquid
was cooked in this. A bluish clay called qudii u was used for the walls of this vessel which turned white when heated. This kind of fire pit was called unaalu. The same vessel was used more than once. One way of preparing the cod soup was with seaweed and seal oil.

Griddle stones may have been used in different ways. A specimen from the late prehistoric Tanaxtaxak site shows a use pattern that might be consistent with Shade’s report (Figure 6.5). A clear line is visible on the (fractured) griddle stone, possibly marking the location of an object; this could have been a thin beach stone as mentioned by Shade. On the outside of the line, food crust residues are plenty, on the inside the surface is clean. This might also represent the boundary of the clay walls Shade speaks of, however no visual evidence of these walls was found on the flat stone, nor is there any mention of clay remains in the excavation report.

**Early Pottery**

Pottery first appears in the area of the Bering Strait around 3000 BP (Ackerman 1982). The Norton tradition, generally restricted to the coastal regions of Alaska, was the first culture in the North American Arctic to have used and
manufactured pottery. Norton, however, is not homogeneous throughout Alaska and the northern expression differs from the southwest mainly in subsistence patterns. These subsistence patterns may prove to have played a major role in the local adaptation of pottery. The southwest Norton tradition was mainly based on a mixed subsistence strategy of fishing (salmon), terrestrial hunting (caribou) and maritime hunting (seal). In 1977, Dumond defined the wider Norton tradition as including the Choris, classic Norton and Ipiutak traditions (Dumond 1977).

Choris
Choris (3800–2600 BP) is the first known archaeological tradition in Alaska to have made and used pottery and it is therefore an important point of departure. Choris may be described as the cultural gateway for ceramic container technology from Northeast Asia, where it is thought to have originated, to Arctic North America (Dumond 2000). Although caribou remained the dominant prey-species, the Choris era marked an initial shift in subsistence with an increased focus on marine resources (Ackerman 1998). Choris bears resemblance to the Arctic Small Tool tradition (ASTt) as well as to cultures on the Pacific coast of the Alaska Peninsula and eastern Siberia (Dumond 2000). As economic focus shifted, sedentariness increased and pottery was introduced. Pottery of this period is generally thin walled, fiber tempered and well fired. Early pottery is cord marked and has flat bottoms (Ackerman 1998). Later pottery has round or conical bases, which makes the pottery less susceptible to thermal shock, and it is usually decorated with linear designs. Check stamped designs are also known, however these designs are more common in the later Norton phase (Ackerman, 1998, Dumond 2000, Dixon 2014).

Norton
By 2500 BP, the Choris culture had been entirely subsumed by the Norton. Subsistence was still based on both coastal (e.g., seal and sometimes whale) and terrestrial resources (caribou). However, river fishing seems to have played a particularly significant role. There is an abundant presence of net sinkers at Norton sites south of the Bering Strait. Additionally, major sites are often located near river mouths along the Bering Sea coast or further upstream. Fishing practices were primarily focused on anadromous fish (e.g., salmon) (Dumond 2016). These fish spend most of their lives at sea but migrate to fresh water to spawn. These “runs” primarily occur south of the Bering Strait, which might explain why the Norton tradition was different in the south and remained there for another 1,000 years, while in the north it was replaced by the non-ceramic Ipiutak around 2000 BP (Dixon 2014).

As demonstrated by Britton et al. (2013), on Nunivak Island, Norton people maintained a predominantly high trophic marine diet around 1750 cal BP. As
caribou and salmon were also available this seems to have been the result of dietary choice and not dictated by environmental limitations. Additionally, the diet seems to have been consistent throughout the year, suggesting that people were able to maintain the same diet in a highly seasonal environment, probably through the storage of dried meat.

The occurrence of the Norton tradition ranged from the Alaska Peninsula to the western Canadian Arctic. Coastal sites are the largest and most numerous and pottery is found in abundance at these sites. Interior sites are also present in the hinterland of the Bering Sea coast and on the Alaska Peninsula. Pottery is often absent at inland sites, though there are some important exceptions, such as the inland sites of the Naknek and Brooks River drainages of the Alaska Peninsula. Some of these sites were quite substantial while others were only briefly occupied. The abundance of caribou antler in Norton assemblages, as well as the distribution of interior sites, indicates that caribou was still an important prey species (Dumond 2000). It has been proposed that northern Norton sites were short-term spring–summer campsites, while larger, year-round sites were located further to the south (Ackerman 1998).

On the Alaska Peninsula the Norton tradition appeared around 2300 BP after a millennia-long hiatus, probably caused by a catastrophic volcanic event. Dumond (1981) distinguishes three subsequent phases during this early period of pottery manufacture on the Alaska Peninsula. He refers to them as the Brooks River Period, including the Smelt Creek, Brooks River Weir and the Brooks River Falls phases. River fishing again became the primary economic focus on the peninsula (Dumond 1998). The geographical character of the peninsula might have complicated contact between groups living on either side of the Aleutian Range. On Takli Island on the Pacific coast of the peninsula, Norton pottery appears only around 1800 BP. Further to the southwest, near the Chignik River, Norton-like features are present but pottery is lacking. Farther to the southwest pottery was found along the Ugashik River (Henn 1978, Dumond and Scott 1991).

The pottery of the Norton tradition does not differ much from what is known of earlier Choris times, but it became much more common. Generally the pots were thin walled (thickness ranging from 3 to 10 mm), fiber tempered and relatively well fired. Based on its decoration, pottery was previously divided into two distinctive types: Linear stamped and the much more common Check stamped type, also seen on Nunivak Island (Griffin and Wilmeth 1964). Both types occurred simultaneously until around 1900 BP when Linear stamped pottery disappeared (Dumond 2000; Griffin 2002). Most of the early check stamp decorations appear on vase-like pottery with a narrowed rim (Figure 6.6 and 6.8a), although bowl shapes are also mentioned (e.g., on Nunivak Island) (Dumond 1969: 26). Early pottery was flat based with walls flaring out (Griffin and Wilmeth 1964). Somewhat later
cylindrical and barrel-shape pots predominated (Figures 6.6 and 6.7) (Dumond 1969; Frink and Harry 2008). As time progressed pottery tended to become thicker and coarser (Dumond 1969; Dumond 1984).

Later Ceramic Traditions

Thule Culture History
By 1000 BP the Norton tradition became subsumed by the Thule in the entirety of Alaska, and Norton pottery of the south-west was replaced by the relatively crude and thick pottery of the Western Thule tradition (Figure 6.8c and d) (Dumond 2000, Dumond 2005). The classic Thule culture is mainly known for its specialized maritime economy (especially bowhead whale hunting), and the rapid migration from Alaska to the eastern Canadian Arctic and Greenland around 1000 BP. Characteristic of Thule culture are semi-subterranean houses that were partly constructed by the use of whale skeletal elements (Crockford 2008). Whaling subsistence industries seem to have arrived in Alaska fully developed but it is unclear where this practice originated and evolved. Possible origin regions are the Aleutian Islands, where sea ice-edge exploitation was already practiced around 4700 BP (Crockford 2008), and the coastal areas of Chukotka (Mason 1998).

On St. Lawrence Island, the Punuk Islands and Nunivak Island archaeological finds indicate an early Thule-like presence at 1800 BP termed the Old Bering Sea culture (Dumond 1969). Crockford (2008: 114) has described Thule culture as “not adapted to a specific migratory resource (i.e. bowhead

6.6. Norton pottery of the Smelt Creek phase (#1025). (Photograph: M. Admiraal, courtesy of the University of Oregon Museum of Natural and Cultural History)

whales), but to a particularly mobile habitat (the southern edge of the seasonal sea ice). The economic focus of the Old Bering Sea culture was exclusively on marine resources such as walrus, seal and, to a lesser extent, whale (Mason 2009). The pottery of this culture was termed St. Lawrence Corrugated. Just like with Norton pottery, it is fiber tempered. However, it is thicker and cruder, similar to Thule-style pottery. Pots are generally cylindrical with rounded bases and thickness varying from 10 to 15 mm (Oswalt 1955). This pottery type is generally absent from the Alaskan mainland with the exception of a few isolated finds. On St. Lawrence Island an early shift occurred towards more coarsely tempered pottery termed St. Lawrence Plain. This pottery is generally viewed as part of Thule. Because this shift occurred much earlier on the Bering Sea islands than it did on the Alaskan mainland, it has been proposed that Thule influence originated in Northeast Asia and arrived in Alaska through the Bering Sea region (Oswalt 1955, Dumond 2006).

McGhee (1970) was the first to connect the development of Thule culture to climatic changes. Whereas the Neoglacial (4700–2500 BP) possibly created the conditions for the development of a sea ice-edge subsistence specialization in the south (Crockford 2008), the later Medieval Warm period (1100–800 BP) brought on warmer conditions. Sea ice retreated and open water conditions lasted longer, which attracted whales. Because of the warmer conditions the sea ice in the Bering Strait started to break up seasonally, allowing for whale migrations into the Chukchi Sea. As this process was shaping up, Thule culture, and the exploitation of whales developed (Stanford 1976; Crockford 2008). As the sea ice retreated further to the north, Thule people, specialized in the utilization of this sea ice-edge environment, moved along with the ice and eventually spread to the Canadian Arctic and Greenland. Crockford (2008) argues that this migration may not necessarily have taken place on land but, rather, over water and ice. The use of kayaks and dog sledges along the sea ice-edge may have facilitated the speedy migration.

The expansion of Thule into Southwest Alaska was different. Here, people of the maritime and riverine-focused Norton tradition were already present.

6.8. Profiles of pottery from the Alaska Peninsula, Brooks River: (Norton): (a) Smelt Creek; (b) Brooks River Weir and Falls phases; (Thule): (c) Brooks River Camp phase; (d) Pavik phase. (Reproduced from: Dumond (2005) figure 28, courtesy of Dr. Don Dumond)
The Thule influence in Southwest Alaska may well have included an influx of new people but there is no clear evidence of a substantial population replacement. Nevertheless, the shift from Norton to Thule culture is clearly defined in the archaeological record and evidently occurred quite rapidly (Dumond and Bland 2006; Dumond 2011). On the Alaska Peninsula continuity is evident, though some changes are notable as well. The Thule period, locally referred to as the Naknek period, was subdivided by Dumond (1981) into two phases: the Brooks River Camp phase and the Brooks River Bluffs phase. During the BR Camp phase, starting around 850 BP, the use of polished slate intensified and pottery gradually changed. At first, the temper changed from organic to gravel and only after that did the shape of the pots change (Figure 6.8c–d). Thule pottery was crude, tempered with pebbles or gravel and thick walled. In many aspects it seems inferior to the earlier Norton pottery. Why Norton pottery was replaced by Thule pottery remains unknown. Could this have had to do with changes in subsistence strategies and subsequent function? Jordan and Zvelebil (2009: 53) point out that fiber-tempered pottery is more susceptible to damage from direct heating than gravel-tempered pottery, and mention the possibility of the use of the former for stone boiling while the latter was better suited for direct heating. What change in subsistence and cooking practices could have led to such a change?

The Classic Thule of the Canadian Arctic took maritime subsistence practices to a new level with a greater emphasis on hunting migrating whales. In Southwest Alaska the focus on whaling did not vary much from the earlier times of the Norton period. It was not until 800–600 BP that large whaling villages started appearing along the coast. Additionally, at this time interior settlements also expanded (Whitridge 1999). Subsistence in the interior was mainly focused on salmon and caribou. Other additions to the diet were bird, beaver and bear, and seasonally, the Pacific coast was visited for the hunt of various marine mammals. Pottery was generally confined to the coastal areas (Dumond 1984).

Around the beginning of the Little Ice Age (AD 1300/650 BP) a large volcanic eruption covered the Alaska Peninsula in a thick layer of ash. This event possibly caused the abandonment of the region for a short period of time. From 480 BP, the Naknek region was reoccupied, marking the beginning of the Brooks River Bluffs phase. Pottery became less abundant and changes in form to a broader type with flat bottoms and thinner, more erect sides (Figure 6.8d) were seen. Various clues point to a close relation with Kodiak from this period onwards, among them the use of the Alutiiq language and the practice of incising beach cobbles, and eventually the adoption of pottery in Southwest Kodiak. People still relied on a combination of terrestrial and aquatic species, which was similar in the Yukon–Kuskokwim Delta. Ultimately caribou remained the most important subsistence resource. The animals provided meat, hides, sinew, fat, bone and antler for food, as well as
the production of tools (Whitridge 2001). Salmon fishing was important during late summer to early fall when large quantities of salmon migrated up the rivers. A new addition to the diet on the peninsula was beluga whale, as evidenced at the Leader Creek site (Dumond 2003). An isotope study of human hair from the Nunalleq site near the Kuskokwim River around 650/570 cal BP showed evidence of a mixed diet (Britton et al. 2013). Maritime resources were still important in the diet, but it was mixed with terrestrial meat and/or lower trophic level fish (e.g., salmon). Whitridge (2001) states that people in Southwest Alaska were “so reliant on fish, including large marine fishes and several species of salmon, that their economies bear little resemblance to those conventionally associated with Eskimo peoples” (p. 18).

Thule Pottery: Shape and Technology

Thule pottery, or “egaa” in Yup’ik language, is typically thick walled, coarse gravel or pebble tempered and poorly fired (Figure 6.9) (Stanford 1976, Dumond 1984). Various types of Thule pottery were defined by Oswalt (1955), including Seward striated, Yukon line-dot, Yukon lined in the north, and Hooper Bay Shell striated and Hooper Bay zigzagged further to the south. The distinction between these types is generally based on variations in decoration, technology (e.g., temper, thickness) and shape. The function and manufacture of pottery remains poorly understood, although some recent studies have focused on performance and manufacture (Frink and Harry 2008; Harry and Frink 2009; Harry et al. 2009). The role of pottery in wider food processing remains unclear. Thule pottery is substantially different from Norton. It is crude, thick walled and coarse, and at first sight seems poorly made. Pottery vessels usually have flat bottoms with straight to lightly flaring walls, and are generally small in size with diameters varying from 10 to 30 cm. This shape is poorly suited for general cooking methods because it is easily affected by thermal shock. Temper is usually sand or stream rolled pebbles sometimes as large as 10 mm in diameter. This leads to fragile vessels that crumble easily and fall apart in irregular breaks. However, the mineral temper
does make the pottery more resistant to direct heating. In order to make the
pottery waterproof, oil may have been mixed in with the clay, and vessels
could have been coated with oil before firing and afterwards at regular
intervals. There is also mention of the addition of bear’s blood to the clay
paste (De Laguna 1939; Murdoch 1892). Thule pottery seems poorly suited for
cooking, nevertheless it was used for it (Frink and Harry 2008).

Frink and Harry (2008) investigated methods of manufacture as well as the
use of Thule pottery by looking at archaeological data, ethnohistorical reports
and current indigenous knowledge. They found that Thule pottery was
primarily manufactured using “slab construction” where the walls of the pot
were built up vertically upon a slab of clay forming the base. This allowed the
pot to be constructed without the necessity of intervals for drying, as may be
necessary when walls are constructed by coiling. The Arctic environment was
a limiting factor for the possibilities and timing of pottery manufacture.
Circumstances were often too cold and damp to successfully dry and fire
pottery, which affected quality (Frink and Harry 2008).

Ethnographic sources tell us that parboiling through direct heating, rather
than stone boiling, was the preferred cooking technique in late prehistoric
times. Sources indicate that fully cooked meat lacks flavor, leading to a
preference for meat that was only partially cooked. As the meat only needed
to be parboiled for a moment, it could be cooked successively in one con-
tainer, making large cooking containers unnecessary. This method of cooking
preserved nutrients, such as vitamin C, which is of major importance in the
diet of Arctic people. It also limited fuel use and cooking time (Frink and
Harry 2008). Harry and Frink (2009) stress that just because food was con-
sumed raw that does not mean that Thule food preparation was not culinary
sophisticated. On the contrary, the method of storing food by fermentation,
freezing or defrosting and subsequent defrosting and preparation, plays a signifi-
cant role in the taste and texture of a meal and therefore determines its quality
(Starks 2007). As stated by Harry and Frink (2009: 335), there is a “biological
and cultural desire for a diversity of tastes and textures” which possibly led to
the use of ceramic pots in cooking and storing practices.

Recently, Solazzo and Erhardt (2007) as well as Farrell et al. (2014) specified
that Thule pottery at specific sites was used exclusively for marine foodstuffs.
However, this occurred in the context of a wider subsistence pattern where
marine resources were not exclusive, as was evidenced by Britton et al. (2013).
Could it be that Thule pottery was exclusively used for the processing of
marine resources while other foodstuffs were processed differently? Anderson
et al. (2017) showed that this was not the case at the Cape Krusenstern site
complex. Organic residue and compound specific isotope results from both
Norton and Thule pottery showed that freshwater aquatic species were the
dominant resources processed in the pottery at this site.
The Koniag of Kodiak Island

The Thule tradition had a significant impact on the technologies used by populations in Southwest Alaska. On Kodiak Island, however, pottery was not adopted until around 500 BP (Clark 1966a; Clark 1998; Dumond 2000; Dixon 2014), despite the fact that the island’s inhabitants probably knew of the technology through contact with people outside of the archipelago. The earliest archaeological evidence of an established human presence on the Kodiak Archipelago dates to approximately 7000 BP and is termed the Ocean Bay I and II cultures, succeeded by the early and late Kachemak. Both cultures had a strong reliance on marine resources (Clark 1998) and the Ocean Bay I people are thought to have been the origin of later cultures in the Aleutian Islands (Dumond 1977). Thule influence reached Kodiak around 1000 to 800 BP and things changed. Drastic stylistic as well as technological changes marked the dawn of the Koniag tradition. The transition from Kachemak to Koniag and the origin of the changes that accompanied that transition remains the subject of discussion (Dumond and Scott 1991; Knecht 1995; Fitzhugh 1996; Clark 1998; Steffian and Saltonstall 2009). Was the rise of Koniag culture the result of an in-situ development on the island or was it the result of contact with (or even a migration of) people living on the nearby Alaska Peninsula? Similarities between the two regions are striking. Changes include the use of large, multiple room houses, the use of sweat baths, petroglyph art, possible mummiﬁcation and a sudden abandonment of bone needles (Clark 1998). One of the most striking changes was the adoption of pottery in the southwestern part of Kodiak Island.

The rich environmental setting of Kodiak Island led to an almost exclusively maritime focus of the island’s inhabitants. To the east lies the East Aleutian Trench, dropping down 6 km. Due to upwelling, currents bring minerals and nutrients to the surface. The area forms one of the world’s most productive ecosystems. Marine mammals such as whales, seals, sea lions, porpoise and sea otters are abundant, as are various species of ﬁsh (Knecht 1995). To the people of the Koniag tradition, salmon ﬁshing was of great importance. During the period of late spring to late summer, salmon migrates up the streams and rivers of the Kodiak Archipelago to spawn. Here they were harvested by the Koniag using ﬁshing weir technologies and spears (Steffian and Saltonstall 2009). Summer ﬁshing camps were located upstream in the many rivers, but also near river mouths where the salmon could easily be intercepted.

Large and more permanent villages were located along the coast where subsistence was focused not just on fishing but also on the hunt of marine mammals. Shellﬁsh was also an important resource as evidenced by numerous midden deposits and even the transport of clams from the coast to upstream ﬁshing camps (Clark 1998). The Koniag also practiced whaling. They used long and slender ground slate dart tips that were very different from the Eskimo harpoons used to hunt whales further to the northwest. Ethnographic
reports mention that the dart tips were dipped in a poisonous substance derived from a mix of monkshood and human fat rendered from prominent deceased whalers. The dart would poison the whale after which it would wash up on shore within a few days (Lisianski 1814 in Lantis 1938: 452). Whaling was a specialized practice in Southwest Alaska and whalers had a special status. During the whaling season they were often separated from the village and lived in caves. While maritime resources were of superior importance to the Koniag, there is also evidence of the use of the terrestrial resources of the island such as foxes, brown bear, roots and berries (Clark 1998).

Pottery is only found in the southwest of the archipelago and the technology was apparently not employed in the north (Fitzhugh 1996). Clark (1998) argues that this may have to do with the migration routes of sea mammals and salmon runs, and thus emphasizes the importance of pottery in a maritime-focused subsistence economy. However, maritime subsistence economies were present all over the island and date to all times, and so the hunt for marine mammals could not have been the only reason for the limited distribution of pottery on the island. Saltonstall (personal communication, 2016) suggests that the limited occurrence of pottery may be connected to differences between the north and south Alutiiq dialect. Dumond and Scott (1991) touch upon the possibility of a migration of people from the Ugashik River area on the Alaska Peninsula towards Southwest Kodiak, where they might have introduced ceramic vessel technology.

Various historical ethnographic sources mention the use of clay vessels by the inhabitants of Kodiak (Lisianski 1814; Zolotarev 1938; Hrdlička 1944; Heizer 1949) or the knowledge of use in the past (Holmberg 1856). Some interesting remarks are noted regarding the preparation and consumption of food, such as that some things are eaten raw but “other food is cooked in earthen pots,” similar to the Aleutian Islands (Lisianski, 1814: 74). The account of Khvostof and Davydov (1810–1812: 104, cited in Heizer 1949: 48) in which they describe the rendering of marine mammal fat to oil is in line with archaeological theories: “from clay they make saucers in which they melt whale fat”. Lamps were used to burn sea mammal oil for light, not for cooking, which was done on fires fueled with wood (Fitzhugh 1996). Heizer (1949) described Kodiak pottery as “an excellent technological product,” while at first sight one might judge it to be “crude and technologically poor” (p. 49). It is made using the paddle and anvil technique, well fired with a hard surface and coarsely tempered using crushed slate, granite or pebbles sometimes as large as 15 mm; organic temper is absent. The shape of vessels varies but pots are generally large. De Laguna (1939) mentions a cylindrical shape with a pronounced shoulder and Clark (1966b: 160) describes a vessel shape with a “flat-bottomed inverted conical lower half and cylindrical, sometimes slightly concave or tapered, upper wall” (Figure 6.10). Both flat and rounded bottoms are described in the literature.
THE “EXTINCTION” OF THE CERAMIC CONTAINER TRADITION

The arrival of Russians and Europeans lead to the end of pottery use in the Arctic. Eventually rival container technologies such as metal pots replaced all functional pottery in Alaska. This process differed between regions. In the Canadian Arctic, the Classic Thule culture had already abandoned the use of pottery by approximately 1000 BP and instead started using soapstone bowls. The absence of clay due to the geological location of the Canadian Shield must have been an important factor, just like the increased mobility during the widespread Thule migration towards the east. Over time, soapstone bowl technology was brought back west, to Alaska, and has a relatively late occurrence north of the Kotzebue Sound (Morrison 1991). This led to the decline of pottery use in the north, but for a while the two technologies coexisted. During the contact period the metal pot was introduced to the people of Alaska. These vessels were more durable and less fragile. Only a few groups maintained the use of ceramic pots and only for ceremonial practices (Arnold and Stimmell 1983). The use of ceramic oil lamps persisted in Southwest Alaska until well into the twentieth century. However, pottery use declined sharply from the late eighteenth century on and was generally abandoned in the entire region by the mid-nineteenth century (Frink 2009).

CONTAINER EVOLUTION: INVESTIGATING PATTERNS IN TIME AND SPACE

The current state of knowledge discussed here has provided a general framework for the investigation of the evolution of container technologies in Southwest Alaska and enables the proposition of patterns throughout time and space. What drove the processes that lead to these patterns? The oldest vessels in Southwest Alaska are the stone bowls from the Aleutian Islands (8000 BP). These vessels are not well studied and their function remains unclear. The bowls may have been used for cooking or for the rendering of marine mammal fats into oil for burning in stone lamps. Stone bowls were mainly...
in use during the Margaret Bay phase and were abandoned after 2000 BP. Griddle stones become more numerous in the archaeological record from 6000 BP onwards and may have been the rival technology that eventually replaced stone bowl technology. Despite their apparent knowledge of the technology (Johnson 2004), conventional pottery was never used by the Unangan people of the Aleutian Islands.

Pottery first appeared in Alaska near the Bering Strait with the maritime focused Norton (Choris) tradition around 3000 BP. By 2500 BP pottery was used in most of the coastal areas of mainland Alaska. Very little is known about the function of Norton pottery because research has mainly focused on shape, technology and decoration. Thule pottery, on the other hand, has received more attention. Whereas Norton was thin walled, fiber tempered and well fired, Thule was the opposite, thick, coarsely tempered and poorly fired. Why the well-made Norton pottery was replaced by the fragile and coarser Thule pottery is a question that has puzzled researchers for decades. The reasons are still poorly understood, although they are likely wrapped up in a larger process of cultural change brought on by the onset of Thule around 1000 BP. Frink and Harry (2008) argue that both time management and the environment were important factors that determined the quality of Thule pottery. However, Norton pottery was manufactured and used under very similar circumstances. Therefore, this cannot solely explain the low quality of Thule pottery. A functional difference may offer a better explanation for the differences between Norton and Thule pottery. It is possible that these pottery types were used for two different kinds of cooking, i.e., Norton may have been more suitable to stone boiling while Thule pottery, with its porous qualities, was better suited for direct heating.

The adoption of pottery by the Koniag tradition of Kodiak Island testifies to the far-reaching influence of the Thule tradition. The presence of certain artifacts, e.g., incised pebbles, on both Kodiak and the Alaska Peninsula, strongly suggest the possibility of contact between the two regions. This may have led to the adoption of pottery in the southern part of Kodiak. However, the incised pebbles seem to have been a Kodiak phenomenon that was adopted by people living on the Alaska Peninsula. Most pottery-bearing sites on Kodiak Island lack large quantities of incised pebbles with only a few per site, while sites lacking pottery on Northwest Kodiak yielded hundreds. Another interesting pattern is the lack of spruce root baskets on sites with pottery and vice versa. However, sites containing spruce root baskets are very limited and so this pattern may be coincidental (Patrick Saltonstall, personal communication, 2016). Clark (1998) suggests a possible connection between the limited occurrence of pottery on Kodiak Island and migration routes of marine mammals. This indicates a difference in subsistence, which led to the adoption of pottery in one place and not in another. However, subsistence strategies throughout the island appear to have been uniform and so it seems
that it was mainly the material culture of the Koniag tradition that was not uniform. The implications of these differences remain unclear.

Nonetheless, salmon fishing and the hunt for marine mammals were the most important subsistence strategies for all the pottery bearing traditions of Southwest Alaska. Sites of the Norton, Thule and Koniag traditions are confined to coastal areas and rarely found in the interior. This brings us back to one of the initial questions proposed in this chapter: What is the connection between the occurrence of durable container technologies such as pottery and stone bowls and a subsistence strategy specialized on maritime resources? A few studies using organic residue analysis have shown that pottery in Alaska was exclusively used to process aquatic resources (Solazzo and Erhardt 2007; Farrell et al. 2014a; Anderson et al. 2017). Only Anderson et al. (2017) employed the use of compound specific isotopes to further differentiate the results and showed the processing of freshwater organisms in pottery. Other evidence has indicated that the diet was not exclusively aquatic but mixed with terrestrial resources such as caribou and riverine resources such as salmon (Britton et al. 2013). This indicates a very specific role for pottery in the wider context of resource processing. The implications of this connection between maritime subsistence economies and the adoption of pottery remains largely unclear but can now be tested through the wider employment of bioarchaeological techniques such as organic residue analysis.

UNDERSTANDING FUNCTION: AREAS FOR FUTURE RESEARCH

Identifying the precise function of container technologies in these marine-oriented traditions is vital to answering key questions concerning the origin and evolution of vessels in Southwest Alaska, the Subarctic and beyond. In this chapter, some questions have been addressed and some have been raised. The main questions raised are 1) What was the function of durable container technologies in Southwest Alaska? 2) What made these vessels so important that people were willing to invest in them so extensively? And finally, 3) What is the nature of the proposed relationship between the adoption of pottery and the increased reliance on marine resources?

Future research is an absolute necessity for the understanding of function, patterns and the wider evolution of the various container technologies over time and space. As early as 1940, De Laguna (1940: 53) stressed the importance of understanding vessel function and shape in order to study the origin and development of Arctic and Subarctic container technologies. In general, the function of all the vessel types discussed in this chapter remains largely unclear. Previous research mainly focused on shape, technology and decoration. This is a major research gap. Of all vessel types, Thule pottery is best understood, a result of various recent studies (e.g., experimental, bioarchaeological,
ethnographic) that yielded interesting results about manufacture, performance and function (Solazzo and Erhardt 2007; Solazzo et al. 2008; Harry et al. 2009; Harry and Frink 2009; Farrell et al. 2014; Anderson et al. 2017). With these studies, and the advance of new research technologies, the first steps have been taken into a research direction that may prove to be very fruitful for filling in the gaps in contemporary knowledge of container technology function and evolution in Southwest Alaska and beyond. Filling in these gaps will lead to answers to specific questions raised in this chapter, such as: Did griddle stones functionally replace stone bowls? Why was Norton pottery replaced by Thule pottery? And why did pottery only occur in the southwestern part of Kodiak Island? It may also lead to a wider understanding of the larger process of the adoption of pottery in the research area. What were the driving forces for the initial adoption of pottery in Southwest Alaska? Did other durable container technologies such as stone bowls play a role in this process?

Many vessels in the study area have food residues left on their interiors. With the use of bioarchaeological techniques, and by analyzing lipids, isotopes and even proteins, the origin of these residues may be determined. Small scale studies using such techniques were undertaken by Farrell et al. (2014), Solazzo and Erhardt (2007), Solazzo et al. (2008), Jeanotte et al. (2012) and Anderson et al. (2017), and yielded very promising results. A systematic study of residues is the next step in researching the evolution of vessel function in this region. Container technologies played an important role in the everyday lives of prehistoric people in Southwest Alaska, otherwise they would not have invested in them so extensively. In the extreme environment of Subarctic Alaska decision-making processes are of great importance. Well-thought-out strategies are necessary for successfully getting through periods of scarcity during the long and cold winter months. Learning more about the role of container technologies and how they fit into the wider process of converting resources into food and fuel will help us better understand the choices and strategies deployed by maritime-oriented prehistoric peoples living in Southwest Alaska, but also in other extreme environments across the circumpolar North.

ACKNOWLEDGMENTS

Our gratitude goes out to Don Dumond and Patrick Saltonstall for their useful comments and input while reviewing this chapter. We would like to thank Frits Steenhuisen for his help with Figure 6.1. This contribution was made possible by the University of Groningen, Faculty of Arts by funding Admiraal’s PhD research project. And last but certainly not least, we would like to thank the editors for their devotion to assembling this book and for reviewing our chapter with great care. Any final errors or omissions are our own.
NOTE

1.All dates are uncalibrated radiocarbon years before present unless indicated otherwise.

REFERENCES


